# The Rise and Stall of the Piston Engine

Kenneth M. Price, Jr

*To my Dad who refused to be impressed by big engines and flashy trucks. To my Mom who let me get a motorcycle. To my friends who drove cars in traffic, raced them on weekends and took them apart. To all those who have worked on one of these cotton-pickin contraptions known as a piston engine at least once, this is our earthly bond.*

Kenneth M. Price, Jr

**Book I.**

The Rise and Stall of the Piston Engine



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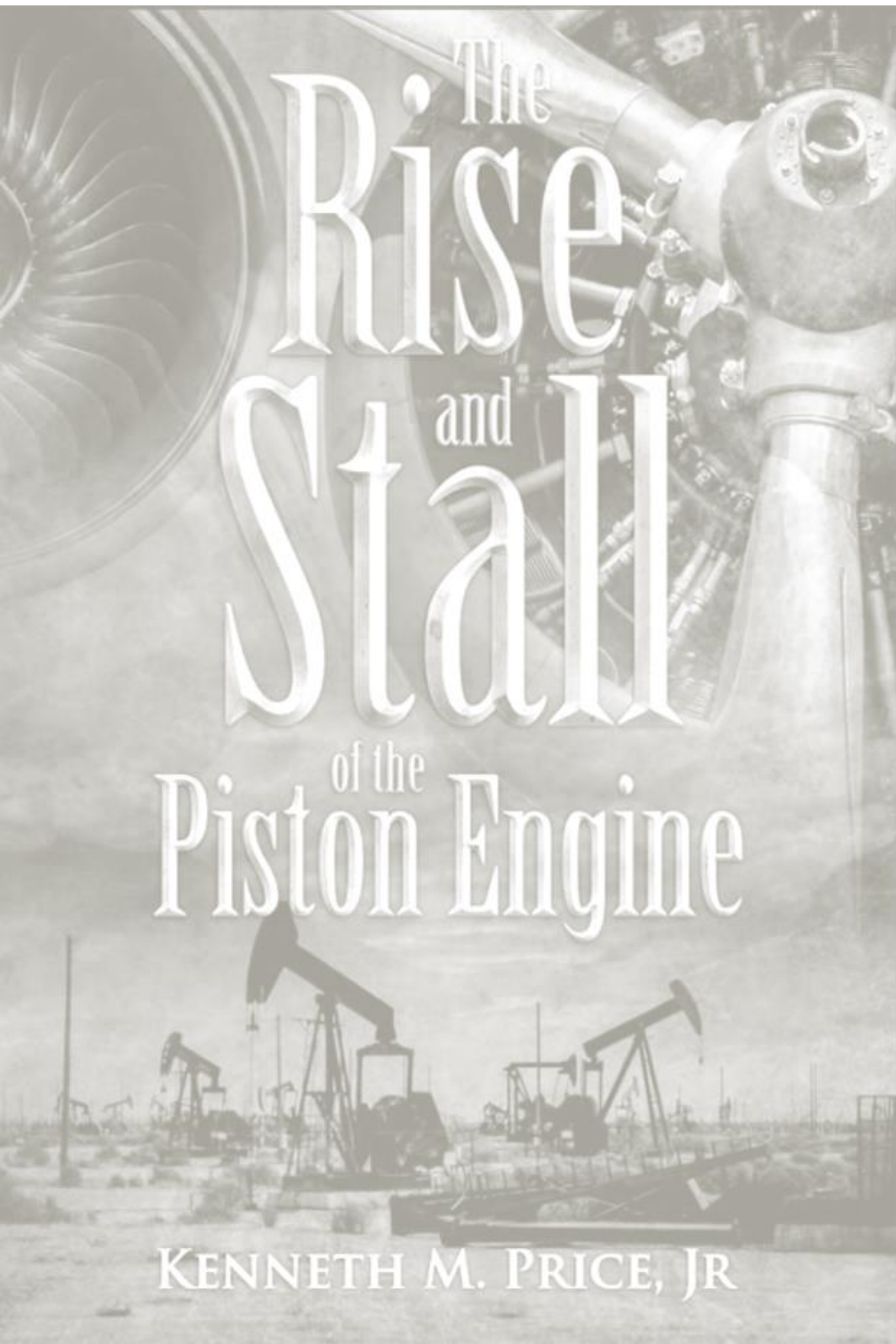
*Note to readers:*

*As I am not a part of any auto/oil-related industry, employer or any scientifically dogmatic organization, perhaps I am a reasonable candidate to describe our current transportation situation accurately. This is a story that needs to be told now, as millions upon millions of people are soon to be impacted by their purchase of a new and very expensive automobile.*

*This publication has been copyrighted but that does not mean that it cannot be revised. This material is currently published in free WEB format, and a small number of PRINTED copies such to remain in a flexible format that when finally completed will represent the true evolution and monopolization of the world's current "petro" empire.*

*I ask those who read it to please assist in the final version by contacting me with any corrections that need to be made. In the meantime, feel free to share it with those you care about in helping them get a glimpse of our stolen future.*

*Kenneth M. Price, Jr*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# The Writings of Kenneth M. Price, Jr.

Book I, ***The Rise and Stall of the Piston Engine***

*The Rise and Stall of the Piston Engine* documents the "evolution" of the gasoline piston engine and in the process exposes the design for what it is; a heavy iron mechanism that consumes excessive amounts of gasoline while wearing itself out from relentless friction. You will soon learn that our use of piston engines was never anything more than a means to create as much fuel demand as the oil-producing infrastructure could handle.

Before you ever turned a key in the ignition of a 19th Century car petroleum engineers had already developed a working model to both apply petroleum and insure the amount needed to make the system run would equate to thousands upon thousands of fuel consumed. The mechanical mechanisms that came to the forefront of powered transportation thusly had little to do with available technology. Their unexpected rise to the top of propulsion mechanisms was the result of carrying out a brilliantly-designed plot to create demand for gasoline, and nothing more.

Book II, ***Titanic and Hindenburg, Two Tragedies One Plan***

Book 2 explains the degree and extent of the actions that the big oil banking conglomerate took to get their plans fully accepted by the population. These plans included the development of psychological shifts in the human mind; such as to deliberately sink a brand new state-of-the-art ocean liner in order to make people believe sea travel was still not safe. Along the way when the Hindenburg comes into vogue, much more of this psychological nuancing of the public had to be developed. Read how the accepted demise of both travel icons are made up stories to fit the scripts. In the process learn that the Titanic, the Hindenburg, Charles Lindbergh and Amelia Earhart were all part of an oil-marketing plan that shifted sea travel to air.

# TABLE OF CONTENTS

# Bibliography

Welcome to the living revision of the rise and stall of piston powered mechanisms; the innumerable ones that pervade human existence on every major continent and land mass in the world.

As I have researched this book I have utilized the incomparable search functions of the internet to find and answer every question necessary to disclose the whole truth. As a result this current edition has been edited and restructured over 20 times and in the process virtually all of the statements have been fact-checked.

If you are reading this book from a computer, then you have the best library ever devised at your fingertips. I urge you to use the search platform of your choice to fact check everything stated in the book that you question. Please forgive me for the lack of footnotes. They are slow to add and ruin the process of explaining mechanical contraptions that would require millions of them.

# FOREWORD

As we enter the 21st Century the world needs an updated evaluation of its transportation mechanisms. And this is because of Earth's present highway dilemma.

For starters the current system is neither safe nor efficient. Secondly, for anyone commuting to work in a vehicle, it will shackle you with a relentless economic burden.

We have allowed ourselves to be lulled into believing that today's super-engineered piston engines are still at the forefront of modern transportation. Along the way we were seduced by the purr and power of the multi-cylinder staccato. And during the evolution of our present day transportation system we began accepting smog and air pollution as necessary evils, as if it was the price of modernization.

The price of modern mechanization is not planetary defilement. We had a non-polluting fuel that was endlessly abundant known as alcohol. Somehow we managed to give it a bad name and ban its use in favor of gasoline. Gasoline is toxic and could have been used as feed stock to produce alcohol. But Big Oil's sole purpose was to sell petroleum.

And even as early as the turn of the 20th Century we had mechanisms like steamships and trains that were cheaper to operate and maintain, and in many cases they were safer than the high-flying and high-speed highway system we have today. What happened to them? Big Oil wanted petroleum sales, not coal sales.

Today, our ecological survival depends upon us eliminating practices that are ruining our earth, plants and food supply, and for that we need free-thinking scientists, engineers and car enthusiasts who are ready to make a change. That's what this book is for.

Now the synopsis about how we've been duped by Big Oil may be too much for some. Some people with close ties to their automobiles and industries may get offended. Try to hang in there, as you're going to learn a lot on the next pages that is contrary to what you've been taught or currently believe. You will never feel the same about the coveted piston-engine-driven contraptions that we have today.

Our current transportation model should include the best prototypes that depict mechanisms we should have had in the first place. It does not. If we sit, Americans will be expected to maintain the same antique system we never should have built in the first place. And so it is crucial that we wake up fast to reverse the current trend to turn our lakes, rivers and seas into petrochemical genocide.

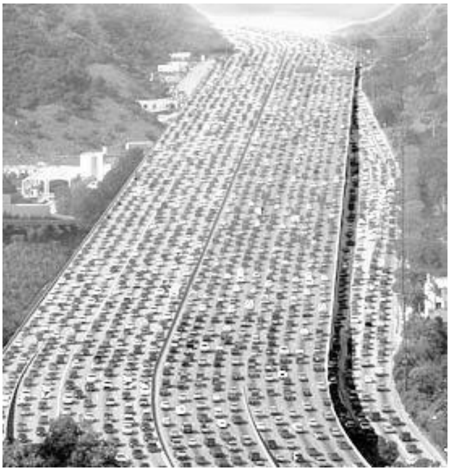
You can be sure that along the way we'll be entertained (distracted) with unnecessary technology, like self-steering cars. But they plan to leave us with the same piston engine designs that neither last longer, are cheaper to repair or get better fuel mileage. The time has come to question and to persist as we must keep Big Oil from rebuilding our transportation system from the same flawed principles.

This time we will build a system that fits the entire planet. Welcome aboard the "Renaissance" of technology and transportation mechanisms with zero pollution as the standard. The shackles are about to come off. All we need is a release of the patents that contain cold fusion, Tesla through-the-air energy and antigravity technology. And isn't is interesting that today Donald Trump's uncle holds in his possession all of the Tesla research!

# CHAPTER 1

## The Modern Highway System

LIKE MOST, I have sat back and brushed off the traffic jams and endless frustrations as best I could. I even served Big Oily for fourteen years. Then I traveled abroad and began learning my "education" all over again. I saw the destruction of pristine property in the island paradise of Fiji. It was there that I lost my appreciation for the highway and transportation mechanisms the oil-auto conglomerates have designed for us.



The picture was recently taken from the I 405 freeway in Los Angeles and represents a zenith of personal passenger car transportation. Yet, each vehicle is controlled by a separate driver, each of which must perform without error!

Take an honest look. The vehicles that we ride in today have morphed from durable Model T's that travelled over open dirt roads at 25 miles per hour into lightweight composite cars that travel at 75 miles per hour. And now we're flanked by trucks that weigh upwards of 100,000 lb. while we're riding in cars that weigh only 5,000 lb.

People riding in cars have to travel alongside trucks full of freight. The high-tech truth is passenger vehicles are defenseless against vehicles that are 20 times their weight. This means that today people travel on the highways with less protection than canned corn. *(airbags are not effective when your vehicle is flattened!)*

Our roadway system is not safe. But even worse is the fact that Big Oily has dealt the public inferior technology in the form of the petroleum powered piston engine. It is inferior to virtually all of the other engine designs that were invented long ago. As a result we are consuming way more of their product than we need to. This is a subtle way of over-charging us for our basic transportation needs, and it is embezzlement of the public good.

In addition, our toxic gasoline powered transportation system serves as a "soft" population controlling "sedative". This "sedative" not only soaks up our wallets and our time, but our ambitions as well. These are the reasons why our primary mode of power, the petroleum powered piston engine, has remained the choice of virtually every major auto maker on the planet for over 100 years.

When we look back at earlier-designed propulsion mechanisms we can see this was a most improbable development of our known technology. When the diesel and turbine came into existence at the turn of the century, both were so much more efficient, gasoline and gasoline engines should have been dropped as a potential engine design.

Today Big Oily continues to tout petroleum as the only potential fuel that is both powerful and abundant. We have to stop listening to them. Non-toxic alcohol based fuels have been tried and found to outperformed gasoline, but they don't want us to know that.

This brings up a very important question: Why have our transportation mechanisms continued to run on a toxic, smog-producing fuel when we have non-toxic fuels waiting in limbo? Furthermore, why does our standard mode of travel still require us to carry gallons of volatile fuel that burns us when we crash and pollutes our land as we drive?

I understand and appreciate the freedom of a personal vehicle, but the fact is over 100 years ago we had a better system running in our cities and downtowns, and none of the vehicles were carrying volatile fuel. In fact, they weren't carrying any fuel at all.

I don't mean to complain but merely point out these discrepancies in our supposedly more modern system. And our vehicles have become significantly more expensive to own and operate. As a standard excuse we're told it's because of the added pollution control "clean-technology"; such as the catalytic exhaust systems which have been standard since 1975. Unfortunately, we still have polluted air. If you don't believe me, do a search for the top ten polluted cities in the United States. Fresno, California sits at No. 1. Reason? It sits in the I-5 Corridor.

If we pay more for our vehicles so that they run cleaner, but the system continues to pollute the environment regardless, we're not getting more for our money; we're getting screwed. The fact is we've let ourselves be entertained by amusement-park-level-mechanisms, and in the process forgotten all of the better ways that were invented and used in the past.

## The Making Of A Monopoly

The way history is currently written, there was a particular wealthy family in America who began what we now know as Big Oily. What history doesn't tell us is that what would eventually become the goal of this wealthy/elitiist family was a part of a worldwide plan; and it was one that was laid down before the distribution and sales of petroleum even began.

**Rockefeller Era Milestones:**

In 1842 dinosaurs were "discovered". Before this, they did not exist.
In 1859 oil was "discovered" at Drake's Well, PA.
In 1886 the first gas powered automobile was patented.
In 1892 at the Geneva Convention J.D. Rockefeller paid scientists to call oil a "fossil fuel".

Look at these dates. In just a span of 50 years, we went from discovering dinosaurs to knowing that all the petroleum on earth came from them!

And how amazing it was that just 17 years after Sir Richard Owens dinosaur "discovery" we managed to drill and strike oil that had beforehand been sitting in the ground for 100's of millions of years!

And how doubly amazing it was that just 27 years after that we invented a combustion engine that required this exact earthly concoction of fuel now referred to as gasoline?

It was we, living off 8,000 years of history from our ancestors who were able to pull off in just 50 years the discovery, development and manufacture of reliable power. It took 8,000 years to find dinosaurs, but only ¼ of 1% of our entire history to build this stinky black liquid into the world's energy staple. This has got to be the greatest story of all time!

From that chart it appears that things really got into high gear in 1859 when they discovered oil. It's as if before that time, the world barely knew how to use fire, much less find a liquid form of fuel for it. That wasn't the case. As you'll soon learn, we had lots of things to burn. It was because of a plan to develop in the direction of petroleum that the world went in the direction of petroleum. That is what I want you to understand.

There never really was competition as we've been led to believe; just players on the inside who knew what to do. Even Drake himself was squeezed out of the action. They obtained signed contracts with each new source that came along. As time went on, the consolidation of these into a few larger ones were even supported by major news. The public remained unsuspecting and mostly uninformed that a monopoly was developing.

Then came the Standard Oil Antitrust Case of 1911 to supposedly save us from monopolization and guarantee competition and a free market in the future. This resulted in the mighty Standard Oil having to break itself up into 34 different companies.

Later, our towns, cities and states would be lured into supporting an industry that was merely split apart physically but would remain a monopoly in spirit. In other words, nothing would really change; the world would still need oil and the price of it would still be controlled.

Perhaps I am being too harsh and this didn't happen? Maybe the public was alert enough to make sure the industry really split apart and stop it from regrouping or ever forming anything that looked like a monopoly again. Maybe Big Oily really was under close scrutiny by the government as they claimed?

Well, if the public was alert and Big Oily was under close scrutiny by the government then explain why between 1999 and 2002 the mergers of Exxon/Mobil, BP/Amoco/Arco, Chevron/Texaco, Conoco/Phillips and others took place as if there never was such a thing as the Standard Oil Antitrust Case of 1911?

Today if you follow mainstream news you will get the impression that the transgressions of the oil industry to monopolize and over-charge citizens of the United States in the past have all been forgiven and forgotten. Never mind the fact we are dealing with a corporatized industry that has demonstrated for 120 years that it has zero regard for our environment.

The sad fact is most of us have become so conditioned to the toxic nature of the industry via the flippant attitudes of Big Media that we've come to accept things like bronchitis, asthma, cancers and chronic fatigue as normal human symptoms. As a result we continue to avoid the connection between toxic petroleum-driven vehicles and our health, and in the process allow ourselves to accept toxic air and water as if it is the necessary cost of motorized transportation in the modern age.

Now is the time to realize that our current transportation system; considering the fuel inefficiencies, extreme cost of operation, pollution, smog, and the fact it is not safe is in actuality a system only a psychotic-minded person would have designed.

## The Making Of The Automobile

And now we are ready to go back to 1886 when the currently accepted "world's first car", the Mercedes "Motorwagen", appeared. Never mind the noise and lackluster performance; the main issue was that it ran on gasoline.

As you will see in the following chapters, gasoline would normally have been the last choice for a viable fuel. But because of its extreme abundance, due in part that every barrel of crude is mostly of this boiling range, from this point forward the vast majority of engines were designed to burn this fuel.

This was in actuality a very odd development, considering that just seven years later, in August of 1893 Rudolph Diesel, would complete the design and construction of an engine that ran on heavier fuel oil which we now refer to as diesel fuel. Most noteworthy was the fact that it ran at twice the compression ratio, whereas gasoline cannot. And thus this engine was much more fuel efficient.

Why this engine design wasn't immediately seized upon as the preferred power choice is more than a red flag at this juncture of development. Big Oily already knew that it the diesel engine was to become the preferred engine, it would result in approximately 50% lower volumes of fuel sales. This is why Rudolf Diesel went missing from his cabin on the evening of September 29, 1913 after boarding the GER steamer SS Dresden in Antwerp, where he was headed for the Consolidated Diesel Manufacturing company in London, and was never seen again.

And there is another reason that early manufacturers of automobiles got on the bandwagon for gasoline; the fact there was a glut of it from the manufacture of lubricants and boiler fuels, which left separated out. Boiler fuels needed to be safer to handle and were thus a heavier viscosity grade. Gasoline was unusable as boiler fuel as it was extremely volatile.

Working in lockstep with plans by Big Oily the manufactures from 1886 onward specified the use of gasoline. And thus all of the engines the auto makers built were designed for the purpose of creating a demand for gasoline.

Without the public knowing what really happened a colossal giant known today as the petroleum/auto industry sprang into existence. Now to understand it you have to understand that every piston engine has been built to consume petroleum and build this empire. You didn't know this because thanks to collusion with the auto industry, the movie and television industry and the news media the cars they produced fulfilled the images they had cleverly seeded in our minds.

As it was, the purchase of a flashy car by a man became a way to fulfill a dream of love and marriage with a woman, and so forth. The truth of the matter is no gasoline piston engine car was ever built to provide happiness and safety for the owner. You are now beginning to understand the selling job that was done in concert with the building of our current asphalt based nightmare.

Those who have been around know all too well that a flashy car does not lead to the fulfillment of dreams; ambition does. We learned the hard way that we were being sold on a transportation system that would always fail to deliver increased safety and economy.

Most would agree that we should at the very least have a preponderance of diesel powered vehicles on the road today for the simple reason the diesel is a more efficient and safer engine than a gasoline engine. The diesel engine's higher compression ratio combined with the engine's ability to run lean without detonation enables it to produce nearly double the fuel mileage of a gasoline engine. And diesel fuel doesn't explode in a crash like gasoline!

But just scrutinize the designs of typical transportation vehicles in virtually every country in the world today, and one common denominator will be the use of a piston engine powered by petroleum, and will most always specify gasoline. Ask yourself why virtually every manufacturer continues to rely upon this archaically designed engine and fuel from 1886.

## The Selection Of Gasoline

You may at first think the subject of gasoline is mundane, but

I can assure you it at least has some very mundane twists in the story. The first thing you need to understand about it is the fact that its composition is made up of such a wide variation of hydrocarbon lengths and types. A molecules length and size effects its boiling temperature. Consequently, gasoline, which contains hydrocarbons that boil within a range of $100^0$F to $400^0$F, contains both light and heavy molecules.

Gasoline is loosely classified as being of a heavier density than naphtha (aviation fuel) and of a lighter density than kerosene (diesel and jet fuel). But what this really means is: gasoline is unsuitable for high octane aircraft engines and standard diesel engines.

If gasoline is used in an aircraft engine, because the octane level is so low, it will detonate. This type of explosion will soon damage the pistons. If gasoline is used in a diesel engine, pre-detonation will damage valves and glow plugs, while its too-low viscosity will also damage the fuel pump and injectors.

What is it about the gasoline engine that allows them to run on this very temperamental fuel? The answer is; they have a lower compression ratio. Here's the big paradox: since the gasoline engine has a low compression ratio, it will be less efficient and thus is will be less fuel efficient than a higher compression engine.

Now, here's where the gasoline story takes that mundane twist: Would you believe that the gasoline powered piston engine has the dubious distinction of producing more poisonous carbon-monoxide than every other engine that was ever considered for automotive use?

These two characteristics of the gasoline fueled piston engine; excessive fuel consumption and carbon-monoxide exhaust, made the choice of this engine the worst power system ever adapted to an automobile. It takes a long time for that to sink in.

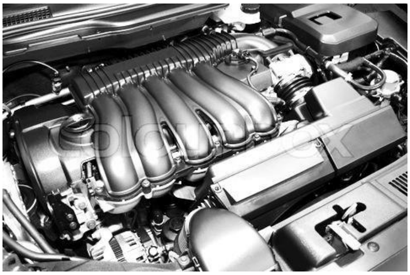
Today's gasoline engines continue to suffer from poor fuel mileage, as is evidenced by their MPG ratings posted on their sticker which reflect 1920;s numbers. And they still produce poisonous carbon monoxide gas, because they're still burning gasoline with low compression engines. This setup is standard equipment for 90% of our vehicles as I write.

This is some sad evolution, considering that our original transportation concept was powered by electricity produced outside of the city in a large power plant burning coal or fuel oil.

Today China is powering trains at 300 mph using this system. Here? The oil/auto industry got the petroleum-gobbling system they wanted.

## Today's Modern Automobile "Choices"

We may get to feast our eyes on a near-limitless array of car choices today but the sad fact is for the past 10 decades little attention has been paid to improving the system the vehicles travel on, such as to reduce traffic and travel delays. There never has been more than the slightest motivation to provide this.



All this plastic will start to crack in 5-10 years.

So let's play one of our future transportation dilemmas: Your car is wearing out, or at least you think it is and it's time to purchase another. So you go looking at vehicles of the type and size you need. And if it's a truck, all of the models will get about the same lousy mileage, and if it's a compact, all of the models will get about the same mileage too. And this is because it will be equipped with a piston engine? That's a done deal!

How many pistons will it have; 4, 6, 8, 10, or maybe even 12? What kind of fuel will it run on; gasoline or diesel? Will it be fuel injected, turbo-charged, super-charged, intercooled, in some combination and have dual exhaust pipes? They get us every time! They mesmerize us by the way they make piston engines look so modern and thus we fail to notice it's just the same engine camouflaged beneath shiny plastic covers with awe inspiring graphics like "Magnum", "Power Stroke", "Viper", "Cobra", etc.

These names are trotted out and repeated over and over.

Each tap into that nostalgic segment of the public they know they can count on any time to make a hit. But really, what is the same about a Cobra from 1966 and one from 2018? Answer: "the name". They call it a Cobra simply to capitalize on the subliminal programming they have already instilled in us.

Over and over again we fall for "new" car and truck models that invoke a new era the media has prepared us for. A new car will thus be advertised as always quieter, smoother, more economical, sportier, faster and attention getting than the last car we bought. But notice that they have never added longevity to the vehicle itself. One reason is because they keep installing piston engines in our vehicles.

Another reason is they keep making the bodies out of iron that will rust. Why can't they give us a new rust proof alloy? Where's the technology when motors that contain 100's of electronic circuits and accessories still use engines that have 100's of moving parts in friction?

Plus, there's the innumerable different engine designs, numbering in the 100's of thousands, making repair parts increasingly hard to find.

The newer the model; the more difficult it is to work on it yourself. Think about this situation; who could fix your engine the quickest and the easiest? Would it be someone who has worked on your same engine 1,000 times or someone who has worked on 1,000 different engines one time? Today, repairing them is a challenge for every mechanic no matter how skilled.

This is what our modern cars deliver:

1). A vehicle that will wear out in 100 to 250 thousand miles and be worth zilch.

2). Circuitry that is so complicated it cannot be fixed without the dealer, and maybe not fixed at all.

3). Components that are so crowded and difficult to repair that a $100.00 part like a starter or alternator will cost $500 to $1,000 to get replaced.

When you consider these three things you realize that automobiles have actually gotten worse, not better.

Engineers are supposed to make things as simple as possible, as easy to work on as possible and as safe as possible. Unfortunately, because certain components of a car are so complex, the failure of an engine or transmission forces us to dispose of the whole car, or face repairs that could reach upwards of $20,000. That's a financial disaster for most families. Thusly, most chose to trade them in on a newer model after about five years. I don't blame them, but that's just what they want us to do.

A whole car can become barely worth the cost of an engine in just five years and we must accept what Big Auto provides us in order to take part in the transportation system. What they have designed for us is a five to ten year "disposable" car. If you don't believe me just take a look at a Mercedes or BMW and note the plastic fuel injectors, plastic intake manifolds, plastic battery and air boxes, plastic grill, plastic bumpers, etc. I mean what a joke their names have become, and all the other manufacturers are in the same boat.

In actuality, 10 year life from an automobile, being that it is such a comprehensively manufactured item, is outrageously short-sided. Note that after 120 years of road testing, vehicles are lasting less and less long. Meantime, we are teaching the next generation to live "cool", and this means learning how to accept cheap materials like fake chrome grills, naugahyde seats and plastic dashboards as quality.

When was the last time we got a vehicle offered for sale to the public that would provide basic vehicle requirements in the simplest form and lowest price rather than offering more technology and at a higher cost? Why have our former vehicle designs, which were simple to repair and maintain been phased out? Why have engines that were known for lasting 300,000 miles been dropped from the lineup. Why do today's most "modernized" engines still use the same toxic fuel.

## It Ain't Because Of Stricter Emissions

Don't let them blame "smog emission laws" as a way to dodge the issue of frozen technology. The fact is it's been ages since we had any of our most basic transportation needs answered with simpler, less costly, less fuel consuming vehicles. Thusly when you buy a new automobile you will not only be buying into a toxic system but one that is way more complex than it needs to be and way too expensive.

Smog laws have been used to render our vehicles into ones that are nearly impossible to fix. Thusly any mechanical or electrical skills you possess are going to do nothing for you when your own vehicle shuts down, as they have been made with many intertwined circuits that employ specific computer chips. Such vehicles can unexpectedly malfunction in a thousand and one ways.

And be sure to keep your car out of the tropics, like Florida or Louisiana, and extreme sunshine, as in Las Vegas or Arizona. Mildew, mold, rats and insect breeding will take its toll as will the drying out and cracking of rubber, neoprene, naugahyde, epoxies and plastics.

If you're in a cold climate, keep your car in a garage that is heated so that it doesn't suffer gradual deterioration from the daily condensation of water vapor. Plastic car parts and circuits have been shown to fail the simple test of time against material hardening, rat-dropping corrosion, heat and cold cycles, insect deterioration and mold.

Don't kid yourself about modern vehicles. Just given time all cars built since 1994 will one day unexpectedly suffer an electronic malfunction that can render the vehicle unusable. This can and often does happen while it is sitting in storage in your garage.

And don't collect newer cars for a hobby. The car you buy today can never be restored as a classic car like the ones of the past and once their electronic circuitry has failed, it will not be possible to operate the car unless it is completely rewired. Adding further to this misguided plan is the fact that plastic moldings and bumpers become hardened, warped and impossible to fix. The only way to restore a new car is to buy new plastic parts.

This is why the price of basic highway transportation is so dear. In the process we become shackled to car payments, insurance renewals, license fees, tires, batteries, oil, anti-freeze, dealer service fees, smog fees and gasoline. When all is added up the costs today dwarf the costs of cars produced 75 years ago.

## Car Crash Standards And Car Accidents

Just in case you had been led to believe that today's higher priced automobiles are justified by the application of car crash standards I include this brief discussion about them.

Although it is somewhat true that federally-enacted car crash test standards have helped carmakers (or forced them) to produce vehicles today that have better crash protection in head on accidents, they have not improved our roads, traffic problems or highway system which has larger problems overall. Thus although they have helped reduce fatalities in crashes, they have still not made the system safe. This is brought home by the average of 34,000 automobile-related deaths that happen in the United States every year.

In addition nearly 1,000,000 people per year are injured on American highways. Considering that we are in the 21st Century such statistics are deplorable. This is for the simple reason that car crash standards only mitigate light to moderate accidents. The have no effect with regard to poor drivers, bad road conditions, exploding fuel tanks and large trucks collisions.

The way the current passenger highway system is designed, commuters in small motorized cars have to go side by side and front to rear with much larger rigs, as if there is no chance of an accident happening. The fact is that such accidents can and do happen, sometimes as a result of just one blown tire.

When a heavier vehicle comes up against lighter passenger cars, crush-in fronts and airbags are pretty much worthless. Worse yet, fuel tanks full of gasoline and vapors continue to explode and burn trapped occupants in severe crashes. This is why I will never concede that this system is safe enough for human beings to use on a regular basis.

In a way we have actually been made victims of car crash standards, as these laws have been used mainly to snuff out more innovative designs and inventions. Because modern crash tests cost 100's of millions of dollars per vehicle design this leaves Big Auto riding atop tests that are too expensive for rival companies to afford. Incidentally, this is the same way big drug companies ride above the smaller, more innovative companies that cannot afford all of the tests necessary to get their product approved by the FDA.

And now, today, with all the tests and standards required by the government the average new car design costs between two and eight billion dollars from beginning to end to bring to market. Does this wrecked SUV look like a six billion dollar design to you?

The implementation of car crash standards has no doubt helped to reduce car crash fatalities. However, many of the autos built in the past should never have been allowed on the roads without seatbelts, head cushions, collapsible bumpers and steering wheels, padded dashboards and shatter-proof glass in the first place. The laws that got passed in the public domain only helped us to mitigate the deficiencies the automakers had demonstrated during the prior 50 years.

We the human race were never so stupid and callous as to design a system that can put a 3,000 lb. family car packed with kids on a busy highway in front of a an 100,000 pound double trailer tractor rig going 70 mph down a grade at night during a rain storm. We didn't design this crazy system, the oil/auto industry did and the cold fact is we've been forced into using it. It is a system that endangers our lives every time we use it, and for that it soaks us financially.

# CHAPTER 2

## The 100 Mile Per Gallon Carburetor

*The day Big Oily had to make themselves perfectly clear.*

I REMEMBER FIRST HEARING the story of the 100 mile per gallon carburetor nearly 50 years ago when I had to buy gasoline for the first time. There I was pumping the smelly solvent at 22 cents per gallon and the gas station attendant told me the story of a carburetor that had been invented in the 1930's that got over 100 miles per gallon. He went on to say that the oil companies had purchased the patent, and added that he had heard that they bought lots of patents for fuel saving devices.

That gas station attendant has no idea what he sparked in the young man at the gas pump that day, and today I am thankful for his knowledge and the fact that he shared it with a young stranger like me.

Now before I present the picture and diagram of the Pogue 100 mile-per-gallon carburetor, let me begin with a factual example of how the auto-oil industrial conglomerate does not serve us. In this case it does not serve us because it does not even allow us access to free technology that would eliminate smog. What is this free technology? Water. How did the industry not serve us? The industry did not serve us because they deliberately denied the public gasoline formulas blended with water that worked better than gasoline without water. That's right. Gasoline formulas blended with water outperformed gasoline without water.

This is a fact. An engine's high combustion temperatures turn the water into steam, which lowers combustion temperatures overall. This in turn prevents detonation even though it promotes higher compression and produces more power from the engine. But the biggest benefit of all was the dramatic reduction of exhaust emissions.

You are likely surprised to learn that water-mixed fuels have been fully researched, documented, tested and applied to gasoline and diesel engines all over the world. And now we should all be saddened to learn the oil/auto industry still refuses to utilize water technology to this day. I hope that you understand clearly: this isn't some new technology, this is denied technology. For example, here's a quote from waaay back:

> *"The use of water mixed into gasoline and diesel fuel results in increased antiknock rating of low-octane motor fuels, reduced fuel consumption, reduced toxic components in exhaust gases and increased reliability and service life of the engine.* **Nicolaus Otto: 1895.**

Nicolaus Otto was one of the earliest inventors of the gasoline internal combustion engine. His "Otto" cycle research is still taught today in colleges to future engineers. But no mention is made of his emulsion research.

I was at the University of California, where in 1976 I took part in running and testing 350 cubic inch engines donated to the university by General Motors. Although there were three test engines in the shop, each one was set up to operate on just one fuel; gasoline. No mention of Otto's water emulsion research was made. Wow, some university!

Let's take a look at something more recent: Results from fuel/water combustion practices for trunk-engine ships that have been approved by Lloyd's Register since 1978:

**Improvements From Using Water-Emulsion Fuel Vs. Straight Fuel:**

1. *Reduction in temperature and combustion speed of the fuel and water mixture.*
2. *Accelerated transformation of harmful carbon monoxide into neutral carbon dioxide.*
3. *Reduced content of nitrogen oxides in exhaust gases.*
4. *Reduced chain reactions occurring during pre-flame-oxidation of hydrocarbons.*
5. *Increased volumetric efficiency.*
6. *Engine runs 200 $C^0$ cooler."*

Again, we must ask, why won't the industry use water in our fuels today? This is a serious question, since if the United States had been saving 20% of their fuel for the past 100 years the nation would not be in the deficit situation it is in right now. In addition, if water-in-fuel technology had been part of the transportation baseline from square one, our nation would have achieved further improvements in power systems and fuels via innumerable 20th Century advances in chemistry, science, electronics and micro-technology! And now, in order to understand the current situation it is crucial you understand that from the very beginning of the gasoline era the industry has not been playing fair. Today, the fact that the world at large is still using gasoline as their primary fuel, clearly shows that Big Oily has no heart.

The simple use of water mixed with fuel has to rank as one of the best fuel enhancements ever for the simple reason that water is both abundant and free. Its use would have saved fuel and eliminated smog. It offered a leap in fuel economy. Yet it has been deliberately shunned and kept from the public. They have denied the entire population a cheaper and cleaner burning fuel for over 125 years.

It was us regular folks who discovered petroleum-water emulsions, but it was just one group of men, wanting increased profits from gasoline sales that decided our fate. The actions of Big Oily reach way beyond greed, as now countless humans have suffered and continue to suffer from the toxic chemicals emitted as exhaust pollution. We are currently experiencing all-time highs in cancer rates.

What are the costs in money as a result of this technology denial? What would a savings of 20% in fuel consumption every year since 1887 have added up to in terms of cost? According to new estimates conducted by the Oil Depletion Analysis Center, the amount of oil consumed since 1870 amounts to 1.3 trillion barrels. If we take an estimate that 50% of this was used in combustion piston engines, this equates to 665 billion barrels. If we saved 20% of this it would amount to 130 billion barrels of saved crude oil. At $10 dollar per barrel, this would have saved the world roughly 130 x 1,000,000,000 x $10/bbl. = $1,300,000,000,000.

And what are the costs with regard to health issues? At one point in my career working for Big Oily I once listened to oil executives making jokes about the smog in downtown New York; never having a misgiving over the fact it was their company which was the cause of it. That's how I learned they could care less about our health issues. Too bad for the unsuspecting souls living or working in the downtown, as smog-producing automobiles crisscross between the tall buildings sending gas into the hallways day after day.

If there's one thing we have going in our favor it is the fact that the auto-oil conglomerates have now demonstrated clearly that they do not care about the people they serve, because they know the use of water-emulsion fuel would virtually eliminate smog, for free.

## Methane And Methanol

We now know we can extend our existing petroleum reserves by combining them with water molecules. But hang on, we're just getting started. From the very first self-propelled car we have had a better fuel to use than gasoline. That fuel is methanol and this version of alcohol does not have to come at the expense of organic food staples, as it is not normally made via fermentation.

It should come as no surprise to learn that methanol can be produced from methane gas, which is the largest component of natural gas. And notice that methane gas, $CH_4$, is just one oxygen atom short of its liquid cousin, methanol, $CH_3OH$. This extra oxygen needed to convert methane into methanol is not that hard to find, since the composition of the air is 20.9% oxygen!

So we could be making all the alcohol we want just from methane gas, which is a byproduct of everything organic that breaks down, plus oxygen, which is in the atmosphere. But meantime we're stuck with fossil fuel and it's a non-renewable energy, right!

In order to understand what a great fuel methanol is we just need to understand a few things about methane gas, because it is often confused with natural gas. Let me explain the difference: **Methane** is $CH_4$ and has four hydrogen atoms, single bonded, to one carbon atom. **Natural Gas** is a mixture of methane and ethene, $C_2H_4$, as well as other heavier gasses, such as ethane and propane.

Ethene, also known as ethylene, has a double bond between the two carbon atoms. Now, because of the presence of ethene in the overall mix of natural gas, it will not liquefy when compressed like butane or propane. In order to liquefy natural gas it has to be cooled to -260$^0$F and pressurized to 673 psi minimum. This is what makes it difficult to store.

But there are other ways to store natural gas, such as converting it into a new liquid such as methanol alcohol or ammonia. (note: ammonia must be stored in a pressurized tank at 125 psi.) Neither methanol nor ammonia need to be kept cold like liquefied natural gas, LNG. At any rate, I hope you can see that transporting liquefied natural gas around the world on railcars and ships at sea is a dangerous and costly endeavor.

## A Giant Dilemma For Big Oily

Methane, $CH_4$, being the lightest hydrocarbon gas, is the best burning gas; however it is not methane gas that the oil industry gooks are most worried about. What they are the most worried about is methanol alcohol. This is because methanol can so easily be made out of methane gas, and methane gas can be made from just about anything organic.

Now when any motorist runs gasoline and methanol side by side they will quickly note that there's really no comparison between them; one is toxic and stinks and the other is therapeutic and sweet smelling. This is why Henry Ford equipped his Model T's in 1908 with alcohol as the standard fuel, leaving gasoline as the optional fuel. But we're not supposed to remember that.

The fact is gasoline is at best a cheap boiler fuel that is dangerous to combust and releases tens of volatile compounds into the air. As such it should only be burned in electrical power plants that are far away from cities and people.

Gasoline stinks when it burns due to the fact that it contains so many toxic volatile elements. But worse yet, it vaporizes poorly because it contains all the petroleum liquids that boil between a range of $100^0$ F to $430^0$ F. Don't even get me started yet on how stupid these wide boiling parameters are!

Let's compare the boiling temperature specifications for gasoline and other common fuels:

| | |
|---|---|
| Aviation Fuel: | $220^0$-$338^0$ F |
| Gasoline: | $100^0$-$430^0$ F |
| Jet Fuel: | $302^0$-$554^0$ F |
| Diesel Fuel: | $325^0$-$675^0$ F |

Can you believe what you're seeing? Gasoline absorbs by far the lightest components in any of the fuels. These are petroleum fractions that boil at just $100^0$ F. Well guess what, these are the fractions that cause detonation in the combustion chamber of a four stroke piston engine when you try to run a compression ratio above 10 to 1!

Looking at the figures above, now you can understand why airplane engines can run a higher compression. It's due to the lack of light fractions. And also note that aviation fuel doesn't contain the higher boiling point fraction that gasoline does. These are the heavier molecules and they slow down the vaporization process and decrease fuel efficiency.

As you can see, gasoline is a lousy fuel, especially compared to methanol which smells good and doesn't pollute. But this is just the beginning of the oil industry's worries about the public catching on to the benefits of Methanol. Their biggest worry is the output yield when you convert one to the other!

First, let me explain some established chemical processes. One process can crack heavier grades of crude oil into lighter grades (Cracking) and the other chemical process can enlarge the molecules of the lighter grades to form heavier ones (Reforming). Many of these processes date back to the late 1800's-early 1900's.

The process the industry uses today to convert natural gas into Methanol dates from the 1920's. Steam reforming is just one part of it, but will give you the idea.

## Steam Reforming Methane Gas To Produce Methanol

The following was taken from an article in Marine Methanol, July 2016:

"Steam reforming is the dominant and traditional method where methane gas and steam is mixed at high temperature and pressure and with the help of catalysts form carbon monoxide and hydrogen (Equation 4). The gas mixture is typically led through pipes coated with catalysts in a tube in shell heat exchanger in order to provide the necessary heat (≈850 °C) for the reaction to take place.

Steam reforming

$2CH_4 + 2H_2O \rightleftharpoons 2CO + 6H_2 \quad \Delta H_{298K} = 49.1$ kcal/mol

Water gas shift

$CO + H_2O \rightleftharpoons CO_2 + H_2 \quad \Delta H_{298K} = -9.8$ kcal/mol

Carbon dioxide is typically added to the gas mixture before the methanol synthesis but can also be present in the natural gas used as feedstock.

**One step steam reforming used to be the dominating process, but is today mainly considered for smaller plants** up to 2500 MTPD where $CO_2$ is available at low cost or is present in the natural gas."

This process shows how methane gas can in fact be combined with water to produce 12 units of free hydrogen. The fact this process is hardly used is a deliberate cover-up of the technology as it destroys the fossil fuel ruse. I have absolutely no doubt they refuse to use steam reforming more because it does not only crack the hydrocarbons but cracks the water molecules as well. This would open up a whole new industry. Thusly, they make sure to avoid technologies that crack water and refuse to update their processes that were designed in the 1920's.

We've all been told a thousand times that whenever you crack water into hydrogen and oxygen, that you get less energy out than you put in. But one thing the scientists neglected to tell us is that water molecules become unstable at $930^0$F. So when we apply this knowledge along with higher pressures and certain metal catalysts, we find that the water molecules do break and bond readily with hydrocarbons. And what do you think we might be able to get out as a result?

Below, according to Open Source Ecology July 2016

> "The solution is to convert methane to the chemically very similar but liquid fuel methanol (CH4 and CH3OH, where one hydrogen is replaced by a hydroxyl group). If one could simply replace one hydrogen with a hydroxyl, there would be no need to produce syngas and run the risk of complete oxidation.
>
> The recent field of photo catalysis offers another pathway to liquid fuel from methane. Here, ultraviolet light breaks water into a hydrogen and hydroxyl free radical, which are highly reactive. When a hydroxyl radical reacts with a methane molecule, a hydrogen is displaced and methanol is produced.

What if there were chemical processes that not only produced methanol from methane gas but from hydrocarbon liquids as well? You know that there surely must be, as liquid hydrocarbons can be broken into smaller molecules with the cracker unit, which is a part of most refineries. Why not use the reformer and steam to crack hydrocarbon liquids directly into methanol?

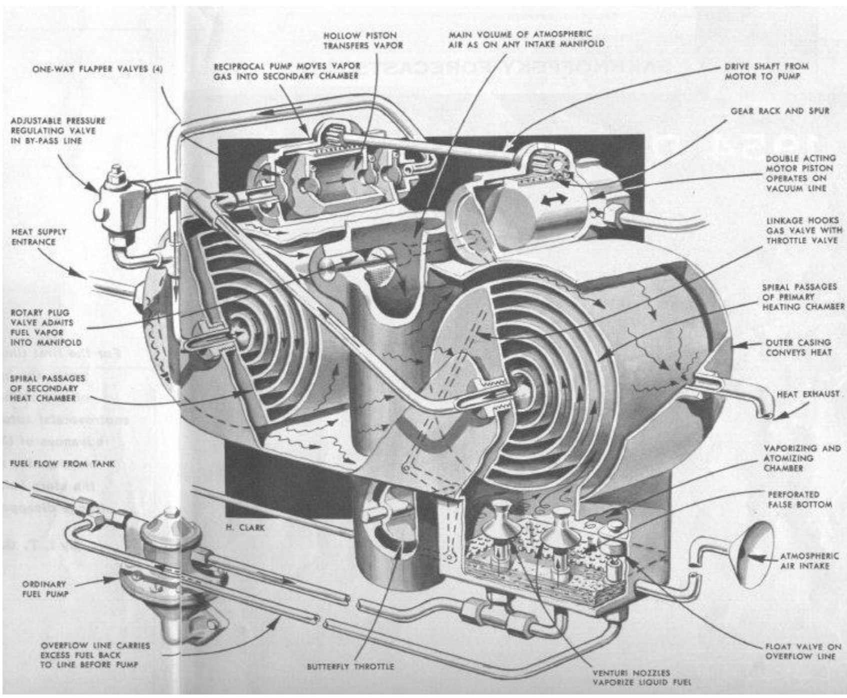
Now here's where the Big Oily becomes scared, real scared. The technology takes a quantum leap, because it proves they can convert gasoline into methanol anytime they want to.

We now know this thanks to the pioneering work of a brilliant engineer named Bruce McBurney. He confirmed that the process of gasoline + water + heat and pressure produces methanol. He found this out after 15 years of researching various 100+ mile-per-gallon carburetors. Actually it all started when he found drawings of them printed in a book he acquired out of curiosity.

In the course of his research he found that the "super" carburetor's function had actually converted the gasoline into methanol before it went into the engine and was combusted.

Shown below is probably the most famous "super carburetor" of all time. This is the patented design of Charles Pogue, and it made headlines in the newspapers when it produced over 100 mpg in a V-8 powered Ford in 1933. This Pogue carburetor even went into production and, for a short time, was sold to anyone who desired one.

Unfortunately for the world, Charles Pogue was soon strong-armed by oil executives from Esso, Texaco, Shell, etc. to cease the manufacture of such a fuel-saving device immediately. Big Oily execs told Pogue it would result in the entire oil industry collapsing and maybe much of the United States stock market with it. At least this is the best story we got.




The Pogue Carburetor; the most famous carburetor of all time.

I'm sure there were many other things said to Pogue at the time, such as "you can still have a good future, Mr. Pogue", "think what is best for you and your family", etc. Well you get the idea. Pogue took their advice. He ended up working the remainder of his life designing and selling oil filters in a semi-lucrative business.

Later Pogue carburetors saw service for the military in World War II tanks. These carburetors were labeled "POGUE CARBURETOR, DO NOT OPEN". After the War all Pogue carburetors were removed.

## The Implications Of Pogue's Invention And McBurney's Discovery

Now back to McBurney's research. There are many scientists and engineers who have studied fuel mileage patents and come up with similar high-mileage carburetors, but it was Bruce McBurney who figured out how the Pogue carburetor and others like it had actually produced four to five times the fuel mileage as before.

First he started with the boiling properties of gasoline. He knew the boiling points of its constituents varied from $100^0$ F to $430^0$ F and that this range was extreme. This is because no liquid burns until it first boils.

He found that the $100^0$ F fraction of the fuel was burned in the cylinder first. The rest of the fuel above $250^0$F did not even begin to burn until it had left the combustion chamber where most of it burned up in the tail pipe.

McBurney's research led to the understanding of the importance of proper fuel vaporization and that with gasoline you were never going to get good vaporization unless you somehow converted all of the molecules in the batch to smaller ones that were more uniform before you started the combustion process. He found that this is exactly what the Pogue carburetor was doing.

In these applications, hydrocarbons like C-6 or up to a C-12 were broken apart into Methane, $CH_4$ and Methanol, $CH_3OH$ before entering the combustion chamber where they were ignited.

McBurney pointed out that by converting the larger molecules, which have an infinite number of boiling points, into mostly single-carbon molecules, methanol and methane, their boiling points were greatly lowered. And he found that when their boiling points were within the same temperature range it resulted in a virtual spontaneous ignition. Spontaneous combustion meant the pistons got a much bigger "push".

In summary, both the lowering of the boiling points and the synchronizing of the boiling points are the keys to what give these systems the ability to produce 4 times the work from the same amount of fuel. But we're just getting started with the implications of McBurney's research. He also states that one of the factors that most carburetor efficiency enthusiasts do not realize is the importance of water in the equation. "That is why these vaporizer systems run more efficiently in humid conditions," he said.

He went onto show there are two water molecules required for every one molecule of gasoline in order to yield $CH_4$ (methane/natural gas) and $CH_3OH$ (methanol). He then found a way to thermally crack gasoline using pressure, water and iron catalyst into methanol alcohol. **The most startling part of the find was that the reaction produced about five times as much fuel as he started with.**

You are reading this correctly. In tests conducted in the Chemistry Department at Brock University in Ontario he used one part gasoline with two parts water together with an iron catalyst, placed them into a pressure vessel nearly identical to the catalytic cracking unit at an oil refinery and heated it to 500 $^0$C (932$^0$F). At this temperature the super-heated steam becomes unstable, then gasoline molecules begin to break apart and combine with hydrogen and oxygen molecules from the water.

It's a perfect combination; on one of the carbon atoms a hydrogen atom attaches and on the other end of the carbon atom an OH molecule attaches. This is the chemical construction of methanol and the amount produced from one gallon of gasoline was 4.5 gallons!

**1 part Gasoline + 2 part Water + heat + iron catalyst = 4.5 parts Methanol Alcohol** plus a little Methane.

$$\textbf{Or:}\quad C_8H_{18} + 7H_2O = 6CH_3OH + 2CH_4$$

This is the big dilemma for big oily. Imagine the public's reaction once word gets out that Big Oily could have been converting their toxic gasoline stocks into methanol all along? And someday people are going to find out they could have produced nearly five times as much fuel as they did. And them people are going to know that we never have needed to drill for 80% of it in the first place. What's going to happen to Big Oily when the world finds out they've been seriously ripped off?

And by the way, we could have had a non-polluting fuel all along as well. This is because methanol is made up of smaller molecules than gasoline and thus it combusts more completely in an engine. Methanol was used at Indy for many years for this very reason. When you use methanol in a piston engine you see a marked increase in horsepower compared to gasoline. Methanol adds horsepower because it combusts more quickly and also because the chemical formula of it contains one oxygen atom in a liquid

Don Garlits, a drag racing legend, poses Aug. 2, 2002, with a 125-miles-per-gallon Pogue Carburetor at Don Garlits Museum of Drag Racing, Ocala, Florida." Bottom right: Bruce McBurney 1954-2015

state. Therefore, as soon as combustion is initiated this liquid oxygen turns to gaseous oxygen, expanding 600 times and fueling the hydrogen-oxygen combustion reaction. Because the fuel is oxygenated in the liquid state the engine doesn't have to breathe as much oxygen on the intake stroke. Because of this, an engine running on oxygenated fuel like methanol, can produce more horsepower for its size for the simple reason it doesn't have to work as hard to breathe in all the air. If we used methanol in place of gasoline all of our vehicles could have been equipped with engines ¼ to ½ the size and had the same acceleration.

Methanol is non-toxic and non-polluting and the oil industry has known about this chemical process since before the turn of the 20th Century. They could produce four to five times as much fuel if they would convert it to methanol using this process. So here is **conclusive proof that there is absolutely no such thing as an oil shortage.**

This has been and still remains one of Big Oily's biggest secrets. They certainly don't want the public to figure out that we've been not only overcharged but forced to use the worst of all possible fuels for the past 120 years.

## The Miracle Of Methane Gas

In Pogue's days and early 1930's the catalytic cracking of gasoline had been accomplished. I'm not sure Pogue knew it, but the oil wizards did. At any rate, Pogue's carburetor catalytically cracked the heavier gasoline molecules into methane and methanol. This is how his carburetor was able to produce four or five times the fuel economy of a normal carburetor.

And now is the perfect time to discuss methane gas as there is much confusion about it due to false propaganda about this naturally produced gas. As a result people tend to fear it.

For example during the BP disaster in the gulf, when millions of tons of methane were being released directly into the atmosphere, industry executives warned via CNN that methane gas was extremely toxic and would kill humans if they breathed it. And they used this as a reason to light it on fire and burn it. Was this better than just releasing it? Hint; you may want to read further before you answer.

Methane: $CH_4$, is often used as a lifting gas in weather balloons. What does that tell us? It tells us that methane will rise high up into the atmosphere. Now we do not live high enough where this methane will naturally accumulate, so why is there all this concern about methane effecting people's health? Could it possibly be a scaremongering tactic designed to get us to fear methane rather than embrace it for the miracle gas that it really is?

Methane is actually NOT hazardous to breathe, unless you are in a room with less than 8% oxygen. So the worst thing about methane then must be for the fact that by rising up into the atmosphere it accumulates there and causes a blanketing effect. And this leads to an increased likelihood of global warming occurring. Again, this is complete non-sense.

Methane is a perfect greenhouse gas. When Methane, $CH_4$, contacts oxygen in the upper atmosphere, where it is exposed to solar energy, it breaks apart to form Carbon Dioxide plus Water.

This is written chemically as: $CH_4 + 2O_2$ ->- $CO_2 + 2H_2O$.

From this we can see how the wondrous gas methane actually supplements the water in the atmosphere as well as adding precious and necessary $CO_2$ which is vital for crops and vegetation. And remember, humans can breathe in and breathe out all the methane they want as long as they don't reduce the overall atmosphere below 8% oxygen. It can only kill you if you allow methane, such as from a furnace turned on but not burning, to drive enough oxygen out of the space to a level below 8%.

On the other hand, carbon monoxide, from the tailpipe of a gasoline fueled piston engine, is lethal at much lower levels and that is because lung tissue prefers it and thus seeks it out over other gasses.

So why would greenhouse climate-change advocates make such negative statements about methane? What could possibly be so bad about the gas that comes out of all decomposing organic materials? Why would they make such a fuss about this splendid natural earth cycle? To totally mislead us, that's why. Big Oily flat out does not want us to be around methane because methanol can be made from methane (with the addition of one oxygen atom) and methanol is superior as a fuel.

So Big Oily likes to waste methane. Today in the Bakken Range of western North Dakota a person can see hundreds of stacks dotting Nebraska's fields of wheat and sunflowers, and they are all actively flaring off methane and natural gas to the tune of 100 million cubic feet of useable gas every day! This is enough energy to heat half a million homes!

Of course, we could be turning all of this methane gas into liquid methanol alcohol and trucking it away to power plants, but instead we waste it. This gives Big Oily an excuse to drill for more oil.

Can you see we need to wake up? Any time we see energy being wasted we should investigate the reason. The needless flaring of methane gas brings up the question as to why the public is forced to smog-equip their cars when the industry itself is not-forced to smog-equip their obvious sources of air pollution? The failure to conserve energy, combined with deliberate contamination of the air, should classify as a serious environmental desecration.

The problem is dramatically amplified worldwide. According to the World Bank's Global Gas Flaring Reduction Program, "In the world today 150 billion cubic meters (or 5.3 trillion cubic feet) of natural gas is being flared annually."

It gets worse. These flared gas wells spew two million tons of carbon dioxide into the atmosphere every year. If global warming was real, it is impossible to enforce vehicle-imposed smog laws, since at the same time the industry can negate our efforts unbeknown and away from prying eyes.

Such ongoing practices render all of the "Expert Carbon Alarmists" into nothing more than hypocrites, while at the same time making existing smog laws useless. But at least now we can see what is going on. Big Oily is drilling for more crude oil at the expense of a superior form of energy which is being thrown away.

This is all made possible as a result of deliberate loopholes within U.S. environmental laws. For example, here is an account from a landfill in the United States:

> "Methane that is currently flared could be processed and introduced into the closest natural gas pipeline or it can be used directly to produce electricity in a micro-turbine, internal-combustion engine or a boiler/ steam turbine. Unfortunately legal hurdles exist that currently prevent this. For example, a landfill can capture and flare the methane produced by the decay of trash in accordance with California law, but if the landfill owner wants to use the methane gas to generate electricity instead, this would displace fossil-fueled production of electricity, which would replace the normal combustion of fossil fuels. So they have to go through a costly and lengthy process of obtaining permits from regional, state, and federal officials as well as producing environmental impact reports."

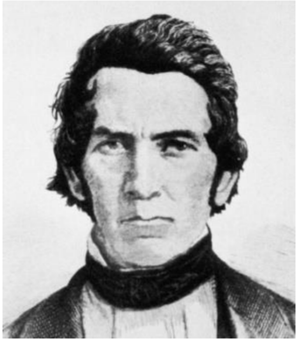
This is why they just choose to flare it. But that doesn't change the fact that every place you see gas being flared off it could be making electricity.

Whether it is connected to the grid or not should determine if gas should be allowed to be flared or not. A rational law would state: "Without a way to utilize the energy, the gas must remain where it is." What exists now is just another racket for the oil industry that benefits the oil industry.

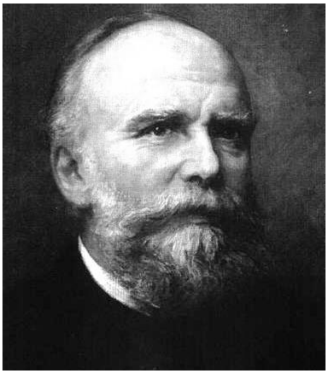
Now also note from this experience how Big Oily demonstrates complete disregard for global air quality. Thus, when publicly scrutinized the industry itself lays way to the fact that it does not possess the necessary leadership skills to serve as stewards of such potentially toxic substances as petroleum and motor fuels in the first place.

If you only remember one thing, remember methane is a miracle gas and methanol is a great fuel.

Thomas Davenport received the first American patent on an electric machine in 1837. He used his electric motor in 1840 to print The Electro-Magnetic and Mechanics Intelligencer, the first newspaper printed using electricity.
Below: Michael Faraday, credited with the invention of the electric motor. Having provided a number of various service projects for the British government, when asked by the government to advise on the production of chemical weapons for use in the Crimean War (1853–1856), Faraday refused to participate citing ethical reasons. Courtesy Wikipedia



Nicolaus Otto. The 1864 Otto & Langen engine was a free piston atmospheric engine (the explosion of gas was used to create a vacuum and the power came from atmospheric pressure returning the piston). It consumed less than half the gas of the Lenoir and Hugon atmospheric engines and so was a commercial success. Eugene Langen pictured below: Courtesy: Wikipedia



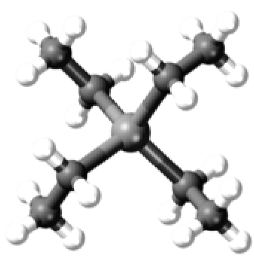
# CHAPTER 3

## Lead, Asphalt, Tires, Batteries And More

AND NOW WE move on to the subject of one of the most toxic ingredients known to man having been put into our gasoline on a worldwide basis. I'll begin with this blatant discussion of the use of lead by the world's trustworthy source of data, Wikipedia:

> "Beginning in the 1920's TEL was mixed with gasoline (petrol) as a patented octane rating booster that allowed engine compression to be raised substantially, which in turn increased vehicle performance or fuel economy. **Ethanol was already known as a widely available, inexpensive, low toxicity octane booster, but TEL was promoted because it was uniquely profitable to the patent holders.**
>
> TEL in automotive fuel was phased out starting in the U.S. in the mid-1970s because of its **cumulative neurotoxicity** and its damaging effect on catalytic converters. When present in fuel, TEL is also the main cause of spark plug fouling. **TEL is still used as an additive in some grades of aviation gasoline and in developing countries."**

**Tetraethyllead** (commonly styled **tetraethyl lead**), abbreviated **TEL**, is an organo-lead compound with the formula $(CH_3CH_2)_4Pb$.



If lead was known to be toxic in the first place, one has to seriously question why the industry ever used this stuff in fuels that were combusted in towns, cities and people's garages. Look at how cavalier they are regarding their past indiscretions against the environment and its inhabitants. This bit of information, in itself, is so incriminating I am surprised it has not already led to some Big Oily executives being hanged for crimes against the people. It appears they have become so confident of their power and control over our modes of transportation they can openly admit they could have used methanol as an octane booster all along, and never used lead.

It's more than arrogant, considering the millions of children whose IQ's have been dramatically reduced as a result of lead poisoning! On top of this they are openly admitting they gave into the wishes of those who placed profits over health. This is deliberate lead poisoning we're talking about. There is no escaping incrimination here.

The harmful effects of lead have been known at least as far back as 700 AD, when the cause for thousands of premature deaths among miners who supplied the Roman Empire, was found to be lead itself. Men were dying at young ages and it was because they were handling and breathing lead particles.

This has all been documented. Search "Vitruvius lead pipes" if you want the full story. And while you're at it, search "Washington DC lead crisis" and "Flint Michigan lead in water" while you're at it. Take a minute to ponder what's going on here with all of these water systems having been made out of lead even though we already knew it was the worst possible material that you could choose to build a water system out of.

After all of these centuries and all of these repeated cases of lead poisoning, it is more than obvious there is a dark force operating amidst our governments and corporations that is intent on helping to carry out a plan to dumb down the population of the United States with lead. It's more than just a sad fact that we have all breathed lead because a corporate decision was made to use it as a standard gasoline additive knowing it was toxic and knowing there was an alternative. In the United States the use of lead went on for approximately 50 years. As a result millions upon millions will feel its negative effects for centuries.

But now hold on! There's more to the story; there's an even bigger reason why Big Oily put lead into our gasoline. (Hint: it wasn't for valve beat-in or reduced engine wear.)

## Lead; The Bigger Picture

The second and major reason why Big Oily began putting tetraethyl lead into motor fuels as early as the 1920's was to counter the catalytic effects of high-mileage carburetor designs. It took us years to discover this and the information has only recently become available. But there is no question that the addition of lead in the fuel had the effect of coating the iron catalysts with a contaminant that would stop the device from performing above that of a regular carburetor.

When Charles Pogue's design came out, he was careful to stipulate that only white gas could be used. This was to prevent lead contamination which would ruin the vaporization achieved beforehand. Consider the ramifications of this article written by a Pogue historian:

> *"In the opening months of 1936, stock exchange offices and brokers were swamped with orders to dump all oil stock immediately. Poque's invention caused such shock waves through the stock market, that the US and Canadian governments both stepped in and applied pressure to stifle him. "Many people attested to these mileage claims as The Pogue Carb went into production and were sold openly. However, one of the crucial factors of these systems was the use of "white" gasoline, which contained no additives. It was at this time oil companies started adding lead to the fuel. Lead is an anti-catalyst that rendered Pogue's carburetor as inefficient as a regular carb."*

In light of the innumerable deceptions that have blighted this industry since its inception, this story is more than believable. It helps to finally explain the successes and failures surrounding men's quest to design a high mileage carburetor. By placing lead into our gasoline the industry was able to "dirty" and thus thwart the function of catalytic metal components required for the reaction which breaks gasoline into smaller molecules like methane. Thus the era of a higher mileage standard was stifled.

But now this is getting to be too much to take. In the beginning Big Oily denied us the use of simple water blended fuels which would have reduced fuel consumption and air pollution. Later they denied us the use of nontoxic alcohol which would have provided us with a higher octane fuel that was completely non toxic. Instead we polluted all of our highways and downtown sections with toxic lead, lethal carbon monoxide and 34 additional toxic compounds.

Or you could put the performance of big oily this way: First they fouled our air with harmful car exhaust, then they added lead to spread it along highways, the downtown and into our water. Big Oily admits they did this for profit folks.

## Lead As An Additive To Prevent Wear And Valve Beat-In

One other note before we move on; just one more lie that we've been told that still needs to be rectified. The use of lead was never about anti-knock, engine wear and valve beat-in as the auto/oil conglomerate stated. If it was, they could have used any number of compounds like nickel oxide to accomplish better anti-wear properties of fuels and lubricants without giving us this horrible toxic additive, lead. Again, by their very own practices, the oil industry demonstrated that they are clearly not qualified to have anything to do with energy producing materials, especially ones that can harm innocent people, animals, lakes, rivers and land.

The only possible explanation for the use of lead was for the short and long term effects it would have on a society. There is a plan to reduce the earth's population. It was written on the Georgia Guidestones.

## The Giant Crude Oil Drain Field

Just as there was a hidden reason for putting lead in our fuel there has been a reason that our cars are equipped with high-friction, inefficient devices. The automobile industry manufactures approximately 80 million new vehicles each year worldwide. Their use today has almost completely displaced older and less costly systems such as steam trains, electrified rail, underground vacuum-powered trains, trams, etc. However, as we have seen, petroleum piston engines are illegitimately enthroned as the power-of-choice for autos and trucks the world over.

The reality is; petroleum powered piston engines are an invention of Big Oily, being they are petroleum-consuming devices with a gigantic appetite. Today, the oil industry relies on every one of them running and consuming fuel. In the United States, without 100 million of these vehicles operating daily, Big Oily would have a fuel storage crisis on their hands within days.

I want you to understand that in order to get rid of all the petroleum that's on its way to our refineries right now, the industry needs an outlet just as a septic system needs a drain field. This is represented by refineries, pipelines, tank farms, gas stations, asphalt highways and tire manufacturers. Now, where does it all go? Into the fuel tanks of cars and trucks that will carry it everywhere.

In this giant petroleum drain field all of the toxic ingredients contained within crude oil are dispersed upon every far corner of the land. Meantime, Big Oily brags about the fact they pull 100 million barrels of toxic crude oil from earth's crust every day. I'm not sure you would want to be part of this boast as crude oil, of and by itself, cannot even be disposed of in a landfill. This is no joke.

By a ruling of the EPA, crude oil cannot be deposited in a landfill because it is classified as a hazardous waste. Makes you wonder why anyone would want to go drilling for it? With this classification crude oil can only be disposed of in a hazardous waste landfill.

Now here's something to think about. How is it that out of the 100 million barrels of this toxic brew pulled up from the crust every day, none of it is ever disposed of into a hazardous waste landfill? How is this possible, when it is currently stipulated that this is the only place it can go? Well, although Big Oily may not be able to throw it away in a regular landfill, it's OK for them to burn it up in the environment and scatter it to the four corner of every state.

I'm sorry, but we have to know how the industry thinks in order to understand what has happened to us. The fact is all of the toxic crude that is brought up from the ground has to be burned or blended into tires, plastics, paints, epoxies, industrial chemicals and asphalt. And this is why the end result of our petroleum-driven society will be a toxic, dumbed down existence connected by unlimited miles of paved roads that are constantly deteriorating.

We already have smog in our air and petrochemicals in our water. We already have exorbitant car maintenance expenses, high fuel costs, traffic confusion and ill will. And we are not any safer than cattle.

As an ox must bear a yoke to pull a wagon; we bare a yoke of homage to gas pumps and maintenance garages. The yoke is made heavy by our dependence on piston engines, now sitting in our garages for getting to work and school. In the process we are endorsing a toxic system that is directly at odds with our future.

## Asphalt; Another Industrial Dilemma

Here is a tidbit of information the oil industry does not want to get out and that is the fact that with today's environmental landfill laws it is impossible to operate an oil refinery in the United States without the road paving industry. That is because unless there is a market in which to sell every drop of oil from every barrel of crude extracted from the crust, whatever is left over will be too costly to dispose of.

Each drum of crude oil refined produces at least one gallon of toxic tar. Over time the amount of tar builds up to the point to where the company can no longer afford to store it. If this happens, with current environmental laws in place, they will be forced to cease operations. This is why the oil industry cannot operate without the asphalt industry, and for this they charge us $100 per ton for the stuff!

Since crude oil itself has sat buried for scores of centuries amidst rock layers of earth it has been exposed to and absorbed innumerable toxic chemicals. Some of these, like PCB's for example, are so lethal to the skin and lungs that they must be stripped out of the fuels that are sold to the public before they are burned in an engine.

So let's say you're an oil company executive wanting to do "good", and your refinery is stripping off a couple thousand gallons of PCB's each month which you need to get rid of. Can you take it to the land fill and throw it away? No. That is against federal law. Can you take it to a hazardous waste landfill? NO, NO, NO! An oil company NEVER pays to throw something away, especially at hazardous-waste prices.

So what do you do? You find another product that you can mix it into, and who is going to know if you just quietly mix it into the asphalt? Now you're not only getting rid of a hazardous waste for free, you are realizing an increased yield on asphalt sales. Give that man a raise!

Yes, this is absolutely how these people think as I have witnessed it firsthand myself. And the fact is we do have PCB's in road asphalt and the industry continues to get away with it as if it's a legitimate component of the formula for asphalt. Are you starting to see why the paving industry is such a critical part of oil refining?

If things weren't looking sinister enough for the asphalt industry remember just one more small detail; the fact it doesn't stand up to sunlight. Asphalt is mostly oil and therefore asphalt has about the same resistance to sunlight erosion as does plastic; minimal.

## Rubber Tires and Tire Wear

Most vehicle owners understand that vehicle tires wear out after about 50,000 miles, since that's just the way it is. Most are convinced tire designs are state of the art in longevity and performance, and besides, what difference does it make; you can't drive a car without them. So we accept it when we have to replace them but we never stop to question the fact that tire life has not increased one iota since the 50's.

Here are some other things we ought to question about tires. What ever became of recapping used tire casings? Where do all the used tires go? What are tires made of? What does worn tire material do to the environment? Has there ever been a tire design that was made from paper, plastic or a composite material?

Today there are approximately 100 million vehicles on the road in the United States. If you times that by four tires per car divided by an average of four years per tire change it equates to 100 million tires per year sold in the United States for passenger vehicles alone. So the tire business is a mega-sized business. If it's a mega-sized business and it's related to the oil industry, guess who is really in control of it?

So it should come as no surprise that tires are made of black carbon, and that this black carbon has been stripped from crude stocks containing all kinds of carcinogenic chemicals. So it is anything but pure but in fact contains dozens of toxic byproducts that are unsuitable for oils and fuels. This is why tires produce black smoke and stink worse than a burning wig factory when you try to burn one. This is why tires are not legally burnable.

So it may surprise some to learn that when they are put onto a motor vehicle, all worries about environmental pollution from tire burning become null and void as then it becomes OK to let them wear out and pollute us to high heaven on our roads. So you can see that the tire industry is just another outlet for toxic materials that need to be gotten rid of. This also means that the tire industry is another industry Big Oily cannot do without. So, like the asphalt industry, don't get in the way of it!

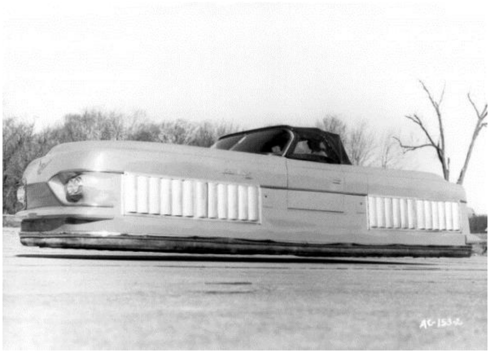
When we put things into perspective from the oil company point of view, the main purpose of the tire industry is not to keep America rolling but to remedy a refinery production dilemma. In this case, similar to asphalt, byproducts that can't be put into fuels or a landfill are a mainstay ingredient. Such by-products of crude oil refining are considered toxic by the EPA, thus they cannot be taken to a normal landfill. However, it's ok for the tire industry to put it into tires, and thanks to loopholes in the environmental protection laws, the industry is able to dispose of toxic waste through normal tire wear. And once again, the disposal of toxic waste is not only free, but profitable.

Perhaps we should make tires out of something that was useful after its life as a tire? How about bio-degradable compost boxes for newly planted olive trees? Well, it turns out that Paper and hemp tires have already been invented, but like I said before; don't mess with the tire industry. Since tire technology is based on the utilization of petroleum byproducts, it is obvious that tire companies are controlled by the oil industry itself. What they call tires are in fact toxic by-products. So in reality they are one of the biggest rip-offs of honest-earned money on the planet.

A superior type of tire material was invented as far back as 1950 that did not wear out, but adopting such a tire would have dramatically reduced the oil refinery's ability to jettison toxic waste.

A final note concerning vehicle tires is the question of whether we should be using wheels of any kind on our vehicles today.

Did you know that there was a scientific article in a Los Angeles paper during the 1950's that announced the recent advancements in hover-craft technology? It went on to speculate that all roads would eventually be obsolete. That would have interfered with oil company operations just a tad. Also, check out this prototype design from Ford:




**1961: Ford "Glideair" Hover Car**
"This revolutionary new mode of travel was recently unveiled by Ford; a wheel-less vehicle that rides on a thin film of air a fraction of an inch above the road. Says Andrew A. Kucher, Ford's vice president of Engineering and Research: "We look upon Glideair as a new form of high-speed land transportation for fast trips of distances of up to about 1,000 miles." A turbojet engine would supply the power to both levitate and propel the Glideair."

Well we obviously didn't get wheel-less vehicles that hovered. What we got was the great American highway program of the 1950's, and now you know why.

## Brake Pads And Brake Wear

In the United States there are three main suppliers of brake pads with total sales of $10 billion annually. Here's another mega-sized business that is related to Big Oily so it's not too hard to figure out who controls 90% of the market. And this is the reason we're still using friction pads in place of electric-resistance in 2023.

The modern disc brake is the brake-of-choice for autos and trucks even though it is hardly more than a design held over from open wheeled race cars of the 50's. Disc brakes to this day are touted as a key component of higher and higher performance from our vehicles, but friction brakes are in contrast with efficiency as they represent massive energy losses within the system.

In the realm of developing true higher speeds for traffic flow, the emphasis is should be on minimized travel time, of which speed is just one of many factors. The most obvious way to decrease travel time would be to eliminate stop lights, placing more occupants in fewer cars and utilizing the most direct routes. Racing around, stop and go driving is a child's game, not a legitimate transportation system.

Electro-magnetic brakes were designed and utilized successfully more than 100 years ago in New York and San Francisco, yet today we are still relying on friction pads every time we reduce speed or descend a grade All of the kinetic energy, the energy that was required to get the whole thing moving up to speed, is systematically tossed out the window. Worse yet, the wasted energy is converted into the production of brake pad dust which we need less of, not more of.

Like tires, brake pads are made of toxic materials. In this case the materials are asbestos and copper. We shouldn't waste energy, especially on the production of toxic dust! Now what a shock it might be for some to learn that these toxic material are now in our water, rivers, lakes, bays, oceans and some people's lungs.

It is estimated that over 1 million mechanics worked on brake shoes, brake pads and clutches materials on a full time basis. A significant number of them have come down with malignant mesothelioma (lung cancer). Yet does this needless environmental poisoning garner much mention from the press? It comes up once and a while, but the materials used remain the same.

The fact is, in 2023 all vehicles should be braking electronically. Even the feeblest electrical engineer could envision the brake rotor and caliper assembly shown with magnets within the flywheel in place of an iron rotor, and copper windings in place of the friction pads. We can get this in EV vehicles and some hybrids, but for the most part car manufacturers will not commit universally to this concept. It's not a part of Big Oily's plans.

## The Plastic Battery Industry

The electrical load of a piston powered vehicle is quite substantial at start-up. In this case, energy is stored in a heavy, lead-acid battery which is kept charged by the vehicle's alternator during normal driving. It is a system that has become so reliable it has become accepted worldwide.

But in the process we overlooked the bigger picture and forgot the fact that we could be using an engine that does not need an electrical system to start it up in the first place. Two examples of such an engine are the Stirling engine and the Steam (piston or turbine) engine which only require a piezoelectric spark to get them running. Another solution the auto industry could employ is an air compressor that compresses air into an accumulator tank and later uses it in a starter motor.

We should consider alternatives, as the battery industry has become another oil-related mega-sized business. And unfortunately it has a similar disregard for people and the environment. Why else would it support a design, that no matter how modern the car, is as short-lived as plastic is cheap.

Forget the notion that five year battery life for a toxic lead or lithium storage device is anything good or acceptable. The fact of the matter is it is such a poor system that it could only have been born of poor decision making. Discarded un-recycled batteries are stacking up worldwide alongside rivers, streams and coastlines.

We should never have let Big Auto/Oily do this to our lands. But it happened. It happened partly because we let ourselves forget about the glass-lined batteries that Hartford Electric provided their customers from 1910 to 1924. Their batteries were exchanged when necessary with a newly charged battery. The customer was charged for the electricity. When the batteries became dysfunctional, they were taken apart and re-plated. This kept the battery cases in service indefinitely.

While we weren't watching closely, our battery cases got replaced with petroleum plastics. While we weren't thinking, we didn't notice that Big Oily had just found another outlet for their crude-related toxic wastes. In this case they are put into the plastic that is used to make disposable batteries, and yes, later we throw them away.

During manufacture, first the oil refinery strips out the toxic chemicals from the oils and fuels. Then a separate petro-chemical company purchases these toxic chemicals as additives from the oil refiner, and puts them into their plastic as part of a formula. The plastic is sold to the battery company where it is made into batteries and sold again to the auto companies, where they end up in our autos and trucks. And then, on its last leg of the disposal journey, these batteries are thrown away with most of the plastic ending up in a landfill.

It's a great business for Big Oily; selling off toxic waste to a secondary corporation, then buying back what looks like something of tangible value. They add it into the price of the car and make a profit off each one.

The worst part of the car battery market is the needless exposure to toxic chemicals that people who work around them get exposed to as they are filled with heavy metal poisons that gradually and methodically destroy neurological cells. As it is today, only desperate poor peasants have the courage and extreme needs to work in a battery recycling factory.

## More Plastic Petroleum Uses

(More on; What You're Buying Into)

Another offshoot of the oil/auto industry is the plastic parts for cars industry. As you can see from the adjacent photo, the amount of plastic components has now reached the point to where much of the car seems to disintegrate in a bad crash with another vehicle, especially if it is a larger one. Maybe it's time to consider that Big Auto has gone overboard with cost saving plastics!

Consider that when the automakers make everything possible out of plastic, even all of the cheap chrome proudly displayed on the front of Ford and GM trucks, they are obviously not trying to decrease the nation's reliance on petroleum usage. Plastic car parts and petrochemical interiors are promoted for the simple reason they give the oil industry an extra outlet for their toxic pollutants, same as asphalt, tires and batteries. They also confirm that oil is not in short supply.

## Spin-on Oil Filters

Another offshoot industry brought to us via the Auto/Oil conglomerate gang is the oil filter industry. Yes, it's another mega-sized business that's related to Big Oily so you can be pretty sure who controls it. And now thanks to our friends in the auto industry who saw to it that we had no alternative but to embrace it or replace engines, the entire industry has adopted this disposable, "blind performance" design that first debuted in 1956.

If you ask me I'd say this metal-clad spin-on oil filter represents one of the worst environmental screw-ups of all time because it is as hard to recycle as a used tire. Now why would the

entire auto industry endorse such a device that has virtually no way of being recycled? Could it be because they want to make sure that it is not recycled?

Once removed for routine replacement these filters remain full of oil soaked paper surrounded by a metal shell which the user cannot get inside. You can check the EPA guidelines like I did. Most states allow these oil filters to be thrown away. Some do not, unless they are crushed first. Big deal!

Most oil change businesses employ a filter crushing machine which reduces it to a hockey-puck size. This is the desired method to throw them away. I could not find any real examples of where these pucks were being recycled into steel at a mill. If they were, the oil and paper left inside has to be burned away in the process.

What a mess as these things have resulted in toxic oil going into landfills. How can the whole auto industry possibly be this stupid, considering that they already had filter designs that were much better? Earlier designs featured filter elements that were housed inside a filter canister that was removable. During replacement one merely had to unbolt the housing, lift out the old filter membrane and replace it with another. Used, saturated membranes could be squeezed out or simply thrown into a fire and burned into ash.

The spin-on filter took the place of filter housings and the filter itself. This was a small up front gain that would only beget a big downstream problem! Today the modus operandi is to replace the entire filter assembly with every other oil change, resulting in a contaminated metal-clad oil soaked sponge to dispose of.

And now would you believe that the spin-on design forces us to over-consume filter components. Since we never get to look at the used filter elements themselves we never know if they really need changing or not. Brilliant marketing!

I once cut a couple of filters apart using a hacksaw, pulled out the element and spread them out for inspection. After 5,000 miles and 15,000 miles on a 350 cubic inch V-8 engine and I couldn't find anything other than discoloration of the paper. I'm not sure they were trapping anything. Now the only time I change a spin on filter on a gasoline engine is when it starts to rust through on the outside casing forcing me to. I'm not kidding.

I also cut one apart from a Detroit Diesel with 20,000 miles on the filter. I didn't find any appreciable buildup of metals, dirt or gunk. It appears that these filters could be extended well beyond the manufacturer's recommendations just as they can on gasoline engines.

The auto/oil conglomerates endorsement of spin-on oil filters further demonstrates a callous disregard for the planet on which we live.

## Clutches, Engines And Gears That Wear

Today's vehicles still retain the use of clutches and transmissions, and this is solely because the lowly piston engine has a limited range of useable rpm. For instance, as you increase the speed of the vehicle the engine will increase in rpm. If you continue to increase speed you have one of two options; switch to a higher gear or over-spin your engine. It is for this reason that combustion piston engines have to be coupled with a transmission that contains multiple gear ratios.

I have to include these parts with the rest of the petroleum-related industries aforementioned for the simple reason that none of these mechanical mechanisms are a necessary component of our transportation vehicles. Pistons, transmissions and clutches could all have been eliminated with the simple embrace of electricity in place of gasoline-powered piston contraptions.

We have to be concerned with the automatic transmissions that lurk within almost all piston powered vehicles. They might have automatic clutches, but they slip under acceleration and drag under idle. This gobbles up fuel mileage. To be using such a device in the 21st Century is engineering insanity.

Secondly, automatic transmissions are complicated, thus they are nearly impossible to get repaired. Chances are it will need replacing when it acts up and this will cost upwards of $10,000. Look at all the parts inside the automatic transmission shown above and try to figure out why they go to all this machining and metallurgy when they don't have to.

They do it because they want this kind of fuel-robbing device connected to the engines, which are generally kept running at a standstill. This puts a drag on the engine which must be compensated for with a higher idle rate. On a manual transmission, a clutch outside the gearbox is disengaged from the output shaft when stopped. The use of electric motors solve this as they can come to a complete stop and restart with ease, while still producing maximum torque.

## Stop Buying Into Bad Ecology

Here in the United States instead of simple transportation we're pretty much stuck with what television tells us looks cool and what Big Oily/Auto displays in the showrooms. Here, and in every other industrialized nation that I am aware of, we do not ever get simplicity, nor do we ever get great gas mileage either. Instead they placate us with expensive, toy-like gadgets, such as an electric truck that sells for $100,000 and can't tow beyond 160 miles.

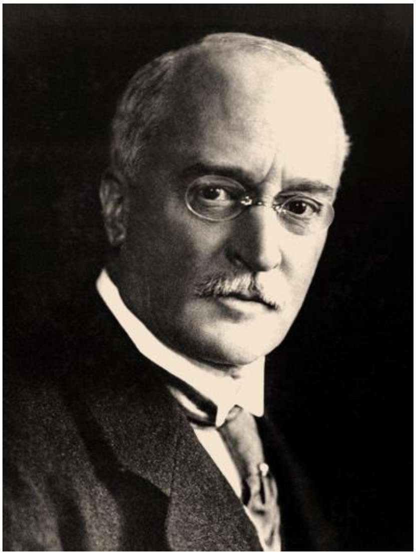
Self steering might seem like a modern idea, but don't try to tell me you will be any safer when you are on the same road as 80,000 lb. trucks. What self-steering does do is direct our attention away from reliable, safe transportation and toward something high tech that we don't really need.

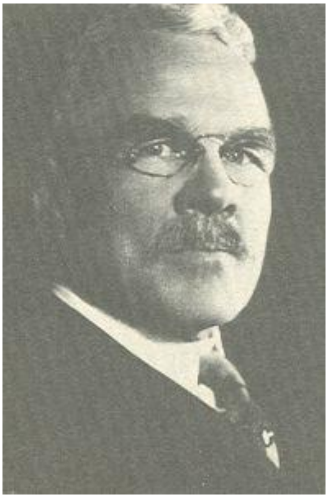
Big Auto would certainly be able to sell them, but Big Oily does not want people driving around in cheap cars that get great gasoline mileage. So the two work together to convince us that every better design should have more power, more innovative electronics and improved comfort. And of course this has to cost more money.

The public can't see the forest for the trees. Thanks to movies and television, both of which depict men in concert with women riding around in petroleum powered cars, many of us are so helplessly conditioned we still dream about purchasing a new flashy vehicle on the false premise it will give us more happiness.

## Lessen The Burden

We can greatly lessen the weight of the petroleum yoke by simply refusing to continue purchasing the gadgets the car industry tantalizes us with. Keep your old car. There are plenty of used cars to last us for years. They'll come around to producing cheap diesel and electric models soon or they'll go bankrupt. Otherwise, the existing auto/oil conglomerates will continue fleecing the public with the same toxic petroleum-powered mechanisms for another 100 years. Every form of life on the planet will be jeopardized by this insane plan.





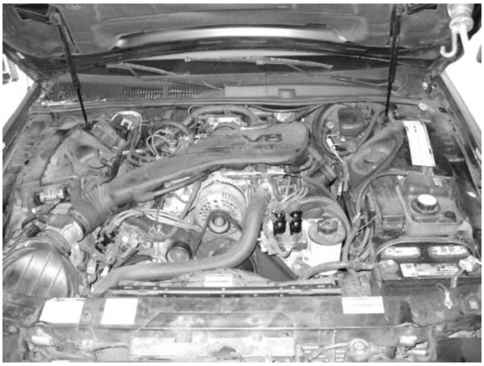
At left; Rudolf Diesel, the inventor of the diesel engine. On the evening of 29 September 1913 he boarded the post office steamer Dresden in Antwerp on his way to a meeting of the Consolidated Diesel Manufacturing Company in London, England. He took dinner on board the ship and then retired to his cabin at about 10 p.m., leaving word to be called the next morning at 6:15 a.m.; but he was never seen again.

At right: Charles Gordon Curtis. In 1896, Curtis patented two types of steam turbines. He combined the principles of the Laval turbine and the Parsons turbine into a multi-stage impulse turbine Although Curtis turbine reached a lower efficiency than the Parsons' turbine, however, it was much smaller and simpler in structure and thus very suitable for simple applications and for mobile use, e.g. on steamships. Courtesy: Wikipedia

# CHAPTER 4

## Justified Air Pollution

*"We intend to put what we have learned to good use as part of a global solution to oil spill response wherever future incidents may occur,"* Nobu Su after 210 million gallons of crude had been lost in the Gulf.



IT IS HARD to imagine a more daunting subject than the attempted repair of a vehicle's engine when it resembles the one in this picture. For starters, instead of looking at the car's engine you are either looking at a cheap plastic cover or a few hundred feet of dirty rubber hose. And every one of these component must be connected properly for your engine to run correctly. Where should you begin troubleshooting a rough-running engine or one not running at all?

If it feels like the deck is stacked against you every time you go to perform simple maintenance on your car, you are not alone. This is because we all face the same paradoxical money-robbing situation in trying to appease state smog requirements and keeping our cars "smog" compliant. Only after forking out $60 dollars to be "smog" compliant are we permitted to operate vehicles which burn toxic fuels. Do you see just a touch of hypocrisy here?

It's hilarious when you realize that a smog certificate is just a permit to burn the industry's toxic fuel into the very air we breathe! And we have to pay for it! But now that you've had a good laugh; how about a good cry? Remember, just 13 years ago, in 2010, the

world's oceans and atmosphere suffered from the BP Deep Water Horizon's disaster in the Gulf of Mexico when a wellhead gave way at 5,000 feet in seawater? As you can imagine from the picture, the amounts of toxic aerosols that burned up in the inferno above the floating drill platform were astronomical.

Most troubling was the act that BP officials were allowed to further exacerbating the disaster by lighting huge crude oil slicks on fire. This insured that their toxic brew went into the atmosphere as well as the ocean!

Once again I called upon Wikipedia where once again they provided me with all the necessary details to indict the oil industry for a century of environmental destruction. Here's what they provided:

> *"After 87 days 4.9 million barrels of toxic crude oil was discharged into the Caribbean Sea. This represented 780,000 cubic meters or 210,000,000 gallons."*

Question: How much of it was recovered? Estimates are that 25 million gallons were recovered in the 500 plus oil skimmers that were employed. That leaves 185 million gallons of toxic crude still in the ocean and on the shores!

An attempt to supposedly reclaim the crude oil was interesting. The story goes something like this: Within just a few days of hearing about the Deep Water Horizon's explosion, Nobu

Su, TMT Shippings chief executive, dispatched a brand new $160 million supertanker from China to Portugal to be converted into a skimmer which was done to remedy the April 20 explosion on the Deepwater Horizon rig. The vessel was named “A Whale”.

The ship was modified such that oily water would be skimmed through one of 12 intake vents cut into the ship's bow. It would then be pumped into a series of tanks. Here, oil would rise to the top and then be siphoned off, while water was pumped back into the sea.

The “A Whale” was said to be able to collect up to 500,000 barrels of oily water a day. TMT Shipping supposedly hired a top-flight New York public relations firm to drum up support for the mammoth 1,100-foot-long ship. They boasted that it could process 21 million gallons of oily water a day.

Then, on June 30, just seventy days after the blowout, they began a test. It’s sounding pretty good so far; as if the industry really has someone who cares or has a heart, and the public falls for it every time. But check out what transpired from this whole theatrical investment after just one week of testing:

> *“BP's use of chemical dispersants prevented A Whale, the world's largest skimmer, from collecting a "significant amount" of oil during a week of testing that ended Friday. When dispersants are used in high volume virtually from the point that oil leaves the well, it presents real challenges for high-volume skimming," Nobu spokesman Grantham said in a written statement that did not include oil-collection figures from the test.*

Can you believe what you just read? Can you believe the level of arrogance as to be banting this kind of destruction about and explaining away their failures to recover barely more than a pittance of the oil as "a learning experience"?

Let's get the story straight: First they converted a ship worth $160 million dollars to an oil skimmer. Then they sprayed the oil so that it couldn't be skimmed. Then they deployed the oil skimmer which was not able to collect much oil. Then they cancelled the program.

Nobu Su emphasized his company absorbed all costs to convert and test the tanker. Sure. He vowed to continue refining the mega-skimmer for use in future spills. Then it was chocked off as a learning experience! I don't think so.

We witnessed a petroleum company throw away 185 million gallons of petroleum, didn't we? In fact, they admitted that they just destroyed 185 million gallons of petroleum! So it's obvious they don't care about saving spilled crude oil. And guess what, it's obvious that it's not in short supply.

But the story gets worse. By spilling a few hundred million gallons of toxic crude into the ocean and burning it up into the atmosphere they undid all of the good that was achieved by the cleaner air standards imposed upon American automobiles since the anti-smog program began. What an outrage!

For decades the public has been forced to pay higher and higher prices for more and more complicated "smog-smart" engines that came at the expense of fuel mileage, reliability and ease of maintenance. For decades the public has had to methodically "smog certify" their cars and pay the exorbitant fees. We have put up with excuse after excuse and gotten double-crossed every time. It's time to wake up and stop buying their lousy cars anymore!

And just what has happened since 2010? Family sized cars continue to be produced that only get 15 to 25 miles per gallon. Better forms of mass transportation like high-speed rail continue to be ignored. Better fuels that could be non-toxic continue to be ignored. The industry continues to support a polluted system with larger automobiles, larger engines and all-wheel drive, while placating the public with frivolous technical innovations like self steering.

It is pitifully obvious that the corporate dictators who promote petro-energy as being viable for transportation care nothing for our health. The legislation they have passed to require smog certification is merely a means to placate the public with regard to serious health issues caused by toxins in gasoline, which in the meantime are never addressed. The end result is that smog laws endorse toxic fuels, and this in itself stifles any chance they could have a positive purpose.

## How Current Smog Laws Work

We're breathing stale air because our elected representatives have not represented the people's needs; having instead become co-conspirators of supporting flimsy environmental laws.

You are not going to believe this but the federal guidelines that form the laws that regulate and control smog **restricts the amount of particulate produced per gallon of fuel consumed.** Current smog "clean air" requirements rate an engine's performance based on **how many micro-grams per gallon of fuel burned** are produced.

That means the more gallons of fuel the engine consumes the more micrograms of pollution the engine is allowed to produce. Can you believe what you just read! This means existing smog laws have nothing to do with fuel economy, fuel efficiency or fuel consumption!

It is this senseless wording of the environmental law which is enabling car makers to continue to build large piston engines. Under current legal guidelines for particulate, a smog-equipped V-8 that gets 15 miles per gallon is more environmentally friendly than a non-smog-equipped 4 cylinder engine that gets 50 miles per gallon. That is because the larger engine produced less particulate per gallon of fuel it burned.

Forget the fact that the vehicle getting three times the mileage only produced ½ of the pollution; logic is not what smog laws are about. They are about protecting the oil industry. Current smog laws produce no incentive to reduce the amount of fuel burned, and in fact encourage the use of larger engines that get poorer overall fuel economy. This is more than faulty engineering, since every gallon of petroleum contains over 34 Volatile Organic Compounds, VOC's for short, and they are all rated as toxic to humans and animals.

And never forget that it is the gasoline powered piston engines and only the gasoline powered piston engines that produces the deadliest exhaust gas; carbon monoxide. With so many people dying of cancer, you would think that car exhaust as a possible contributor to the skyrocketing cases of it would be in the crosshairs of major researchers. The reality is few dare to bring it up as a possible consideration since it's the best way known to get yourself defunded.

Bigger engines produce more carbon dioxide and carbon monoxide, especially at idle, for the simple reason that they burn more fuel just to keep themselves running. These facts dismiss the notion that larger piston engines getting poorer mileage are less polluting than smaller piston engines getting better mileage with slightly higher proportional rates of pollution.

Today's environmental exhaust laws are illogical and counter-productive. They do provide alibies for the oil executives who have to answer for all the haze, smog, ill-health and dysphoria that permeates every metropolis. Thusly, whenever they do address smog, they put it on the backs of the public by stressing the importance of driving clean new cars. Aside from blaming us from driving too much they recommend dumping older cars, even if they are still reliable because they supposedly pollute too much.

The nation's "environmental" laws, though producing clearer skies for a while, have failed to stop the expansion of smog and haze above every major city. The reductions that were made from its peak in the 60's have gradually crept back up to levels that every oil company executive ought to be ashamed of.

## The End Result Of Worthless Smog Laws

Because of the proliferation of personal vehicles over mass transit and busses, people in the cities are languishing in worse polluted air than ever before. Today the most polluted city in the United States is Fresno and it is because of the I-5 traffic which cuts through the basin in which it is located.

Smog laws have not helped citizens in their quest for clean air. They have burdened our cars with extra gadgets that steal gas mileage and deprive car owners of their ability to maintain and repair automobiles themselves. The real air quality issues should focus on getting rid of gasoline and the engines that burn it.

Today the average car owner can do few repairs. A former human resource that used to keep vehicles on the road and operating properly has been lost. Thusly our cars get tuned in certified shops and according to factory specifications. It's all so highly technical but the fact is we are actually stuck with **factory fuel specifications that are not in our best interest!**

Fuel mileage is now fully in the control of the factory that set your car's fuel settings. Factor settings insure that the driver *cannot exceed a certain mileage*, guaranteeing that the car will consume about 15 gallons in 300 miles with little variance. If you don't believe me, check the web site Fuelly.com. and watch YouTube videos on this very subject if you need more convincing.

If you are a high-tech kind of person you can apply your computer skills by obtaining a fuel-tuning program and computer interface. A good home mechanic can use a computer tune-up program to tweak their car's fuel system and increase mileage by as much as 30%. However, it you take your car back to the dealer for its scheduled tune-up they will reset the fuel settings back to factory specifications. This will cause your gas mileage to drop back down to where it was before.

Another effect these bogus smog laws have had on the public is to make selling or buying a used car much more difficult and costly. It is often a smog related issue that forces a person into selling their automobile prematurely because they can't get it to pass the smog requirements. What do you do when your car was running fine but it won't pass smog? You take it to a mechanic and he tells you it might require an engine rebuild. Today, since modern engines are either expensive to rebuild or next to impossible, you decide to trade the car in rather than take a chance and have it rebuilt. Now you are right back to where you were six years ago; starting out from scratch with a new car loan.

The ones polluting the air do not care about our air. Not one government or energy-related corporation cares enough to do anything more than just sit back and watch a bungling oil giant dump billions of gallons of toxic crude directly into the world's oceans. It only took one of their disasters to negate all of the pollution-control efforts that we made in the transportation, manufacturing and power generation industries since the beginnings of reform in the 1960's. And yet they continue to use the same practices callously, arrogantly and devoid of remorse.

The public has been bilked billions of dollars for decades. Meantime, Big Oily hit a home run in sales.

## Oxygenated Fuel: In Hiding For 100 Years

Now we're going to really get down on Big Oily. To do so we're going to go back to the subject of gasoline.

Because gasoline is made up of such a hosh posh of petroleum molecules there are hundreds of chemical formulas for it. The typical, or ideal, chemical formula for it is called octane and is written as $C_8H_{18}$.

This is just an average formula, one that represents the chemical formula of a gasoline molecule roughly at the midpoint in size range, and it seems to be the one they want us to settle on. You will notice that the formula contains C for carbon and H for hydrogen. Also note that there is no O for oxygen. That is because the formula of gasoline does not include oxygen.

A small note: All of the alcohols contain oxygen. This is why they combust more completely and produce increased power.

I should add that the formula for diesel fuel looks quite similar to the formula for gasoline; you just have to picture longer molecules, because it is more viscous. Diesel is typically written something like $C_{20}H_{42}$, meaning it would have much longer and thus larger molecules. And therefore, diesel is less volatile than gasoline. Neither gasoline nor diesel contain any oxygen in their formulas.

Because the fuels that we use in our vehicles and trucks do not contain any oxygen atoms in their chemical formulas, in order for the fuel to be burned a substantial amount of oxygen must be obtained. This requires the engine to constantly pull in air from the environment. Since there is no oxygen in the makeup of these fuels and since there is only about 21% oxygen in the air, gobs of extra air has to be ingested and compressed by the engine during its attempts to combust and produce power.

You will learn in later sections that as this air is compressed and exhausted back out, the forced movement of it takes a lot of horsepower from the engine. For this reason the petroleum piston engine is the most inefficient of all combustion designs because it works so hard to get air inside just a tiny combustion chamber and back out again quickly.

The situation is compounded by using a fuel which is not oxidized, because one ton of air per each 20 gallon tankful of gasoline burned will need to be drawn in, compressed and pushed out. For this reason other more powerful fuel types were investigated.

As early as 1870 such kinds of potent "fuels" were tested during torpedo research. By using turbine or multi-propeller engines they were able to propel heavy steel torpedoes under water at 50 knots.

Superchargers and oxygen concentrators have been employed to increase the amount of oxygen into the combustion chamber. In reality, both should be standard equipment on all piston engines in order to help them breathe more efficiently for the combustion volume they have.

Now consider this: since nitrogen is 79% of the air and oxygen is just 20.9%, stripping out the nitrogen first would leave nearly 99% oxygen. Since nitrogen only gets in the way of the desired oxygen, getting rid of the nitrogen should result in an engine that can breathe five times as much oxygen!

So the engine would only need to be 1/5$^{th}$ the size to produce the same power, and will burn less fuel because it is not wasting energy compressing nitrogen which does not react anyway. Remember, a smaller engine needs less fuel to run itself.

Now is the time to show you just what the value of all of our smog laws have been. In this example, a group of students in the United Kingdom were pulled from regional schools and universities to participate in the annual Mileage Marathon Challenge near Leicester, England. The goal of the challenge was to create a vehicle that could set a new record in fuel mileage efficiency on a flat surface. The cars had to maintain a minimum speed of 15 miles per hour. The students didn't know the limitations of a small diesel engine the way they had been taught by mainstream. As a result eleven year old Kitty Foster, who piloted the car and is shown, got an incredible 1,325 miles per gallon!

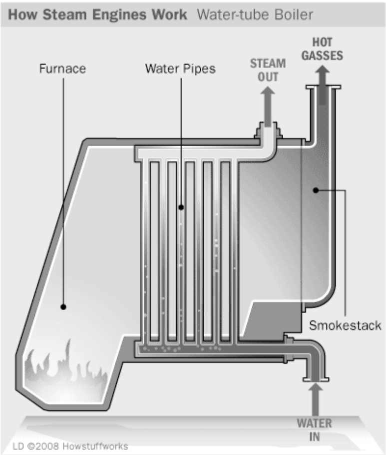
The unique design featured a hospital patient **oxygen concentrator** which was coupled to a small **diesel engine** along with some smart technology. The system was originally developed to treat injured soldiers, but in the car it is powered by an innovative micro-diesel-engine. Cambridge Design Partnership used elements from its own lightweight oxygen concentrator to create the unique car. The technology is called "rapid pressure swing absorption" and it starts by absorbing the nitrogen out of the air and then vents it off separately.


If a few adults and kids can figure out how to couple this technology to the intake of an engine, don't you think the car companies could too?

Unfortunately in this case, just as the public does not get oxygen in their fuel formulations, we won't see car companies installing oxygen concentrators into our vehicles either.

I suppose I should also mention that the military uses liquid fuels that are very powerful in rockets and missiles, but they are not allowed for public use under the **United States Secrecy Act of 1951.** Because of this act, the public is denied the use of an entire list of better fuel formulas such as borohydrides and hydrogen peroxide.

## A Better Use For Gasoline
### (The only use for gasoline)

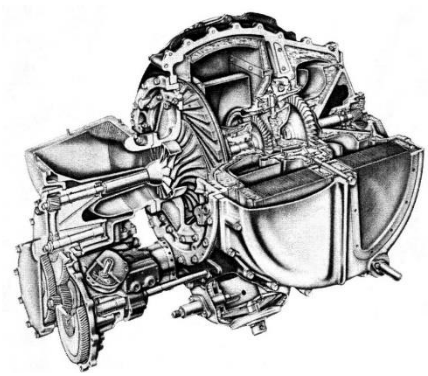



If you have heat, you can make steam. If we were driving around in steam powered cars that burned gasoline or diesel we would consume less fuel than with today's combustion engines. This is for the simple reason that a boiler is more efficient than a piston engine. This is because the fuel and air that is used to feed a boiler does not require compression.

When petroleum is used in a burner you can stoke up the burner and increase the output without having to do any extra work. While it is true that current piston engines utilize oxygen right out of the air the fact is a boiler type engine does the same thing more efficiently. Additionally, boiler type engines do not produce carbon monoxide as do gasoline piston engines.

You can get more energy efficiency by using a boiler to extract the heat of combustion than you can get with any reciprocating engine for the simple fact that the exhaust temperature of a piston engine is always going to be over 1300 $^{0}$F. Compare this to the use of a modern steam boiler equipped with preheat coils where you can get exhaust stack temperatures down into the range of 500 $^0$F or so.

And in-depth discussion of the efficiency of a gasoline piston engine is presented in appendix 14 where it is shown to be 15% overall from fuel to wheels. This is in stark contrast to a modern steam-electric plant which operates at up to 38% efficiency. It is therefore not difficult to see which use of gasoline would produce greatest efficiency.



As I noted, gasoline does not produce carbon monoxide when it is burned as boiler fuel. When it is used in a turbine type of engine it does not produce carbon monoxide either. This is because it is much easier to get excess air into a turbine, and since the mass of air goes in the same direction it doesn't have to be sucked through bended manifolds and valve ports. Either a steam or turbine would be a more logical application for a gasoline-burning engine.

## Wasted Energy

Take a look at the picture on the next page. Shown is a 4 cylinder gasoline engine with a turbocharger and it is being run at full load. There are two things to take note of in the picture: 1. The yellow color of the exhaust manifold indicating a temperature of 1,8000F! 2. The cherry red color of the turbo exhaust pipe which indicates a temperature of 1,3000F.

Can you believe all of this heat in front of your eyes is just being wasted? This is exactly what is happening to all of this heat energy when you operate your car, you just never see it. And that's not all; additional heat is given away via a liquid cooling system and radiator.

Anyone with knowledge of the basic laws of thermodynamics can see this is a blatantly wasteful design but this is exactly what the auto/oil industry is expecting you to buy into. The fact is we can no longer afford the excessive thermodynamic waste from a piston engine fed fuel at international prices. Clearly, there is enough heat here to boil water for steam injection, and it's being wasted.

## Steam Heat And Water Injection

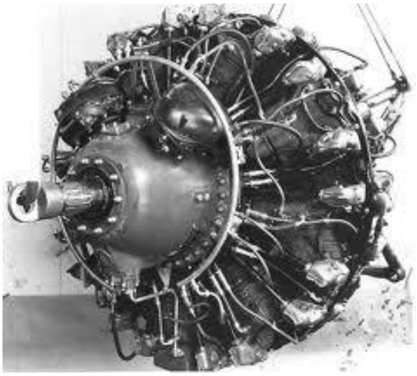
What if I told you that every combustion engine will benefit with a certain amount of steam being injected into the cylinders. With a simple jacket of tubes around the manifold to make steam, this can then be introduced into the engine's air intake system. From there it would flow into the combustion chamber, turn to steam, then become super-heated steam. Then again, as we discussed from Chapter 1, they could just put water in the fuel so it becomes steam in the combustion chamber.

Can you see how many ways there are to easily capture much of the lost heat that the industry is casually dumping to the wind? If we could just put water in the fuel we could increase the average combustion pressure, BMEP, without overheating the engine. This allows the engine timing to be advanced which adds more power and reduces emissions. This results in improved gas mileage. This is exactly what they discovered in 1895!

When water is used in gasoline formulas, some of the heat is absorbed by the process of water vapor going into the formation of super-heated steam. This results in less heat going into the engine's block. Water injection is the simplest way to improve a piston engine's performance, yet no auto maker will do it.

Water injection was used during World War II on supercharged 18 cylinder Wasp air-cooled engines. Additionally, the 1944 Vought Corsair F4U-1D, a factory-built fighter-bomber model, was powered by a R-2800-8W engine with water injection. This engine is shown above.

It was found that water injection could result in power increases up to 50%, while at the same time keeping these heavily loaded engines from overheating during takeoff.



Water injection was also used in torpedoes. More is provided in the upcoming chapter. In some ways water is even more effective than adding additional oxygen because water expands 1700 times its volume in the liquid state as it goes into this gaseous state. On the same token, oxygen expands 600 times its size from a liquid state to a gaseous state.

The injection of water into the cylinders allows more power w/o burning up the engines, since much of the heat of combustion goes into the creation of water vapor rather than into higher combustion temperatures.

Water injection is an engine saver, especially when operated under extreme loading. If car manufacturers were really doing anything to help fuel economy they would at least build a steam heat recovery system into the exhaust systems of our car's engines as standard equipment.

# CHAPTER 5

## Engineering Obsolescence

*"I will build a car for the great multitude. It will be large enough for the family, but small enough for the individual to run and care for. It will be constructed of the best materials, by the best men to be hired, after the simplest designs that modern engineering can devise. But it will be so low in price that no man making a good salary will be unable to own one – and enjoy with his family the blessing of hours of pleasure in God's great open spaces."*
**Henry Ford**, 1908

Today's evolution of the piston-powered car, in the face of superior technology, with a zillion plastic parts and a zillion parts in friction, has exposed Big Auto for what it is. All of the supposed performance gains in vehicle design have merely revealed that piston engines prevail because of an industry that was bent on getting them. There really has been no positive evolution as can be pointed out by these two following examples.

There were the Volvo 140 Series from 1966 to 1974. This vehicle proved that piston engines could be made to last 300,000 miles without an overhaul.

From 1955 until 1974 Volkswagen manufactured a cheap layman's sport vehicle known as the Karmann Ghia. It sported a streamlined body combined with an efficient air-cooled transaxle drivetrain in a low-slung car that performed nearly as well as an English sports car. It wasn't the fastest thing at the track, but people who owned one were happy for the fact they handled so well yet got an impressive 31 mpg and sold for under $2,000.

It was as easy to work on as a Volkswagen Beetle and used many of the same engine and chassis components. Simple, sporty and cheap.

Today, with modernized emission and safety standards in place, the smaller sportier car designs are anything but simple and anything but cheap. The fact is in the United States we don't get the option of a small streamlined car with an efficient simple engine that's built for great mileage. If you'll notice, every small sporty streamlined car is offered with an over-sized engine that gets fuel economy equal to a sedan, and that's if you're lucky.

It is sadly obvious that American traditions have given way to endless monetary demands placed upon individuals as they mature into adults. Somewhere along the way five year car replacement became routine for many car owners. Those who could afford a new car this often would do so to insure proper reliability. In the process, few have noticed that five year car replacement is an incredibly short lifespan. It is as if the world has forgotten about copper, nickel, stainless steel, titanium, vanadium, aluminum, bronze, tin and an untold number of new allows that do not corrode.

The reality is five year service life for something that requires so much in materials, labor and tool costs is a foolhardy use of our resources. The Model T was not in this category. It was a long lasting and durable design. No wonder we got hooked on gasoline-powered cars. The Ford Model T is always described as having a solid, durable and well-designed engine. Unfortunately, it set a standard that was too high for the industry to follow.

> *"The Model T employed some advanced technology, for example, its use of vanadium steel alloy. Its durability was phenomenal, and many Model Ts and their parts remain in running order a century later. Although Henry Ford resisted some kinds of change, he always championed the advancement of materials engineering, and often mechanical engineering and industrial engineering." Wikipedia*

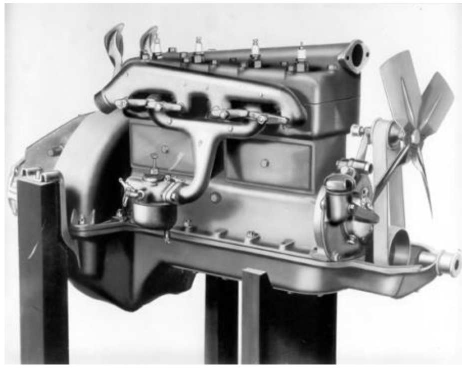
This makes you wonder why Big Auto doesn't champion alloy materials technology in our vehicle car bodies today. Today overall car life expectancy in the United States is 10.8 years not just five years. That means most cars keep going. What does that tell us if we have been trading in our car for a new model every five years? It tells us we could have probably driven the old car for five more years. Do you have any idea how much money this would save the average person? We'll take a closer look at that later.

1925 Ford "New Model" T Tudor Sedan

Perhaps you formerly believed that a 1908 Ford Model T was junk by today's standards. That's what Big Oily would like, that's for sure. But before we decide, let's review what this amazing vehicle offered:

> *The Model T had a front-mounted 177-cubic-inch inline four-cylinder engine, producing 20 hp. for a top speed of 40–45 mph. According to Ford Motor Company, the Model T had fuel economy on the order of 13–21 mpg. The engine was capable of running on gasoline, kerosene, or ethanol.*

The Model T ran on three types of fuel! This makes this Ford



more than remarkable, considering that this engine design was an engineering masterpiece for its day. Even though the Model T itself was phased out in 1926, Model T engines continued to be produced in the United States until August 4, 1941. And there was still a demand to provide replacement parts. This means the Ford Model T engine was manufactured for 33 years; a glorious period in automobile ownership because this engine design was available and fully supported by factory made parts. You won't find that today.

Furthering the positive testimonial to this engine design is the fact it was licensed by the Third Reich in Germany to be manufactured and was used in virtually all of the trucks used to carry troops and supplies to the battle fronts.

If I was to judge, by the sturdiness of the engine block combined with the simplicity of its design, I would vote hands down for the Model T as the best gasoline engine ever manufactured. This happened in 1908. No wonder there are so many of these still running today.

## The Myths Surrounding Auto Recycling

Now re-think the current situation, noting how few older automobiles and trucks are on the road today. That is because virtually every car older than 2003, a year I chose by going back 20 years from today, has been swept from our roads and junked. If we look at the total car sales during the 20 year period from 1976 to 1996, when sales averaged 12 million cars and light trucks per year, it calculates to 240 million vehicles. So if we just look at the last forty years of auto sales, during this time there were 240 million cars junked!

Since the average life of a vehicle is now about ten years, we need to add the cars that were purchased from 1996 up until 2006 as well, as they are likely all junked by now too. This brings the total of cars junked over the past 40 years to 360 million! That's a ridiculous amount of remanufacturing, especially the remanufacture of the same junk!

Of course it would make more sense to coat our cars with copper or nickel, stainless steel, other non-corroding metals or just tin like the old Model T, so that the bodies would not corrode into iron-oxide powder as they do now.

Today the much heralded "savior" is recycling. I'm sorry to tell you that it has become just another media-made joke. The recycling industry may be gigantic and ongoing, but it is anything but a wise solution to such a colossal problem as the wearing out of vehicles worldwide. Sure, some of the material to build a vehicle is saved, but when a vehicle is junked all of the labor to build it is lost. This fact is never paid any mind.

Each step of the remanufacturing process costs money and in order to "re-manufacture" a junked car body it must be transported, disassembled, crushed, shredded, melted, cast, rolled, cut, formed, machined, assembled, coated, painted, tested, transported, stored and resold. New car owners pay a part of every process every time they buy a car. Wouldn't it make more sense to pay this just once instead of over and over again?

In the end all, of these processes negate any significant savings in energy usage verses starting out with the raw materials from scratch. The way to save energy and help the environment would be to build them to last and the industry knows it. Recycling automobiles does not reduce pollution, it increases it because it does not recoup interior components such as vinyl seats, door covers, dash assemblies, plastic bumpers, light covers, glass, paint coatings, etc. from the vehicle. Instead, much of this material ends up in landfills contributing to environmental pollution.

A more modern approach would seek to reduce material and energy devoted to the manufacture of car bodies, not increase it. The easiest way to reduce materials and labor would be to reduce the number of vehicles that are built in the first place. Of course we have the ability to manufacture a car body that would last 100 years. Now would going out in a 1926 Rolls made of bronze, nickel steel, copper, teakwood and leather that runs like the day it was new feel like an unhip thing to do? Do you think you could handle the change?

One other thing I must mention about car recycling is the fact that it appears many cars are not being recycled at all. This can be seen from the many videos produced on the subject of car "graveyards". It turns out there are many of these all over the world. They are usually decommissioned air strips with new and used model cars parked on them permanently. It's a serious environmental mess. One thing is obvious, many new cars have never been sold, not even to the highest bidder if they are older models, for example. Instead, they are junked, with no attempt having been made to reclaim any of the metal, engines, seats or wheels.

How the industry is able to write off such a total loss is a subject of my current research.

**Cash For Clunker Program**

This government program was born in 2009 in the face of a staggering auto industry, or so the story goes. The Feds stepped in with just the right impedance to help us clean up our air with the Cash for Clunkers program. 700,000 vehicles were traded in during the two year program. Some got as much as $4,500 for their old car for the purchase of a new car. The government spent 3 billion of the taxpayer's money on the program. It has since been admitted that the program failed to stimulate the American auto industry.

That could be because in reality it was just an ill-conceived program designed to get older cars off the road because they bucked the 10-year-to-recycle mindset they have programmed the public to accept. In addition, many of these cars were still reliable and the fact they were older meant they were repairable. Since repairable cars are not in the future plan, government ads labeled them as polluters. This gave the owners of these older vehicles a false incentive to get rid of them in the name of air quality, and many of them did.

But, as we've noted, they never cared about our air quality! If they did we wouldn't be burning gasoline in the first place and breathing carbon monoxide. The fact is these older cars weren't polluters; they were some of the best cars still in existence because they could be kept running by their owners.

Five to ten year car life is only good for company profits and stockholders. Considering the financial strains most families are already burdened with, premature vehicle replacement makes no sense. What it does do is promote the cheapest designs manufactured at the cheapest price resulting in the public receiving a flimsy replacement vehicle that offers less safety on the highway than canned corn carried as freight.

**Blatant Examples Of Designed-To-Fail**

Let's see just how bad things have gotten for current vehicle owners. As if the public sector doesn't have enough of an economic burden already, to speed up the pre-planned adolescence "process" various components are built into our cars and engines that will fail long before the engine itself could need a rebuild.

The most blatant example of deliberate engineered obsolescence is demonstrated in engines that have rubber timing belts located behind a hard-to-remove-cover where you can't inspect them. Before the advent of the rubber timing belt the camshaft was driven by a set of synchronous steel gears or a steel chain. Take a look at this one. What do you think will happen to the engine if this belt breaks while the driver is going down the road at 60 mph? The reason for this belt is to keep the pistons and valve motions in perfect synchronicity. That's why the belt is toothed along with the camshaft and crankshaft pulleys. If the pistons and valves go out of synchronicity they run into each other, and this damages all of the pistons and valves. You might as well start looking for a new engine at this point. One failed $50 dollar rubber part just cost you $10,000 or more, not to mention being stranded and towed.

This is an unforgivable practice by the auto industry; making something that is so critical and hard to get to out of rubber. It doesn't make any sense to make a precision engine out of steel, then jeopardize the entire operation by equipping it with critical rubber component.

Don't be fooled. When automakers boast about how the use of a belt helps to dampen the engine's vibrations you know this is a bogus explanation of a faulty designed component. I have never heard of one human being ever noticing or complaining about a vibration from a timing chain or from timing gears coming from inside an engine.

The other part I remember is how infrequently steel chains suffered complete failure like belts do today.

## Spinning Shafts And Gears Mean Outdated Technology

For anything that accelerates and slows down, a priority should be the reduction of rotational mass, also known as inertia mass. Yet carmakers are still leaving this out of the car equation due to their continued use of heavy drive shaft components from the past. They might have micro-chipped our vehicle's fuel system but in the meantime they left our wheels hooked up mechanically to a cumbersome engine.

How wise is this? Picture your car engine's crankshaft, transmission shaft, drive shaft and rear axle all spinning at 60 mph. How much energy is there just spinning right in front of you? Here's how to find out. See how much energy it takes to stop it. That's how much energy it took from the engine itself just to get the drivetrain up to speed.

Now let's say your car's rear wheels are jacked up off the ground as in the car shown at right. You want to get everything spinning. Everything in the drive train is in gear. You start spinning the rear wheels at the same rpm that would equal about 60 mph in 4th gear, which is about 400 rpm. The engine crankshaft is now spinning at about 2000 rpm. The transmission, driveshaft and differential will be spinning at a speed somewhere in between. Now! With all of these components free spinning (approximately highway speed), SUDDENLY drop the car to the floor and see what happens. You know there is enough energy in motion to propel your car through a brick wall, across the street and into another garage. That's because the rotational inertia of all of these spinning components represents a huge amount of energy. The poor engine has to provide the energy to this power robbing drivetrain before it can ever produce one iota of acceleration for your vehicle. On top of that, we're going to waste all of this spinning energy when we slow the vehicle back down. Actually, we're going to convert the rotational energy into brake pad dust and rotor wear. Tires, wheels, drive-shafts, differentials and transmission gears all have to come to a dead stop. This is madness.

Rotational inertia should be maintained, not given up and replenished repeatedly. How about making a vehicle where only the wheels have to come to a complete stop? The easiest way to do this is to eliminate the parts that you had to speed up. There is a way to do that. It's called an electric car and it utilizes a wheel hub motor. This is the most efficient way to transmit electric energy to a drive wheel. At a stop, with the wheels stopped, the motor is stopped as part of the wheel itself. Little energy is lost from revving up and slowing down heavy inertia parts. No energy is lost sitting at idle.

There's a trove of inertia weight spinning just in this final drive component.

The public has no idea that the acceleration of an electric car from a standstill is mindboggling. That is because within a fraction of a second, when you tell it too, the drive motor begins to spin, and you're off. Yes, you can rev up a Dodge Viper to about 6000 rpm, drop the clutch and get a fast start. But it will still not be as fast as a Tesla. The 4 wheel drive electric driven Tesla has no rival in standing start acceleration.

The Viper is not as quick because you still have to accelerate the entire drive train of the Viper up to speed. After all, it was just sitting there at zero rpm even though you were racing the engine. So before the drivetrain of the Viper gets spinning the wheels of the electric vehicle have already been turning for a few milliseconds. Moral of story: don't buy a Viper unless you want to get embarrassed by a Tesla.

## Aerodynamics Of Automobiles Overlooked

A critical component of every piston engine vehicle is a water cooling system which is tied into a large radiator. In order to insure that plenty of airflow gets to the radiator, car manufacturers use this

as an excuse to put the thing right up front. By placing the radiator in the front end of cars and trucks this results in a box-like shape, right at the front of the vehicle where it cuts into the wind. Big Oily loves this design.

I don't care how much chrome or decorative trim is on the front of a car, if it is a blunt or rough shape then the air stream in front is going to be broken up. In the study of aerodynamics it's called turbulent flow and it results in drag. This is why Big Oily loves extra big engines, V-shaped engines, large radiators and flashy chrome grills. It is easy to shape it into a blunt front end.


This shape supports laminar flow. Will you auto dudes ever get it?

Now when it comes to flying like a bird then you need to construct your vehicle like an airplane, because up there if you don't exhibit laminar flow over your surfaces, you are coming down. Airplanes are all designed to support laminar flow as this allows the air stream to gently bend around the object going through it. Since a car is traveling through the same atmosphere as an airplane it should have the same front end of an airplane. A few did in the past. One of them was the Tucker, which was a revolutionary automobile that featured the engine over the rear axle and the radiator in the rear. Air was drafted from the underside of the car rather than the front, leaving the Tucker's front end artistically rounded and streamlined much like an airplane.

The Tucker was too stream-lined to be permitted by big auto/oily.

As a result of this, and the fact the engine was located above the rear wheels negating the need for a lengthy and heavy driveshaft, the Tucker had the same acceleration with a six cylinder engine as other cars equipped with V-8's. And it got 28 miles per gallon when similar V-8 powered cars of the day were getting 14 miles per gallon.

The Tucker also featured an engine that was a flat configuration, like the Volkswagens and Porsches of the 50's through 80', and had 3 cylinders on each side of the crankshaft. You will notice that the flat engine design has been mostly discarded.

Most of us never got the chance to buy one since the company was sabotaged by back-stabbing financiers after only 55 vehicles were made. Manufacturers have chosen to continue mass production of V-Engines, which are very tall and thus require a taller hood resulting in a large up-front radiator. They are definitely not trying to improve gas mileage.

## More Auto Maker Illusions

Automakers of today are anything like Henry Ford's original concept, since they equip our vehicles with so many parts that are made of rubber and plastics. Just look under the hood of a modern car's engine. You'll find that there is so much plastic covering it that you can't even see the engine. This is an outrageous over-use of plastic!

People today are so detached from automobile maintenance and repair that to them this plastic ornament actually looks like an


engine. Look closer and note the plastic top says "hemi". This is an invention carryover from the 1950's Chrysler Desoto, and it is now being offered on a new truck. People fall for it; it gives them a reminder of the glory days on the open highway. Sadly, it won't be long before this plastic cover starts to lose its appeal, as it only serves to make the engine impossible to work on without first removing it.

If you have one, remove it before rats find a home underneath and begin eating your rubber fuel injection hoses. If these materials seem out of place amongst their metal counterparts located underneath the hood you are correct in your summations. The fact is they are unsuitable for high temperatures like those found under your car's hood and as a result over time they begin to harden, crack and fall apart.


Look at the air filter box in the adjacent picture. The air filter box is critical to the longevity of the engine. Yet here in this expensive European car the air filter box is made of cheap plastic material. This is going to crack long before the engine is worn out. In this case, the failure of the air box will allow dirty air ingestion and cause the engine to wear out prematurely. This is the kind of adolescent engineering trick Big Auto torpedoes us with routinely.

The engines are complicated enough, but even if the engine doesn't give out, the body will. That's because car bodies continue to be made out of iron, and though they are coated with epoxy paints that look flashy as they leave the factory, it is barely better than the same old primed and painted iron cars of the 40's. In fact it's pretty much guaranteed that within 5 years your flashy car will have patches of missing paint unless you kept it in a garage. These will soon give way to rust spots which will grow in size. If you don't take care of these spots your car's exterior will be rust and junk plastic in 10 years.

## The 100,000 Mile Mental Wall

Today's cars are not any more reliable for the first five years than the ones our grandfathers drove, and they are anything but long lasting. But we've been programmed to believe that 100,000 mile engine life and/or 10 year vehicle life is somehow appropriate in the 21st Century. They have led us into a society that updates and replaces common items like cars in a shorter and shorter amount of time. This gives them the ability to justify cheaper made mechanisms and hide behind short vehicle life statistics.

The fact that cars are made of iron-rusting bodies and feature overly-complex lightweight souped-up engines didn't just come about by accident. Both the engine and body have been engineered to meet the minimum, and the crossbar is set at 100,000 miles. Now it's time for some psychotherapy. The auto industry has been producing cars that lasted well over 100,000 miles since 1908 when the Ford Model T first made its appearance. Nicknamed "Tin Lizzy' it featured the use of non-corrosive tin in the car's body. Today, these car bodies have lasted over 100 years, proving that if car bodies were built just a little better, they could be used over and over again for decades. But there has been no attempt to improvement the life of our car bodies.

Make no mistake about it, the concept of a car wearing out in 100,000 miles is an absurd premeditated concept the car manufacturers underwrite and follow. They do it beginning with ridiculously low 50,000/100,000 mile warranties as if this implies that their product is built to quality standards befitting the 21st century. The fact is today's warranties represent virtually no improvement over cars built in the 19th century.

Who wants to fork out $50,000 for something that is going to be worth 10 cents on the dollar in just 100,000 miles? Tell me what is a worse investment than a new automobile.

## How To Drive Cheaply And Beat The System

If you're a person who can live with the possibility of breakdown, then you can drive whatever used car you are driving until it breaks down. Then you fix what broke and only what broke and keep driving. You will be pleasantly surprised to see just how much longer it continues to get you back and forth to work without suffering a serious breakdown.

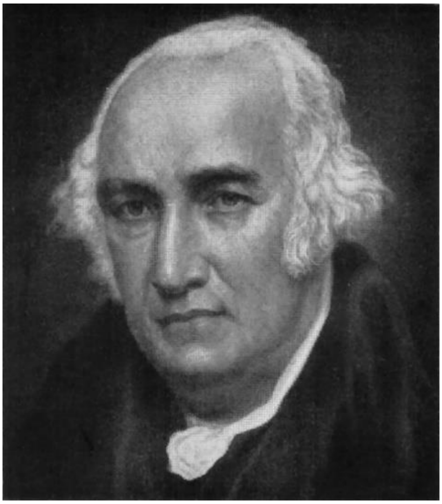
Don't repair things you don't need; cruise control, four-wheel drive, stereo system, air-conditioning, etc. Keep driving it. You're car, perfectly maintained or not, is not going to be worth much with high mileage on the odometer anyway.

Find out ahead of time if the engine has a rubber timing belt. If it doesn't, keep driving and saving money. If it does then you are going to have to replace it before it takes your whole engine down. This usually happens around 100,000 miles. Plan ahead for the cheapest way to replace it.

As a general rule, lower priced simple car designs are going to be easier to keep running. Six cylinder engines and larger are equipped with steel chain timing belts, as well as are truck engines. For example, I had a 1994 Ford Explorer and put 242,000 miles on it with never changing the timing chain.

Remember, you can live without air conditioning, stereo music, cruise control, 4 wheel drive, fuel gauge, odometer, etc. Also remember, you're not only saving a ton of money but saving yourself from car bondage as well.

James Watt: 1736 to 1819,] was a Scottish mechanical engineer and chemist who improved Thomas Newcomen's 1712 Newcomen steam engine with his Watt steam engine in 1781. This became fundamental to the changes brought by the Industrial Revolution in both his native Great Britain and the rest of the world.



# CHAPTER 6

## The Piston Engine Destroyed

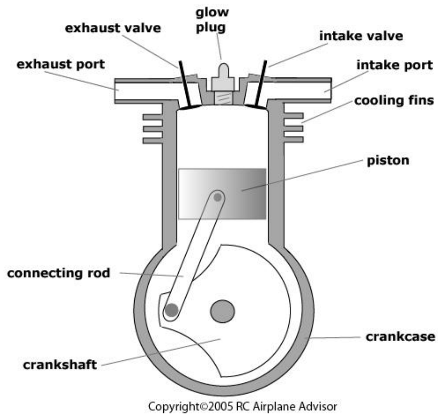
*The Mundane Truth Regarding the "Modern" Petroleum-Powered Piston Engine*

A PETROLEUM POWERED PISTON ENGINE harnesses the pressure created when fuel is mixed with air, compressed and ignited with a spark plug. When it burns, it expands rapidly, and since it is contained within a cylinder, the pressure goes up dramatically, pushing against the top of the piston moving it downward.

This expanding gas that is produced inside the combustion chamber of a piston engine is similar to liquid under pressure. Think of liquid as behaving just like a gas but it is more viscous or dense. Liquid under pressure is what is harnessed in a hydro-electric dam.

An expanding gas also represents a pressure and flow (burning-expansion-exhaust), except in this case it is in a gaseous state rather than a liquid state. In one case we harness the pressure differential of a gas; in the other we harness the pressure differential of a liquid.

At the time the petroleum piston engine was being designed and selected, there were in existence designs of steam turbines, rotary steam engines and hydro-powered turbine generators that harnessed steam pressure and water pressure, or should I say pressure differentials. Yet most oddly, none of these proven concepts were applied to the same types of pressure differentials within internal combustion engines. All research and manufacturing proceeded as if piston engines where the premiere choice.




Piston engines manufactured today and since 1887, that burn gasoline, contain the same components shown in the diagram in similar fashion. Today's metallurgy is vastly superior from 100 years ago, and so many of these parts are now built much stronger and lighter than before, but it's still the same design! Let's take the design from the top:

## The Wimpy Fuel Gasoline

A piston in a piston engine performs much like a cannonball. The piston is inside a cylinder, the cannon ball is inside a gun barrel. The piston makes a seal within the cylinder with rings that spring out against it; the cannonball uses a leather wad. The piston uses gasoline and air mixed together, the cannonball uses black powder. The piston has to compress the gasoline–air mixture into a space about 1/10$^{th}$ the original volume, the cannonball does not have to compress the powder at all. For the sake of

Here, one power cylinder of a modern gasoline powered piston engine is depicted. The "modern" petroleum-powered piston engine has all of these components. Exception; the diesel would not have a spark plug.

comparison what happens if we use the same fuel in the cannon as is normally used in the gasoline engine.

Gasoline has approximately 18,500 BTU/lb. Gun powder about 1,800 to 1,900 BTU/lb. So it initially appears that there is about ten times the power in gasoline than there is in gunpowder on a per pound basis. Gasoline must be a pretty powerful fuel in a piston engine, right? Not at all, since the fuel has to be mixed with air before it can combust. The total amount of air available to power a piston is determined by the length of the stroke and the diameter of the cylinder. And it's this amount of air that is going to determine the maximum amount of fuel you can burn on each stroke of the piston.

If we want to power the cannon with an air fuel mixture we have to do the same thing; the length of the barrel times the bore gives total volume of air that we can compress. In the example calculation below, I compressed one liter of air mixed with the correct amount of gasoline vapor to power this small cannon. One charge is equal to one liter of air plus a small amount of fuel to mix with the air; then it's compressed to 1/10 of a liter.

**Powering the Cannon with Fuel plus Air**

A mole of gas = 22.4 liter     Oxygen = 28 gram/mole
Therefore; 1 liter of Oxygen = 1.25 gram Oxygen
Common air fuel ratio in a piston engine = 12.8 air/fuel
1.25/12.8 **= .10 grams of fuel to burn. Note; this isn't much fuel. But placing more fuel in the cannon will have absolutely no effect since there will not be any surplus oxygen present to burn it.**
Total energy from the explosion: 10 grams ÷ 450 grams/lb. X 18,500 BTU/lb. = **4.1 BTU**

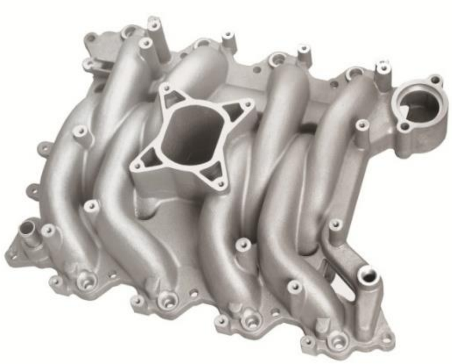
**Powering the Cannon with Gunpowder**
Compression ratio of 10:1 in a one liter piston = 100cc available for gunpowder charge.
Total energy from the explosion: 100 cc = 100 grams X 1,800 BTU/lb. ÷ 450 grams/lb.     = **400 BTU**

In the case of the cannon, using gunpowder in the place of vaporized fuel and air afforded 100 times the amount of propulsion energy. This is because we were able to fit much more fuel behind the ball since we are not limited by air. The amount of gunpowder you can burn is not limited by air because gunpowder is a type of fuel that contains oxygen within the fuel itself. So with gunpowder we can get a lot of power into a small space. The point is there is little power available from a liter of fuel vapor. One power stroke of a piston engine doesn't add up to much.

On a pound for pound basis, gasoline and petroleum fuels may look ok, but when you look at them on a volume basis, gasoline, and diesel fuel as well, are really quite wimpy for the simple fact that they need air and lots of it in order to combust. As a result, any machine that we make to compress and explode fuel vapor is going to have to be quite large in order for it to ingest and compress all of the required oxygen to burn the fuel that is supplied into the engine.

Here is where a turbine engine shines; it can breathe gigantic quantities of air because it is all going in one direction through a large diameter tube.

## The Intake Dilemma Of A Piston Engine



Pictured: intake manifold for an 8 cylinder engine Note the tubes that the air must flow through in order to get into the combustion chamber. The exhaust manifold subjects the flow of gasses in the same way. With a turbine engine the gasses go through a single straight section. Remember, 79% of this air is Nitrogen, which just goes along for the ride.

Getting air into and out of a multi-cylinder piston engine is an entirely different matter than the one-direction turbine. For example the air intake manifold above took thousands of hours to design and hone into the proper and compact shape. What a waste of engineering. It's just an air restrictor, and it will have a second one, the exhaust manifold, on the other side that the gasses will have to go through as well.

Now, before the air goes into this manifold, it must first go through a throttle plate, shown. The throttle plate serves as an **intake restrictor.**

After the air goes from here through the intake manifold, it goes through the intake valve. This is a narrow passage, which is rapidly opened, allowing the gas into the combustion chamber. Then the gasses go out around the exhaust valve, down another narrow passage, then out through the exhaust manifold, and from there to the tailpipe.

You can see that the poor piston engine has to do a lot of work just to get all this air and exhaust into and out of the combustion chambers through these curvy air bottlenecks known as manifolds. And so the sad truth is the combustion volume of a petroleum piston engine comes at an exorbitant cost. In this case the cost is lost energy to the pistons as they pull air into and out of the combustion chambers.

And, there's a further limitation. Unlike a turbine, every piston engine has a failure limitation regarding maximum rpm. This is the point just before a piston rod breaks under tension or a piston pin shatters leaving one end of a connecting rod free to whip and stab the engine block. This rpm limitation limits the rate and volume of combustion, and thus limits the horsepower.

Because a piston engine has such a difficult time inhaling, compressing, and exhausting air plus the fact its shaft speed is limited, when compared to a turbine engine in terms of horsepower per lb. of engine weight, a piston engine performs at 1/100th the level of a turbine engine.

**Fuel To Air Ratio**


What makes the gasoline engine so problematic? Gasoline.

There is another idiosyncrasy regarding gasoline, and this is how air must be mixed with it in order for the engine to operate properly. This gasoline/air vapor **must always err on the side of being too rich, otherwise the fuel will detonate**.

What is meant by "too rich" is that the air fuel mix contains slightly more fuel to burn than there is oxygen present. In other words, the amount of oxygen must be reduced slightly below a stoichiometric ratio for proper combustion. Otherwise we will again have premature ignition and detonation! This makes gasoline the mule of all fuels.

On one hand, we have to provide enough oxygen to have complete combustion and clean burning. On the other hand, if we give it just a little too much oxygen it will not combust properly; it will explode (called detonation).

It is for this reason that the gasoline engine has to run with a rich fuel mixture. It therefore follows that in using this engine we have no choice but to pollute the air, just to keep the engine from self-destructing. This sounds like the very worst imaginable design by anyone the least bit concerned about air quality.

Such a paradox as to the use of gasoline in piston engines should have caused Big Oily/Auto to shun either gasoline as a fuel or the piston engine as a propulsion mechanism in the first place.

Up until the late 60's there were many workhorse sedans that came equipped with naturally aspirated 6 cylinder gasoline engines. Cars like the Nova, Valiant and Falcon got about 20 mpg. These same vehicles also came equipped with a V-8 and the performance was much enhanced. As expected the fuel mileage dropped a little to about 16/18. I have owned cars like these and would do just about anything to be able to buy one of them today.

That's because with a few tools and some time I could easily keep one of these cars running for 300,000 miles without ever having to take it to a professional garage. And they were a pleasure to work on; you could get to all the parts.

Then along came the smog mandate laws and all of our former designs that were self-serviceable went into the crapper. Initially, the easiest and most obvious way to reduce smog emissions was to burn the excess fuel that formerly went down the tail pipe in the tail pipe itself. To accomplish this most manufacturers equipped their existing engines with "smog" pumps.

Rather than modify the engine to run lean, like the Honda CVCC engine of 1975, they just used the same engine and equipped it with an air compressor powered by the engine via a belt. This arrangement pumped raw air (extra oxygen) into the exhaust ports, and this did help to reduce smog in the LA basin. It also drained overall power produced by the engine.

Then the automakers made the cars even more sluggish by putting a damper between the throttle pedal and the carburetor. When you stepped on the throttle fast it would respond slowly. As a result, most of the cars produced in America during the 70's and 80's got even worse fuel economy and on top of that, performed sluggishly. No serious attempts were made by any major automaker except Honda to actually solve the "gasoline has to always be rich" riddle, which the supposed "smog program" should have addressed.

Thusly the "smog" program" merely mimicked an honest attempt to give the public clean air. And as you already know, it could have been as simple as mixing water with the fuel and/or reformulating it into alcohol.

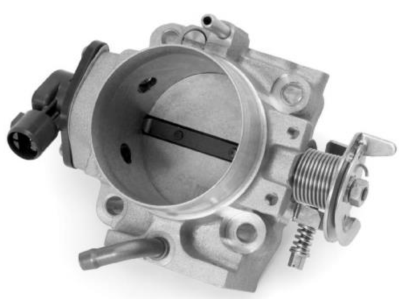
As a result, the 1960 "smog laws" became a worthless hand-slap that made the public pay for it with lousy vehicle performance and mileage. In the meantime it allowed Big Oily to keep selling us the same toxic fuel and enabled Big Auto to keep selling us the same large clunky engines that performed even worse than before.

Think about the illogic here; they allowed the vehicle manufacturers to give us cars that consumed even more gasoline, as if this was a way to reduce the pollution created by the combustion of gasoline.

The breakthrough smog gadget came out of Europe in 1975. Known as the catalytic converter, it is used on every gasoline fueled vehicle today. Later during the 90's, a cheap low-pressure fuel injection system was designed, and it is basically the same design that all car manufacturers use today.

This low cost, low pressure fuel pump allows gasoline to be squirted into the induction manifold just before it goes into the combustion chamber to be compressed. This means it only has to operate a low pressures. You should note that this kind of a fuel injection system is inferior to the fuel injection systems that are equipped on diesel engines. It just happens to be much cheaper. On today's cars most of the injectors are made of plastic.

## Another Paradox; How To Reduce Engine Speed

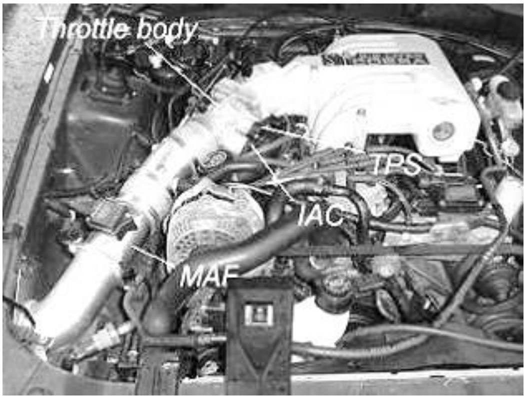


Here is a close up of the throttle plate mechanism that is a must have item for every gasoline powered piston engine.

Now it is time to introduce another peculiar attribute that plagues every gasoline fueled piston engine and that is this fact: In order to reduce the speed and power output of a gasoline piston engine the air intake must first be reduced before the amount of fuel is reduced. This may not seem so odd at first, but consider this: when a diesel engine is under a load at a certain rpm, you reduce the rpm by reducing the fuel. Conversely, with a gasoline engine you do not do this because you cannot do this! If you reduce the amount of fuel without reducing the air first the engine will immediately go into a lean condition and this will cause it to begin detonating rather than to slow down. What a crazy engine this is indeed!

Now in today's modern fuel injected engines the air restrictor and the fuel injectors are controlled simultaneously. But the main problem is this: anytime a gasoline engine is operating below its maximum rated output (less than wide open throttle) ***it must be starved of air.*** Wake up and understand what you are reading. Anytime your car is not under maximum acceleration, the engine is choked.

Do you understand that under such partial-load conditions the pistons will have to pull down against a vacuum and that it takes extra horsepower to pull them down against a vacuum? But this is the only way to reduce engine rpm when it is spinning at operating rpm.



The intake system of a modern 4 cylinder gasoline powered car. Note the throttle body. It is here that the air intake to the engine can be totally closed off in order to starve the engine of its ability to take in air.

The situation is totally unacceptable, since our engines are operated at partial load most of the time anyway. Thus our engines are almost always operating against a restrictor which adds work to the running of the engine itself. This lowers the overall efficiency.

A good example of a partial load condition is when you are cruising down the highway at a constant rate of speed. And, yes you are hearing me right. Under these sublime conditions, where it seems that your engine is just lumbering along, it is not running in an efficient mode. Not at all. Because steady state highway driving requires only about 25% of the vehicle's rated engine horsepower, such gasoline-engine-equipped vehicles typically operate well below their maximum rated horsepower output, and this is where engine efficiency is poor. It looks like Big Oily has pulled another one on the public.

Early gasoline engines suffered from detonation when gasoline flow was reduced or restricted while the engine was running at full speed. This inherent problem took some time to figure out, eventually leading to the addition of the restrictor plate in the intake system to make the design workable. Diesel fuel does not detonate; therefore diesel engines can avoid this pitfall and are thus superior designs. Here is one more glaring example of the fact that we should be using either a different engine design or a different fuel formulation.

During light load driving conditions, such as steady state highway cruising, the throttle plate of a medium to large sized engine will typically be open only 25%. This means the engine is doing extra work just to pull the pistons down during the intake stroke. Here's a summary of the operation of the throttle plate in gasoline engines, carbureted or fuel injected:

**Full throttle operation (accelerating onto highway)**
Throttle Plate, is wide open.
Pistons are pulling against minimum vacuum

**One quarter operation (highway speed driving)**
Throttle Plate closed 75%
Pistons are pulling against increased vacuum

**Low speed operation and stopped (idling and traffic)**
Throttle Plate closed 95%, `
Pistons are pulling against maximum vacuum

The more the intake is restricted the harder the engine has to work in order to aspirate. The harder the engine has to work the lower its efficiency will be. Yet virtually all gasoline engine intake systems are operated like this for the simple reason that air starvation (reducing available air and oxygen) is the only way to reduce the power output and control the engine.

## Should We Buy The Extra-Large Engine?

Most of the public perceives that a larger engine will be a longer lived engine because it will not be loaded as heavily during the life of the car. But unless you are towing a lot of weight and doing it regularly, you can forget about a larger engine saving you money. The fact is you will not see longer engine life but it will cost you up front and with each and every fill-up thereafter.


Think about what you now know. Vehicles that are offered with extra-large engines (often a desired upgrade for power and towing enthusiasts) will be the most severely air restricted in normal cruising conditions because of their higher horsepower ratings. As a result, they may only be at 15% of rated power output at highway speed. So unless you want to go fast and tow a trailer, and some people do in which case the bigger engine works, I would go for the smaller engine every time. **Extra-large engines are inefficient at almost every speed, so while in traffic they rob us blind.** Plus, added engine weight adds more costs down the road in tires and brakes.

A vehicle's engine should be designed so that it operates most efficiently at the power loading you will be operating at most of the time. In the case of using a gasoline engine you can see that this is only possible if you had an engine that is just big enough to move you along at highway speed when you have your foot to the floor. Surprisingly enough, this is the way that industrial vehicles and trucks used to be designed. They had just enough power to reach 60 miles per hour wide open. Of course, they were only able to traverse a grade at 15 mph or so. A package like this will get better fuel economy and the engine will last just as long as the larger engine. We don't use this system on our highway trucks anymore because everyone wants to be going full speed all the time.

And lastly from this discussion about intake air and fuel ratio problems; we have seen that the only logical application for any gasoline fueled piston engine such that it could be run efficiently and therefore unrestrained at full throttle would be a stationary application to power a constant load generator or pump. In this case the engine would be properly sized such that it could be run at full operational load with no restrictor on the air intake.

You can also see that the application of the gasoline piston engine for a car where it is almost never at wide open throttle is insane. And there's more. The amount of frictional energy losses that occur within piston engines is enormous. So when we take a 300 cubic inch V-8 that puts out 300 horsepower we are going to have to input 90 horsepower or 30% just to turn the engine at 4,000 rpm where it delivers its maximum rated 300 horsepower.

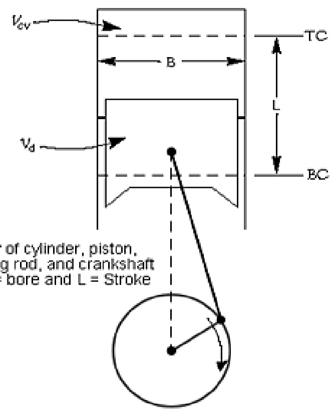
**Now, two more negative attributes of piston engines come to light:**

1. The engine itself works its fanny off just to make itself rotate.
2. Because it is so hard to rotate, the engine has to have a powerful starter motor.

It is because of these two idiosyncrasies of the gasoline piston engine that we allow ourselves to be sold on the illogical practice of leaving our engines running, even while we are at a dead stop. Big Oily wins again and we're still not finished.

## Compression Ratio Problems using Gasoline

At this point you might find it hard to believe that there are even more reasons not to use gasoline in any kind of a piston engine, but that is the case. Let's take a modern gasoline engine. It will have a compression ratio of around 10:1. If the engine pulls in air at standard atmospheric pressure of 14.7 psi , it will thus be compressed to fit into a chamber that is 1/10th of the original gas volume which will yield a pressure that is ten times the original, or 147 psi. (actually it will be about 200 psi because of the added thermal expansion of the air fuel mix).



Geometry of cylinder, piston, connecting rod, and crankshaft where B = bore and L = Stroke

When we compress a gaseous-state fuel/air mixture; its temperature increases. For example, if we compress this gaseous fuel and air mix from the volume of a kickball into the volume of a baseball, the temperature of the gaseous fuel and air mixture will rise. This is called **adiabatic compression**. It is this temperature and pressure increase that is going to going to cause auto-detonation gasoline of vapors if you run too high of a compression ratio.

So with gasoline, as the fuel of choice in any piston engine, we are really stuck with a low compression engine. This situation is made even worse when the engine is run at only a partial load. This is what I will attempt to explain next.

Today a typical large passenger car engine would typically have a displacement of approximately 300 cubic inches and a compression ratio of about 8:1. There are two main parameters that dictate how much power any given fuel powered piston engine can generate and these are displacement and compression ratio. Total displacement means that the total volume of all the cylinders, from the point where each piston starts to the bottom where it stops and turns around again, would total 300 cubic inches; a little over 5 quarts of volume.

Having a compression ratio of 8:1 means each time the piston goes from bottom to top the volume of the gasoline-air vapor that was drawn in during the down (intake) stroke will be compressed to $1/8^{th}$ of the original volume. Why can't we just make a smaller engine that is 150 cubic inches and design it with a compression ratio of 16:1 instead of 8:1 and get the same amount of power? That's exactly what we do with racing engines.

In simple terms, if the pistons were pushed down by twice the gas pressure, you would only need to have pistons that are ½ the area. Well, here's another annoying fact about the use of gasoline as a fuel; it won't tolerate this higher pressure. *(The pressure at the beginning plus the pressure at the middle of the cycle divided by two is a rough estimate of a term called Brake Mean Effective Pressure).*

We can't do this because gasoline has the propensity to detonate when used in a piston engine at any compression ratio above 10. This means that as the piston is coming up toward top dead center the fuel mixture prematurely ignites and produces a destructive pressure wave that is aimed toward the piston which is coming up towards the explosion. An explosive force pushing against a piston BEFORE top dead center is not an efficient way to make power and will ruin the engine in short order.

So now we've learned that gasoline, when used in a piston engine, has two situations that cause detonation. These are: running too lean and running too high of a compression ration. This is why gasoline is an illegitimate choice as a fuel in piston combustion engines.

Delving deeper, gasoline could tolerate a higher pressure, BMEP, by the injection of water vapor into the cylinders. At a minimum, gasoline should be reformed into diesel or methanol at any common refinery. It would be a simple process to produce a fuel that would allow higher compression engines. Vehicle engines could be smaller and lighter, and their fuel economy improved. Maintenance costs would be less. Our air would be smog free. Unfortunately we must all live in ignorance of these discovered facts.

## Piston Engines Demonstrate Horrible Thermodynamic Efficiency

Here's another not-so-good attribute of the petroleum powered piston engine that we need to air out. Let's us continue our evaluation by analyzing the overall thermal efficiency.

As you have observed, every petroleum piston powered engine generates and loses heat. High-temperature exhausts gas goes out the tailpipe; this is lost heat. Heated water from the engine block is cooled by the radiator; this is more lost heat. A fan blows air through the radiator and across the engine releasing surface heat from the engine; more lost heat. And thus the piston engine of every car delineates extreme thermodynamic inefficiency.

Friction rings and sliding pistons all produce excessive thermal heat during the motion of metal against metal, gradually overheating the crankcase oil making it necessary to constantly get rid of even more heat with an oil cooling system. Therefore, a system to cool the oil and the engine block is another critical system on every engine in order to prevent it from melting itself together. So this is clearly not an efficient design.

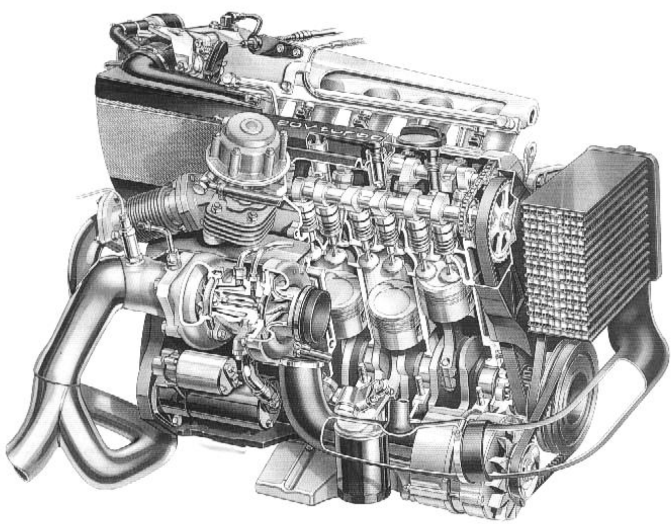
Anyone with a moderate understanding about thermodynamics can understand that a system which takes in air at approximately 60 $^0$F and then delivers it out of the exhaust manifold at approximately 1300 $^0$F is a thermodynamic apocalypse. Big Oily wins again.

## Turbo-charged Piston Engines

*"We admit we have a better engine design, but we're going to keep the pistons for nostalgic purposes."*

Many people associate the invention with Caterpillar and Cummins, who began manufacturing turbo-charged diesel engines in the 50's, but turbochargers were used extensively on piston aircraft engines during World War 2. In 1965 Chevrolet introduced a turbo powered Corvair called the Corso Turbo.

In 1979 the Mustang II was offered with a turbocharged 2.3 liter 4 cylinder. It turned out to be a poor performer as many of the turbochargers failed and some of the engines caught fire. It failed to duplicate the performance of the 5.0 liter V-8 engine. This led to the Ford turbo package being cancelled in 1982.

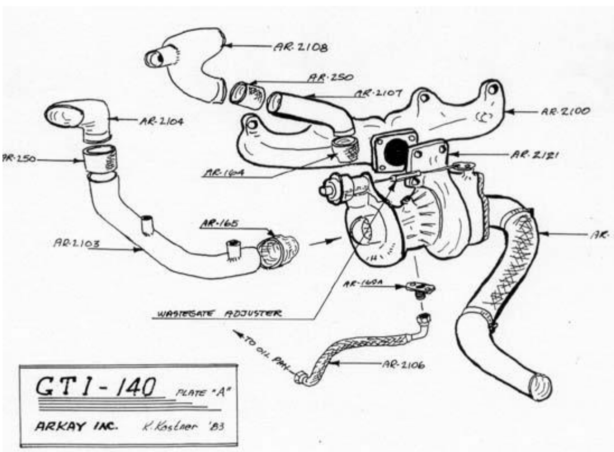


If you are running a turbo-charged diesel over the road, then this is a device definitely worth having. Remember, the diesel can run a higher BMEP and thus turbocharging will increase the efficiency enough to pay for itself in fuel savings. But this does not apply for gasoline engines.

It needs to be noted, however, that turbocharged gasoline engines are prone to spark knock because of the higher gas pressures, whereas diesel engines will benefit from the heat and extra pressure.

And as you now know, the easiest way to improve a gasoline engine's performance would be to reformulate gasoline so it could combust at a higher pressure. Never-the-less, turbochargers are still to this day being sold to the gasoline-buying public under the guise of improving engine performance.

Automakers tout the turbocharger as a rotary device similar to a jet engine. And this suggests that a spinning turbocharger somehow turns an antiquated reciprocating engine into a rotary device like a jet engine. It's just a rotary air pump for the engine. Yes, they help cram more air into the engine adding some horsepower, but the engine is still a reciprocating piston engine. It just has a rotary component added on. This adds even more parts to the engine package.

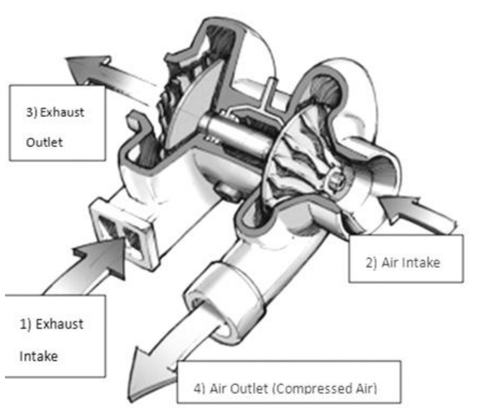



As you can see in the picture, this is no easy gadget to install. At first, the unit looks compact and simple. But because of all of the plumbing required to connect the intake and exhaust systems, the full installation of a turbocharger is a very expensive upgrade that requires many components to be carefully crammed into an already crowded space. The installation will make it difficult to get to the alternator and starter, but we'll worry about that later.

There are so many feet of tubing required to hook up a turbocharger that the only way to see all of the necessary components is with the engine on a test stand.

## Turbocharger Basics

A turbo charger is a fan-like device that runs off the exhaust gases coming out of the engine's exhaust manifold. Since these gasses are normally expelled from the vehicle's tailpipe it sounds like a great solution to the otherwise-wasted high-temperature exhaust gasses.




The fact is when you couple a turbocharger to a reciprocating engine, you've still got the same hefty friction-producing pistons being tossed back and forth and such parts are going to wear out the same as before. The engine is able to breathe oxygen into the combustion chamber more easily, but with all this same friction and heat loss, it's still going to lose the same amount of heat out the tailpipe.

Since a turbocharger does not reduce the temperature of tailpipe exhaust, it does not make the piston engine more thermodynamically efficient, and this is where automakers have managed to exploit a point of confusion. As equipped, turbo-chargers work off of differential pressure, thus they do not harness heat, which would increase overall thermal-dynamic efficiency. Turbochargers also require significant cooling to protect the bearing that is in-between the intake and exhaust rotors, therefore they must have an oil circulation system as well.

Now, on the most modern turbocharged gasoline engines they have managed to make them operate more efficiently by providing significant enhancement of the intake system, thus allowing a smaller engine to combust more fuel. And this is because **the turbocharger, being a near-frictionless device, is a more efficient form of power than a piston engine.**

What the above statement really proves is this: We should be using rotary engines, period. The fact is Big Auto should drop the use of reciprocating engines from the propulsion system entirely. Why won't they wake up? Big Oily maybe?

During a turbocharger's normal operation, the engine's exhaust gasses gush from the cylinders then out through the valve ports and exhaust manifold. These exhaust gasses are pushed out by the pistons going from bottom to top during the exhaust stroke, and this is what powers the device. As a result, exhaust gasses are at a high pressure, and it is this pressurized gas that is utilized by the turbocharger.

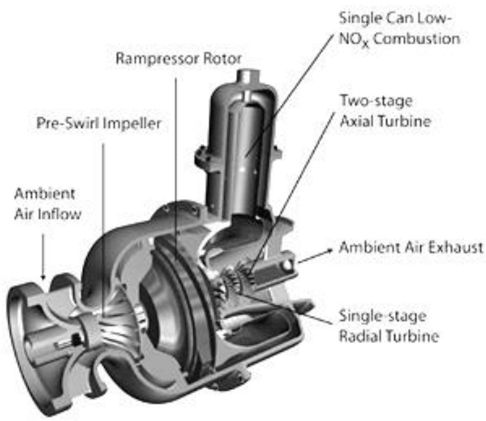
A turbocharger does not harness energy from further combustion, only from pressure. Therefore, we are not getting something for nothing by harnessing this otherwise untapped flow of hot gasses out of our engines. What it does mean is that now we are getting something out of the exhaust stroke of the engine's pistons. Normally the exhaust stroke of this engine is a wasted stroke. A wasted piston stroke occurs as the piston goes from bottom to top and back down again without producing any power. In this case, now at least the exhaust stroke is doing something to help to push gasses through a fan and make power.

Keep in mind, the piston is now going to have to push harder to expel this exhaust gas at a higher pressure, which is what the turbocharger itself needs, and remember, a turbocharger has absolutely no effect on the temperature of the exhaust gas leaving the tailpipe of the car. As stated, it is not adding thermal efficiency, but rather allows for a smaller engine package to start with.

In other certain applications a turbocharger can help a piston engine to operate at a slightly lower rpm to get the same horsepower as a non-turbocharged engine. This is a lot of parts for a relatively small gain, since the engine is still wasting a huge amount of heat energy out the exhaust and radiator. Is it worth the extra complications, parts, initial cost and expensive maintenance? Honestly, how many moving parts should it take to make a good engine in the 21st Century? Answer: one.

In the final analyses a turbocharged reciprocating engine resembles nothing more than a humorous display of what happens when you put two engineering contradictions into the same gadget. I say they are engineering contradictions for this simple fact that: If it is true that a turbocharger will help make a reciprocating engine more efficient than a non-turbocharged reciprocating engine, then the turbocharger itself must be a more efficient type of engine than a reciprocating engine. In summary, they should concentrate on the design of the rotary engine and drop the dead weight of the reciprocating portion of it.

The Wankel was sort of a combination of a turbine engine and a reciprocating engine. And there are many better alternatives than an engine-turbo combination. Consider the recently designed Rampressor Turbine engine shown which is a further development of this combination. The pistons have been replaced by the rampressor rotor (a rotary motion device). You can count all of the moving parts on one hand.




An engine design like this could be engineered and re-engineered until every part is designed for maximum life. In the meantime such outdated practices regarding petroleum piston engines need to be discussed again and again. When the design has been perfected, we will be able to hold our hand out in front of the exhaust gasses coming out of the engine and not get burned.

That's how an intercooled Chrysler turbine engine's exhaust was. That's when you'll know you have an engine operating with a thermodynamic efficiency that is suitable to for the 21st Century.

# More Unsettling Facts Concerning The Viability Of The Petroleum Piston Engine

**Very Hard To Start**

Because of all the friction that is created between pistons, rings, camshafts, valve-springs, etc., petroleum-powered piston engines are inherently difficult to crank over from a dead stop, especially when they are cold. This necessitates the provision of a powerful electric cranking mechanism, a suitable battery with enough reserve juice to crank the engine for a few minutes and a charging device known as an alternator. If these components are unnecessary using alternate engine designs, then this represents a sizeable waste of money. In 1924 you had to wait twenty minutes after lighting a Stanley Steamer before you could drive it, but you could do it with a match. This is just one example.

**Must Continue Running, Even At A Standstill**

I know we have covered this with the discussion of the stop-start devices that started being installed around 2016. Never the less, such a system was tolerated for more than a century as the public was instructed to keep engines running when we are stopped, rather than shut them off and restart them.

In 1895 when a Reich Electric vehicle was at a stop, everything was stopped. There was virtually no energy being lost. When a 1915 Stanley Steamer was stopped, everything mechanical was stopped. What a racket! Gasoline piston power was a propulsion design produced by racketeers!

**The engine will stall at low rpm**

Most automotive piston engines will stall and stop running at any rpm below 700 rpm. Thusly this type engine has to be kept running at an rpm above 700 rpm otherwise it might quit running in traffic. What a joke this is considering it is now 2023 and still most of our vehicles are turning over at 700 rpm while stopped in traffic.

We are paying for our own asphyxiation.

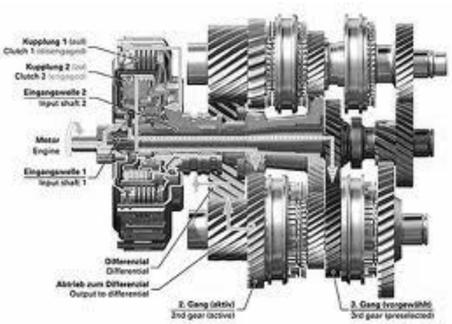
The car's air conditioning system is set to require this minimum rpm. The air conditioner is a fuel robbing mechanically driven gas compressor under the hood that makes your engine run even hotter and we use it to make ourselves colder. What a thermodynamic apocalypse!

No one seems to notice how recreational vehicles use evaporative refrigerator/freezers powered with propane gas which is burned to produce heat, which expands the gas, which is cooled in the air, which is then depressurized and provides cooling. Why don't the car manufacturers equip our cars with evaporative air conditioners which use the vehicle's hot exhaust to do the same thing?

Our current air conditioning systems cause us to burn extra fuel, even when we're not moving. Who do you think would ever think up such a design? Big Oily, maybe?

**The Engine Requires A Transmission And Clutch**

We already partly covered this fact about how a petroleum powered piston engine produces little torque from 0 rpm to 1,000 rpm. And this necessitates a clutch mechanism to disengage the engine at rest, and a transmission so the vehicle can get up to speed once it is moving. These two additional parts are entirely unnecessary.




Here is a component schematic of an oil-filled torque converter that multiplies engine torque inside the transmission bellhousing. It allows some slippage so the vehicle can be stopped while the engine runs. A friction clutch built into the center of the converter locks its input and output shafts to the same speed for highway cruising. Computer-controlled hydraulic pressure selects which combination of gears within several planetary sets can rotate, changing the ratios between the input and output shafts. It is hoped that the unit never goes down for repair.

Here's some elementary automotive engineering: Gears reduce available horsepower and add resistant inertia into the power train. This robs acceleration and fuel mileage. Neither steam nor electric powered vehicles require a clutch or transmission.

When car makers selected the piston engine as a means of power propulsion they tossed in the added weight and maintenance of transmissions and clutches to every vehicle manufactured.

## Petroleum Piston Engine Summary

When and only when the public becomes aware of the poor attributes of our current transportation system will we finally demand a design that features clean energy propulsion. In the meantime, here is a summary of all of the piston engine deficiencies discussed so far:

**Petroleum Piston Engine Shortcomings**

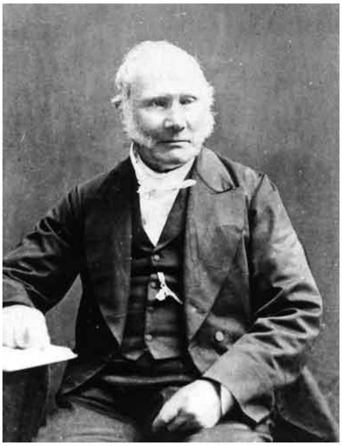
1. Hard to start; requires a sturdy electric start mechanism
2. Hundreds of parts in friction; wears out quickly
3. Limited rpm range; requires clutch and transmission
4. Heavy; takes a large engine to power an automobile or truck
5. Continues to run even when at a stop
6. High Rotational Inertia; robs acceleration
7. Requires a cooling system to get rid of heat
8. High exhaust temperatures, heat loss, poor thermodynamics.
9. Complicated (many machined parts) and difficult to repair
10. Costly and difficult to manufacture
11. Cumbersome; large radiator contributes to a blunt front end.

**Gasoline Piston Engine Shortcomings**

(Add the ones above plus these)

12. Extremely poor fuel mileage, only 15% efficient overall
13. Requires a spark plug and ignition system
14. A throttle plate, engine is starved anytime below full throttle
15. Requires fuel mixture that must err on the side of too rich
16. Cannot run a compression ratio above 10:1.

It has come to the point where it's undeniable the public has been sold on a loser with gasoline as our primary motor fuel at this late stage of industrialization. This is a charade for Big Oily/Auto, and it needs to be exposed.



John Ericsson, pictured left, in the 1820's invented the Caloric, or hot air engine which used hot air instead of steam as a propellant. A similar device had been patented in 1816 by the Reverend Robert Stirling, shown at right, whose technical priority of invention provides the usual term 'Stirling Engine' for the device.

# CHAPTER 7

## The Petroleum Yoke

If you hold down a job, you, as an average citizen must endure overpriced cars and fuel for your basic transportation. Referred to as the "petroleum yoke" this fact is true for virtually every industrialized nation.


The hard truth is the world still doesn't have the kind of mass transportation system it needs and our current modes of travel are anything but glamorous. Today, a person commuting from the suburbs to the city spends $20 a day in gasoline, manages to make it to work, and in the process gets hammered by car exhaust along their route. We still travel in flimsy cars that don't protect us in the event of a mishap of human or mechanical origin. We will suffer the indignity of having to pump gas ourselves out in the wind while we ring up $100 dollar sales for Big Oily and they don't even have to have a person there to tell us "hello" or "thank you".

Our exorbitantly priced cars that we purchased will hardly be worth a down payment five years later when we turn it in. The system bleeds us dry at every juncture.

It all supposedly began with the break-through internal combustion engine, "the engine of the future" as it was called then. The basic design was epitomized by the Ford Model T.

Men the world over became transfixed by the steady throb of pistons turning a crankshaft that could be hooked up to not only cars but mill-saws, crushers, bailers, water pumps, generators, etc. Later, women would become enamored with stately and outrageous auto body designs along with luxurious seats and interiors.

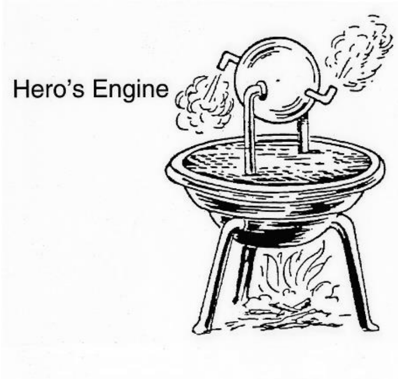
Our former freedom of travel became a form of self-expression as we let the style of our automobiles broadcast subliminal messages about ourselves. Whether we were rich, poor, thrifty, extravagant, brash or boring seemed to all be reflected in our chosen set of wheels.

Today we can look back through the old movies and see a depiction of 1900's American traditions. Black and white scenes feature sculptured steel bodies that defined a love-affair between the modern day American and the open-road automobile. This is the American Dream that was fed to us for the past 120 years, and is still going strong.

A love affair normally encompasses both sides, but unfortunately in this case, it did not. Time went by. Trains and busses became unfashionable. Cars and trucks got more expensive. The price of fuel skyrocketed. Traffic congestion became the norm. Fuel mileage stayed the same.

Today the published illusion of a beneficial partnership between car makers and car buyers reveals Big Auto to be a squanderer of truth. And this is because despite innumerable discoveries in energy, digital electronics, quantum physics, micro circuits, nano-particles, cures for diseases, deep oil drilling, space exploration, etc. the world at large is still powered by high friction reciprocating engines that run on toxic fuel.

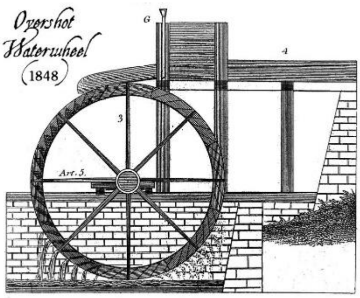
What do our automobiles really say about ourselves today? Mostly that we have let ourselves be deceived and used. For there simply is nothing extraordinary about the piston engine other than the noise they make at drag racing and motocross events.




The piston engine itself goes way too far back in our past for it to be legitimate today. In his book, "The Giza Powerplant" author Christopher Dunn reveals numerous examples of advanced machining capabilities of the ancient builders of the Egyptian pyramids over 6,000 years ago. In fact, there are innumerable examples all over the world that display evidence of advanced machining, casting, coating and engineering.

Using bronze, our ancestors were building steam powered machines thousands of years ago. This is demonstrated by the Hero engine designed by Heron Alexandria in 10AD. This engine, by the way has very little rpm restriction and makes our everyday piston engine mechanisms look ancient. The ancient Greeks and Romans not only understood pressure and hydrostatics but they also knew how to harness it with a rotary motion mechanism. Their mechanisms were more efficient than the mechanisms we use to power the majority of our cars on the road today.

Rotary power has been around much longer than we realize in the form of the water wheel. Pistons came along later. The water-wheel was simpler to construct and only had a few moving parts. Without really knowing it, we had a rotary power device that was superior to reciprocating piston motion. It is more than interesting to note that 21st



Century propulsion devices totally ignore this concept. For example, we could just point a steam nozzle at the rim of a water wheel to get it spinning. This is called an "impulse" turbine BTW.

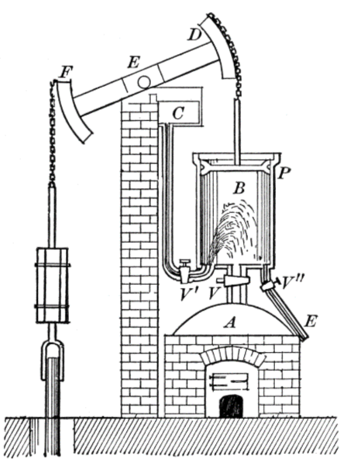
The piston engine is not some "revolutionary", recent or modern invention. This begs us to ponder what would be a revolutionary or recent modern invention? For starters, it would not be a petroleum-powered piston engine, and this is because of two contradictions in basic engineering:

1. The design of the piston engine does not mesh with the current capabilities of scientists and engineers who can manufacture hundreds of better engine designs such as Wankel, Micro turbine, vane, Rampressor, DiPietro, etc.

2. The fuels these engines consume do not mesh with environmental health, as their use pollutes rivers, lakes, oceans and air.

And let us not forget that by the early 1700's virtually every industrialized nation had learned how to produce power from anything that would burn to produce heat, for this is all that is needed to heat a boiler and make steam.

The crankshaft and piston had already been developed from adapting a connecting rod to water wheels that drove wooden rams inside a cylinder to produce piston water and air pumps. It didn't take much more ingenuity to power these pistons with steam, such to produce reliable rotational power like the water wheel. Steam gave us the ability to have power anywhere.




The Newcomen Engine in 1712 was the first steam engine to utilize steam power for mechanical work. And it is still true today that useable power can come from anything that will burn to produce heat. There are many abundant materials that can be burned and the vast majority of them are better than gasoline. Unfortunately, Big Oily has placed the false notion inside our heads that modern power comes from burning gasoline and or diesel fuel, and that these fuels only come from within the earth. But as I have just shown, anything that will burn can be used to make steam for a steam engine, and everything that grows on the planet will burn.

Many people today believe that their car or truck requires a complicated electronically controlled engine due to smog laws, and that a complex gasoline formula is also required to make it perform properly. But the fact is a standard fuel for transportation is in itself toxic. A more modern approach would be to power the system with things that are on hand, with trash, wood and plastic chips at the top of the list. Instead, the engines Big Auto equips our vehicles with are specifically designed for gasoline or diesel.

This compact steam engine by Cyclone Power Systems puts out 100 Hp. and is self-contained. It can run on many different types of fuel and does not produce carbon monoxide. So far, no interested vehicle manufacturers.

The dawn of the industrial revolution began with the advent of steam engines that could produce electrical power reliably, such that it could be connected to every building, road and factory in the city. And they provided this most advanced form of power from anything that would burn.

Steam engines were controllable, powerful and extremely reliable. The numbers of moving parts were only a fraction of those found in today's modern engines. Later steam locomotives would be utilized to move most of the heavy freight across the continent.

This form of locomotion continued to dominate the railways up until 1965 when they were finally taken out of service. Prior to this time there was not a diesel engine powerful enough that would fit inside of the dimensions of a locomotive frame.

Never underestimate the power of steam. The fact is steam engines effectively out-performed the modern diesel piston engines that have replaced them for the simple reason they did not require an expensive oil-company-supplied processed fuel. The early steam locomotives were specifically designed to run on coal. This is an amazing fuel which can be scooped directly out of the ground and burned.

Now when you convert coal to a processed liquid that has to be burned in a liquid-only engine have you increased the efficiency? The answer is flat out no! This means our form of propulsion today is not "modernized", it's just true that steam has been forgotten.

The engine under your hood could very definitely be a steam powered engine if only the concept had been kept and improved. The oil dudes said, "no!" If they had said "yes" we could have a car out in our garage right now that could run on wood, alcohol, ammonia, methane, manure gas, coal, heating oil, methanol, bunker fuel, hydrogen peroxide, nitro-methane, soy bean oil, straw, grass, etc. By the way, all of these alternate fuels pollute less than gasoline.

Remember, gasoline is a substance so poisonous that if you EVER put any of into a cooking pot it will render the pot too toxic to ever be used for cooking again.

We've been sold on a system that offered us false progress. The fact that our current vehicle engines require a specific fuel like gasoline doesn't make them more advanced; especially not when the only ingredient they will run on has been designed by and is only provided from one source; Big Oily. That is called a monopoly.

## Colleges Need A Reboot

Our current history books leave much to be desired. They rarely go back far enough and thus tend to ignore many human inventions from our past that have been used in civilizations before us. It's more than possible that an ancient society might view our piston powered cars are the most stupid form of transportation they have ever seen.

The ancient Egyptians made simple 1 ½ volt batteries in clay pots. They look very primitive. For this reason historians have forgotten to note the fact that it is very significant for the fact that they understood electricity. They had the knowledge of a type of energy that went way beyond turning water-wheels and piston pumps, but historians have failed to notice that. Perhaps part of their ancient knowledge included ways to live long healthy lives and be free of toxins and disease. Perhaps their wisdom included specific advice and methods such to avoid the use of petroleum, and never use it!

What we never consider about the value of electrical knowledge is the value of the humans who know it. They knew that they can take 100 of these 1 ½ volt units and hook them in series, and they knew they could produce 150 volts which would be enough to power bright lights. We have seen those bright lights depicted on the inside of one of the crypts of the Hathor Temple. And by the way, they could have used the electricity to convert water into hydrogen and oxygen.

They can hide technology from us. They have hidden technology from us. They are hiding technology from us. We are not riding high on a horse by the way we live our lives today. I hope you can see that, and I hope you can begin to see how much they have done to steer us into the false system we have today.

## The Official Piston Of 1712

The official historical version of the piston engine goes back to the Newcomen engine in 1712 when the first steam engines went into service as pumpers. James Watt is credited with inventing the first steam engine that used a connecting rod to a crankshaft to produce rotary-motion. That was in 1782. This steam engine went into a wide variety of industrial uses.

But of course it happened even earlier. In 1606 a Spanish inventor had already patented the first steam piston engine (in Spain). Actually these dates don't indicate when the device was first designed; they merely tell us what date and place the invention showed up. More research would reveal, regardless of the dates not being exactly correct, they were invented a long time ago.

Now, it may surprise you to learn that during these early times of engine development there were ideas other than petroleum combustion that were not only being explored but were showing greater promise. One of these promising developments came from an inventor who began experimenting with the expansion-contraction properties of air as it was heated and cooled. His name was Henry Wood and by 1759 he was successfully powering engines by utilizing temperature differences in conjunction with air expansion-contraction properties.

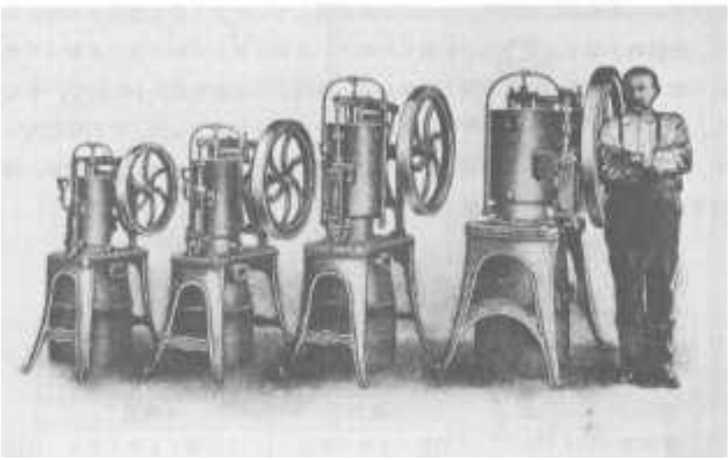
His engine worked by first pumping hot heated air into a large cylinder. Then the air cooled and contracted, allowing atmospheric pressure on the other side of the piston to push it back up. Then the air was heated again, driving the piston back down.

The next phase was to put this into a continuous process using two pistons which transferred the gas back and forth from a "hot" end to a "cold" end. Heat was applied to the hot end. Power could be increased by also supplying cold water to the cold end. This was the actual beginning of the Stirling engine. The engine worked wherever you had a temperature differential, such as petrol heat to atmosphere or atmosphere to arctic water. This was a far superior engine concept than the soon-to-follow internal combustion engines that had to compress and combust a fuel/air mixture with every stroke.

## 1807: Quantum Leap No. 2

**Quantum leap No. 1** occurred at least as early as 1606 with the first steam piston but it was the invention of the steam boiler itself that was quantum because it produced a method to convert anything that could be burned into steam, and steam could be used to power a piston or wheel coupled to a crankshaft to produce rotational energy.

**Quantum leap No. 2** occurred in 1759 and was the invention of the Stirling Engine, when the steam boiler was replaced with expanding gasses. Few saw it as a quantum leap but it was clearly a breakthrough discovery because now came a much cheaper way to make rotational power. With the Stirling Engine there is no need for a steam boiler.



The first to build a working model of Wood's original "Stirling" design was Sir George Cayley in 1807. This improved design by him was later produced by the Caloric Engine Company in England and also by the Roper Caloric Engine Company in the United States. These engines not only existed but were manufactured for a few decades. They produced rotational power utilizing whatever was available to burn. They could power a generating device for lights, heating, power tools, machines and pumps.

For some unexplained reason the Rev. Robert Stirling in 1816 earned him a spot in history as the "inventor" of the hot air or "Stirling" engine. In actuality, he had only made some modifications. At any rate, over 200 years ago inventors achieved a giant step forward by designing a system that could do the same thing as a steam engine without a boiler, making it a system that everyone could afford and utilize.

With the advent of the Stirling Engine any person anywhere could produce electricity off whatever biomass, bio gas or bio-liquid his property could produce. Here was a way to turn trash and burnable materials into electricity.

With electricity, a pump could transfer water up to a higher pasture for irrigation or it could operate a grinder that turned grains into flour. It could provide lights at night and power a machine tool, whatever. Anything that could be burned to produce heat was all that was necessary to make a Stirling Engine run. That is why when the Stirling Engine came along it was heralded as one of the greatest inventions of all time.


During the 1980's NASA was mandated by the U.S. Congress to design, build and evaluate the feasibility of the Stirling engine for the purpose of having a dual fuel alternative in the advent of a war or oil shortage. NASA was specifically charged with constructing a suitable and economical power-plant for American cars. The 1985 Chevrolet Celebrity was chosen as the baseline vehicle. It was equipped with a manual four-speed transmission; a 2.66 drive axle gear ratio, and had a test weight of 3000 lb. and was front-wheel-drive thus representing the majority of cars sold in the United States.

NASA began their research using a Stirling engine manufactured by United Stirling AB of Sweden. This gave them a solid base to start and from there they produced the Modified II version in 1986 that got 58 miles per gallon compared to a 2.5 Liter 4 cylinder standard engine which got 40 miles per gallon. After 8 years of research and development, this is what NASA reported:

> *"Early Stirling engines were slow-running machines that produced low power and therefore could not compete with the more versatile spark ignition and diesel engines. These reasons are no longer valid, as evidenced by the work described in this report.*
>
> *In fact, I maintain that Stirling engine technology now contains advancements as rapid and significant as those in microchip technology and that this leap forward will invalidate any existing misconceptions of Stirling in the general technical community. Although designed for an automotive application, the basic concept of this engine can be used across a broad range of applications. It represents, therefore, not a subtle change in the technology but a watershed achievement."*

NASA designed a Stirling engine that by the second prototype was 54% more fuel efficient than a 4 cylinder gasoline piston engine. That was in 1986. They sent a comprehensive 54 page report to the Department of Energy. And this, having satisfied the stipulations of Congress to find a compatible engine that could run on alternate types of fuel, was all that was needed and all that was forthcoming. That's because fuel efficiency never gets the concern it should.

Big Oily knew before what most people noticed; that the Stirling engine truly did represent a quantum leap in energy production and was thus a serious threat to their monopoly. And as time went on they would face continued challenges from innumerable fuel saving prototypes. Big Oily would always have the foresight to spot them and head them off.

## The Biggest Con Of The Century

It may be hard for you to imagine a power system that runs off whatever you have nearby in surplus to feed into it, because we have so many environmental laws that forbid the burning of just about everything. But that is the way it used to be. The world's inventors had in fact been using piston engines for a at least a few hundred years before petroleum was first or ever used as a fuel. These piston engines were powered by steam or water, which could be generated by burning anything at hand such as trees, bark, leaves and coal or utilizing a river.

In pre-petroleum times vegetable oils and animal fats were utilized for stoves, heaters, lamps, lubricants, waterproofing, etc. in a much broader range than they are today. As you will soon learn, under a microscope, these natural oils and fats resemble petroleum hydrocarbon chemistry to a startling degree. In fact they are capable and functional in every application filled currently by petroleum products and they perform equally or better.

There is one major difference, however, and that is the fact that surface-grown fuel is free of the myriad of toxic pollutants that earth-produced fuels contain.

Since the Carter Administration of 1976, there have been many discoveries made and put into publication regarding new bio substances like hybridized algae that can produce hydrocarbon chemicals in the form of alcohols or hydrocarbon distillates for engines, boilers, heaters, stoves, etc. and in whatever quantity we demand. Growing algae from carbon dioxide is a bio method to produce hydrocarbons from the land or seas using $CO_2$ from the air or from utility exhaust stacks. The only other ingredients to make it run are water and sunshine.

This unequivocally dispels all of the myths perpetrated by professional illusionists; the notion that petroleum is a non-renewable source of energy. This has been the big con from the beginning and continues to be today.

We have been made to believe that burning our own trash is bad, yet it is ok for us to burn 20 gallons per week of petroleum in our cars. This is a mindset brought about by laws designed to help clear smoke from the cities and towns. Now today, even though burning gasoline produces carbon monoxide and smog, not to mention at least 34 toxic chemicals in its makeup, it is expelled into our air legally. Why is it, that for the past 120 years, the power we get from this energy comes at the expense of our health? This means there has been no progress for the past 120 years.

Just because we are living in the 21st century is not a reason to assume that any of us are smarter than the citizens who came before us. The fact is, the government/auto/oil conglomerate wants us energy stupid, and most of us are. I know this is a lot to think about, since most of us are naturally inclined to be trusting folks. Thus we have a hard time accepting the truth that anyone could be so greedy as to plan for and sell to the public a toxic system, even though it came at the expense of our health.

But this is what did happen. We see the propulsion mechanisms they continue to equip our cars and trucks with and we know they are grossly inferior to many and better types of engines. From engine type to fuel type, nothing has been improved for well over a century!

Our ignorance and willingness to go along with it has given birth to an extraneous manufacturing abyss highlighted by today's "modern" electro-fueled gasoline engines that are the most difficult to tune and maintain of any piston engines ever manufactured. Now, something as basic as a bicycle requires a computer to diagnose what is wrong when a circuit malfunctions, often leaving the driver stranded.

There are two main reasons that we have been kept from using an engine design that would be cheaper, have fewer parts, be more efficient, last longer and pollute less:

1. They want us married to gasoline
2. They want us to use lots of gasoline

Nothing else explains it better.

## Piston Motion Vs. Rotary Motion

Just as the industry has fought us tooth-and-nail to keep any fuel other than gasoline off the market, they have likewise hindered the development of anything other than reciprocating engines, with extreme prejudice toward rotary engines. This is even though mankind harnessed water in turbines in front of our grandparents very own eyes.

During operation, the rotation of the power blades is always in the same direction and always rotational and always in perfect balance. Conversely, in every piston engine regardless of what type, there is a back-and-forth motion of the pistons, which requires energy to stop and start them, over and over. Additionally there is the friction of metal-to-metal between the piston, rings and cylinders. These two energy losses are why a rotary design, which spins about a shaft, easily outperforms any reciprocating counterpart.

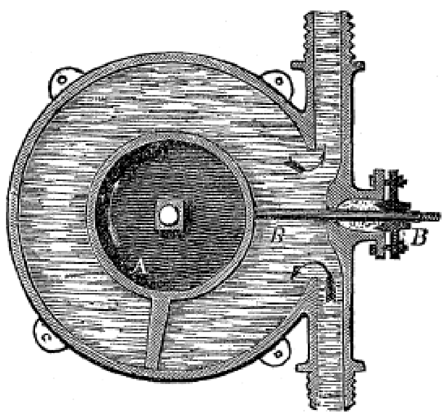
If we look at what has been discovered, according to modern history, over the past two hundred years human scientists have invented, perfected and constructed windmills, propellers, impellers, turbines, rotary compressors, rotary steam engines, rotary hydraulic pumps and others, all which rotate without friction about a central axis.

In a steam or petroleum powered turbine engine the turbine blades, which harness the power of pressurized gas, vapor or water, are never in a state of contact with any other piece of the machinery. Except for the bearings that support the center shaft there is no mechanical friction.

After 1781 and the Watt steam-powered piston engine, came many designs for actual rotary steam engines. These were engines that utilized one "piston" paddle or wand affixed to a shaft that moved around inside a round circumference, such that the "piston" never came to a stop but always continued in the same direction. So the concept of the rotary, frictionless engine was not only known but built and used in a multitude of applications.

Yet for inexplicable reasons reciprocating piston engines would go on to receive endorsement in much greater abundance than rotary or turbine designs. This soon became the norm in the area of transportation vehicles where an efficient and compact design was critical. Could this have been the result of a budding petroleum industry looking for a way to market a product that was in over-abundance?

Note; The industry could have used gasoline as a boiler fuel to power large turbines to generate electricity and power busses and trains, but it would have been too efficient to fit their marketing ambitions.



The Bramah & Dickenson Rotary Engine: 1790. Piston A rotates in a clockwise direction inside the round cylinder shown. When the piston reaches point B the sliding mechanism is quickly pulled out to allow the piston to go on by and then reinserted. This mechanism is geared into the shaft.

We can see that from about 1850, with the petroleum industry just getting off the ground, there was continued development of piston powered engines, with it culminating with the gasoline powered Mercedes car in 1887. This might have been a remarkable car to the oil industry, but the fact is it utilized the worst engine yet to be designed.

At this time the steam engine was both efficient and reliable. It just needed to be scaled down. Since a steam piston receives steam on both sides of the piston and on every revolution, they are really quite efficient. Compare that to combustion piston engines with four strokes per cycle and thus require 4 times the pistons to produce the same torque.

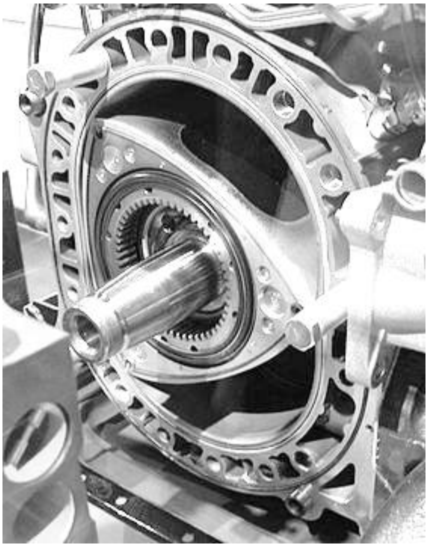
The Stirling engine was even simpler, just needing a more compact design.

The diesel engine was perfected by 1893 and was simpler and more efficient, since it did not need an electrical system and could run higher compression.

But at the end of the $19^{th}$ Century the gasoline-powered car was to be, for the most part, what all of the major auto manufacturers would provide. And really, the only thing noteworthy about gasoline powered cars was that they consumed gasoline.

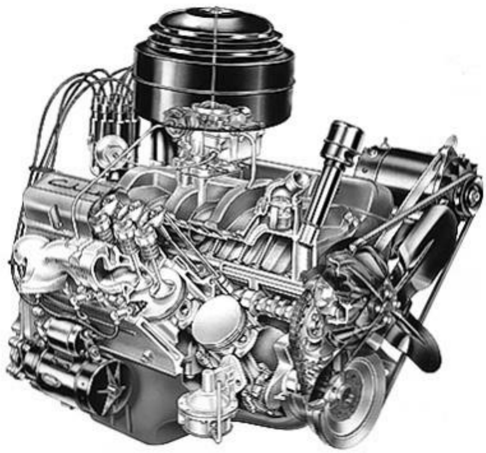
## Enter: The Wankel Engine

Note that today the manufacture of Wankel engines for automobiles has completely stopped as of 2011. This is when the last Mazda RX-8 was made. This is a confusing direction for the auto industry, as a whole, to take. Turbine and rotary engines that have been designed and built were much simpler than the petroleum powered piston engines that have remained prevalent. The documentation underwrites both industrial sabotage and hypocrisy, as we now know it would have been far cheaper for Big Oily to equip automobiles with the much smaller Wankel design rather than to keep manufacturing V-8's with hundreds of moving parts that have to be machined.



Here in the United States we will not get a 1000 cc economy gasoline engine nor will we get a 1.4 liter diesel like they currently offer in Europe. The fact is, if they wanted us to have better fuel mileage, they would have given us the Wankel engine. The major automakers could have begun building much smaller and lighter engines as early as 1964, as evidenced by the introduction of the German-made NSU Spider, and later in 1965 with Mazda's Wankel-powered compact.

The automotive world was ripe for change and here was an engine that put out so much more horsepower than a piston engine of the same size that its automotive dimensions were much scaled down. This dramatically reduced the size of the engine, resulting in less room being taken up by the engine itself, plus its lower weight helped reduce the overall weight of the car itself.



Size comparison using equally sized alternators to scale the Mazda engine with a Chevy 265 V-8. Note, the Wankel also includes the transmission, which would be everything aft of where the starter motor bolts to the engine.

Compared to existing piston engines, with hundreds of moving parts, the Wankel design only has four moving parts. That means the number of parts that require casting and machining is greatly reduced. The tiny engine block took much less material than the block and cylinder head of the much larger piston counterpart. It would have been much cheaper to manufacture these smaller

Wankel engines compared to the larger multi-cylinder engines that are prevalent today.

Instead of pistons going back and forth within cylinders of constant friction, the Wankel's power rotor turned in only one smooth rotation. At last reciprocating pistons, with their horsepower-gobbling friction and limited rpm could be left behind. Actually, the design had been around since 1927, but that's part of another book.

The only way that this engine did not put every piston engine on the planet to shame is for the simple reason that the plan to use piston engines had not changed. Big Auto just needed to make it look like they gave a competitive design a fare shake.

The Wankel engine vehicles that were manufactured showed traces of brilliance, but we got tricked. *Big Tricky Oily only wanted to make the public think they had actually tried_to develop a better engine.* What we got was a misuse of our trust in the form of a gas-guzzler version of a superior engine.

The industry used this bad example against us as justification to cancel the use of Wankel engines in the future. This was in fact a complete turnaround from what had been planned. Take a look for yourself to decide it the Wankel engine was given serious consideration as a viable new engine:

> "Many manufacturers licensed the design, attracted by the smoothness, quiet running and reliability resulting from the simplicity. Among the manufacturers signing licensing agreements to develop Wankel engines were Alfa Romeo, American Motors, Citroen, Ford, General Motors, Mazda, Mercedes-Benz, Nissan, Porsche, Rolls-Royce, Suzuki, and Toyota. In the United States, in 1959 under license from NSU, Curtiss-Wright pioneered improvements in the basic engine design. In Britain, in the 1960s, Rolls Royce Motor Car Division pioneered a two-stage diesel version of the Wankel engine.
>
> American Motors (AMC) was so convinced "... that the rotary engine will play an important role as a powerplant for cars and trucks of the future....", that the chairman, Roy D. Chapin Jr., of the smallest U.S. automaker signed an agreement in February 1973, after a year's

negotiations, to build Wankel engines for both passenger cars and Jeeps, as well as the right to sell any rotary engines it produced and sold to other companies. AMC's president, William Luneburg, did not expect dramatic development through 1980, however Gerald C. Meyers, AMC's vice-president of the Product (Engineering) Group, suggested that AMC should buy the engines from Curtiss-Wright before developing its own Wankel engines and predicted a total transition to rotary power by 1984. Plans called for the engine to be used in the AMC Pacer, but development was pushed back.

AMC designed the unique Pacer around the engine. By 1974, they had decided to purchase the General Motors Wankel instead of building an engine in-house. Both General Motors and AMC confirmed the relationship would benefit in marketing the new engine, ***with AMC claiming that the General Motors' Wankel achieved good fuel economy.*** However, General Motors' engines had not reached production when the Pacer was launched onto the market. The 1973 oil crisis played a part in frustrating the uptake of the Wankel engine. Rising fuel prices, and also concerns about proposed US emission standards legislation added to the concerns.

General Motors had not succeeded in producing a Wankel engine meeting both the emission requirements with good fuel economy, leading to the company cancelling development in 1974. Unfortunately as General Motors was cancelling the Wankel project, they issued the results of their most recent research, which claimed to have solved the fuel economy problem building reliable engines with a duration above 530,000 miles."

The cancellation of General Motors' Wankel project required that the 1975 AMC Pacer had to be reconfigured to house the AMC Straight-6 engine driving the rear-wheels instead of the front. This happened even though virtually all of the major auto manufacturers began preparations in 1959 to begin replacing piston engines with this newer light-weight design. AMC had been a part of its development up until 1974.

So what happened that caused all of the manufacturers with the exception of Mazda to drop such a promising new design? Perhaps the oil-company created Arab Oil Embargo of 1973 had something to do with it. Just one year after the "embargo" would have been a convenient time to drop the Wankel program, using the paranoia of short supply and higher gasoline prices. And this type of action would have been nothing new. Breakthrough designs and attempts to evolve our means of propulsion often end up in the public in a form that is designed to fail.

The General Motors 350 cubic inch diesel of the late 70's is a prime example. In this case, the public got a choice to upgrade to a diesel, but the diesel engine that General Motors built was a maintenance disaster. General Motors used their reputation in combination with the people's trust in them to produce a diesel powered vehicle, which they were willing to pay extra for. General Motors then deliberately put a faulty diesel engine design out on the market, and when they started breaking down after 40,000 miles, they gave the public the idea that diesel engines were no better than gasoline engines. The fact is, General Motors never tried to give us a diesel engine for our automobiles. They only made it look that way.

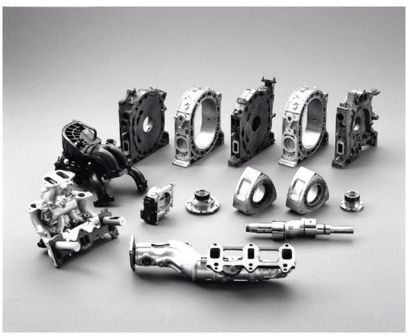
Remember, the worst thing that could happen to an oil supplier, since they are a monopoly, would be to lose their exclusive position with the buyer. And with an engine that could run on a multiple number of fuels, this kind of fuel flexibility would be a disaster for the existing monopoly. The Wankel could run on gasoline, diesel, kerosene or alcohol.

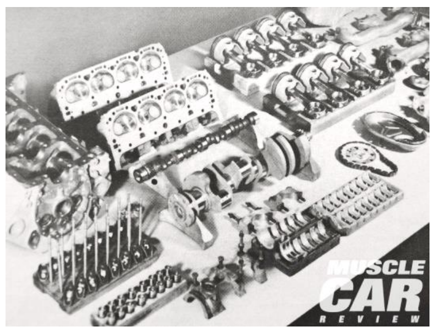
Before it was discontinued, an updated Mazda RX8 engine, after decades of improvements in the engine and fueling, demonstrated its ability to run leaner fuel mixtures than a piston engine, without detonation. This allowed gas mileage to reach 30-35 mpg. When you compare it to any other kind of sports vehicle with similar performance, the Wankel engine does in fact double the fuel mileage. That's pretty impressive for a gasoline engine.

The lean-burn fuel economy of the RX-8 confirmed that this type of engine can put out more horsepower than piston muscle cars do with a lot less fuel. Lucky for Ferrari et al.; those who can afford to buy these cars do not care one single bit about the cost of fuel, so they get away with producing their tiny cars that only get 10-15 mpg. What a joke!

Mazda has now sold approximately 800,000 RX-7s and over two million rotary engine powered cars in total. Still, they were just scratching the surface of potential fuel mileage improvements for this engine. The RX-8 engine today obviously has way more power than necessary for a compact car. This indicates that the current Wankel engine design for a car is too large, meaning they should scale down the size of the 1.4 Liter engine to one much smaller.

Attesting to the superior performance of the Wankel engine are hundreds of drone and para-glider manufacturers all over the world now using the design because it is such a lightweight power-plant for its rated horsepower. After many years of trials and testing in aircraft, airplane mechanics and engineers have improved the durability of the rotor seals. The former Achilles heel of the original design has been completely solved by developing silicon carbide ceramic apex seals. With these seals the projected engine life in gen-set applications is 20,000 hours. If this checks out as true, then the Mazda Wankel engine could approach that of a turbine engine.






An approximate size comparison of the parts of a Mazda Wankel compared to the parts of a conventional V-8 engine it can replace. This original 1.2 L version put out 110 Hp. This same engine today is 1.4 L and puts out 300 Hp. per rotor. This engine can be made extremely powerful for its size.

Above are the parts for a two rotor Wankel alongside the parts for an 8 cylinder piston engine of the same horsepower. Which one is the easiest to machine and manufacture? Imagine if all of this unnecessary engine weight was subtracted from our vehicle's total weight? Imagine, with its fewer parts, how much easier it is to repair. A garage mechanic could lift one out and place it on top of a workbench. A home mechanic could stick it in a box, take it to UPS and ship it to the rebuild shop. These are reasons enough to switch to this kind of engine.

Had the Mazda Wankel delivered 40 to 50 miles per gallon in a mid-sized affordable commuter car like it should have, it would have received demand from every car dealer in the world. The simplicity of design coupled with its increased performance could have spawned a whole new-car revolution. As it was Mazda got to market their Wankel engine only by setting it up to burn good ole gasoline and limiting the rpm. The vehicle package they offered thus consumed fuel excessively, giving it even worse fuel mileage than a standard 2.0 liter piston engine.

The product that was actually sold to the public was precisely engineered to be beaten out by a reciprocating piston dinosaur. This allowed them to effectively kill the Wankel. In the meantime the media continued to keep the public comatose regarding it. You have to understand that just like the invention of the Pogue Carburetor, the introduction of such a revolutionary engine could not be tolerated in the petroleum powered car arena. Even chief oil executives have to cover their losses. What do you think is the easiest way to achieve that?

So here we are as of 2023 and not one car manufacturer is building a car with a Wankel engine. This comes after the Mazda RX Models Wankel engines which had a run of 47 successful years! It was also an era during which the engine design had become better than ever. Does that make sense?

It seems hard to believe this engine would be the one dropped instead of the much more cumbersome and expensive piston engines that prevail. But you might be surprised to learn that

the Wankel engine design **is thriving within an emerging lightweight aircraft industry, such as ultra-lights, hover craft, drones and small to medium planes.** A scaled down air-cooled Wankel engine is standard equipment on many types of military drones which are being manufactured in the thousands. They can stay in the air for days and as a result must be extremely fuel efficient.

These new found applications of the Wankel attest to the fact the engine is very light, easy to manufacture, is durable, reliable and fuel efficient. As it was then and is today, a smaller Wankel engine that was designed with the intent to maximize fuel mileage could produce a quantum leap in the automotive world. It is only because of a severe case of piston preference by Big Oily/Auto the Wankel engine has not been fully optimized and adopted universally.

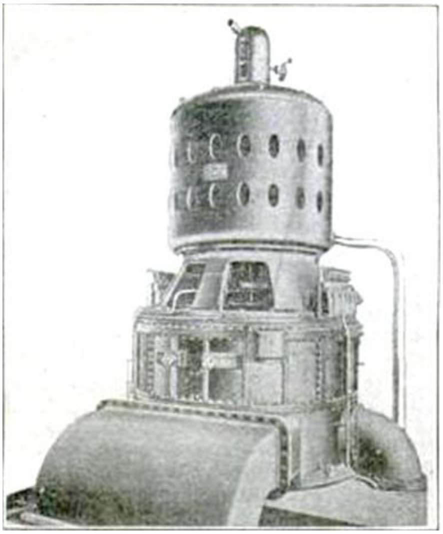
Liquid cooled Wankel drone engine; courtesy rotronuav.com

## Mechanical Combustion Vs. Electric Drive

Here's another concept the industry plays well below its potential. The electric generator demonstrates a way of creating power basically without any contact or friction. It requires knowledge of physics, magnetics, electrical fields, etc. Even still, the world's first electric generator, designed by Michael Faraday, went into service in 1832.

Engineers and scientists in that era were able to produce quantum-leap inventions and apply them to the public's wellbeing because they were less shackled by the limitations of what we now call "modern engineering", or better yet, "petroleum engineering". Just about every engineer or scientist today would have to agree that the electric motor invention is far more advanced than any piston engine invention.

As it was, up until 1887 our world only had electric and steam-powered vehicles. Thus, when the gasoline-powered vehicle made its entrance onto the transportation scene there were already dozens of electric vehicle manufacturers in operation. The fact that electric powered vehicles got off to an earlier start and were well ahead of their piston powered counter-parts in 1887 is not something the oil-sponsored historians want you to remember.



This 2000 KW Curtis steam turbine produced power from 1903 to 1927. Note: This is a rotary/spinning type of power mechanism. It demonstrates that scientists and engineers knew how to harness a pressure and flow rotationally at this stage of power development. Charles Gordon Curtis (1860-1953

It is more than noteworthy that this type of power transmission was not more fully developed and utilized in the design of our transportation systems as they were expanded during the turning of the 19th to the 20th Century. Because it was during this era that engineers came up with electrified rails, electrified overhead cables and cable cars that were electrically driven and this sent the oil industry into a panic. They knew electric motors linked together from efficient power plants would most efficiently power mass transportation once it was in place. And for a while it looked like America just might get this new and efficient form of travel as such systems sprang up in San Francisco, Los Angeles, Portland, New York and other major cities.

To counter this trend, they began in earnest to convince the public that personal cars were the way of the future thus to convert the public from mass transit to oil-driven personal transportation vehicles.

Our nation's electric rail systems were shut down in the 30's and 40's. Now, after 100 years of sanctioned use, most of us have been spoon fed piston engines for so long we accept them as a valid 21st Century device. Our cars and trucks continue using the same piston engines when other devices that harness pressurized liquids or gasses (the combustion process in an engine) have been upgraded to a turbine, rotary or electro-mechanical design.

Before 1908, innovations and improvements were being applied to electric designs and steam powered designs, resulting in vehicles that performed with total reliability. Both of these forms of propulsion had fewer inherent problems to begin with and neither had the propensity to stall the way the piston engines did. There were many competing designs for the attention and preference of horseless carriage manufacturers. Within almost every major city in America pedestrians already had access to trains, subway trains, electric cable cars, commercial horse drawn wagons and buggies. Americans did not just one day discover that we had this terrible need for personal cars powered by gasoline engines.

Pictured: a high-end 1904 Kroger electric vehicle very popular with wealthy owners.

What we did have was a sound transportation system already in place, which was allowing America to develop in a remarkable way. A person who worked hard could finally meek out more than the minimum necessary to just get by, and with a functioning and efficient transportation system in place, they could get to the better jobs.

Few people today realize that the demise of electricity and steam has been via the wishes of the oil/auto industry itself, not the people's preference for throbbing pistons. The electric car began its demise in 1908 with the introduction of the $500 dollar Model T, which at that time ran on a magic substance that was pennies per gallon. Most noteworthy of all, a Model T was priced well below that of a Kroeger or Ryker electric. They attributed the "assembly line" allowing mass production that allowed the manufacturing costs to be so low. But the design and manufacture of that engine took a lot of special tools and materials to construct. And the bankers set up an assembly line on such a massive scale that nothing could compete with it.

The electric car era came to an inglorious end in 1924 when the last of them were made in America. The Stanley Steamer, which had been produced from 1897, went out of production the same year. If you ask me, these were the finest cars ever made. You could start the steamer with a match, not that people did frequently. You could charge the Ryker from a generator running on trash. If you could just find any rot-gut fuel such as gasoline, kerosene, turpentine, paint thinner, linseed oil, etc. etc. you could drive for free. Imagine such a thing!

## Big Auto Diesels

If we were allowed to convert the 100 million cars in the United States from gasoline engines to diesel engines the result would be a reduction of fuel in the amount of hundreds of millions of gallons each day. Unfortunately, Big Oily can't live with this reduction in sales volume.

The car companies lay out the ratio of diesel engines to gasoline engines each year, then proceed to build them in those numbers. In the end, we get few choices. For example, if you want a diesel in a compact car it will not be available. If you want a diesel in your truck, prepare to pay for all the features and end up with a 16 mpg pig.

The majority of us end up commuting on gasoline, all for the purpose of increased sales of petroleum through lowly low compression gasoline engines. And that's partly due to the fact the public has suffered bad lessons regarding diesels because of poor diesel designs.

The fact, is the diesel engine is such a better power package than a gasoline piston engine, they should be standard at a minimum. This is just another example where the car and the truck industry lets us down by charging excessively for the upgrade to a diesel engine, which then turns into a much heavier vehicle.

Today, they burden the diesel engine with a separate tank for a special fuel oxidizer that comes with exhaust restrictions that reduce the power output of the engine. The modern diesel pickup truck's heavy engine causes them to eat up brakes and tires. Fuel mileage is halved in stop and go traffic. Then there is the 24 quart oil change to deal with every 5,000 miles or sooner.

When we add these extra costs up along with the horrible price premium they add on, most of us choose to remain shackled to gasoline engines. This has all been calculated to leave the diesel owner with a few pennies in savings when all is said and done.

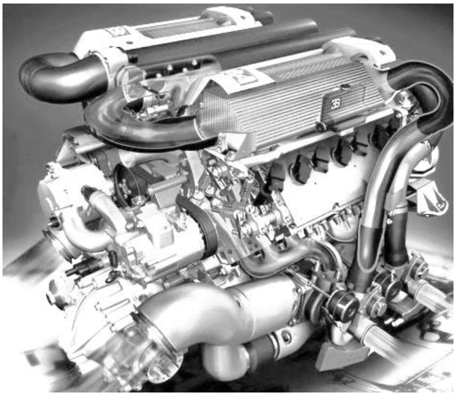
You should also take note of the fact there are virtually no small diesel engines placed in cars that are sold in the United States. For example, the Peugeot 208, rated at 74 mpg, is not available in the U.S. The Citroen C3, rated at 71 mpg, is not available in the U.S. Same with the Vauxhall Corsa which is also rated at 71 mpg. Next is the Volkswagen Golf, rated at 67mpg but is no longer offered in the U.S.

BMW 3 Series is rated at 61.4mpg, but I could not find one for sale at a U.S. dealer as of February 2023. Next is the Ford Focus diesel at 61 mpg. Again, could not find one available in the U.S. The Audi A4, rated at 58.9 mpg is only available in India.

These would be a marketing sensation here if we could just buy them, but unfortunately it would expose all of the hybrid designs as over-engineered and over priced. We always have to keep in mind that it's a controlled market; only so many diesel-equipped cars are permitted to be sold in the U.S. each year. Big Auto will continue supplying the public with gasoline powered cars as if they were in the same category as diesel and rotary engines, because their aim is to sell gasoline.

## 100 Years Of Fluff

Here we go: The world's fastest street car for 2022 is the Bugatti Chiron, equipped with a 8.0-litre quad turbo W16, to produce 1,578bhp that tops 300mph. It has a redline of 7,200 rpm.



Pictured: the Bugatti W-16.

But folks, I need to make perfectly clear this car is built for one reason, and that's to make the public think that piston engines are still the fastest engines on the road in a vehicle. Therefore they must be the best up-to-date engines. The facts have shown that this is flat out not true, but I will attempt to prove it again.

Shown below is the real "fastest car in the world". Check out what kind of power it has; Hint: not piston engines. What a waste of time that would be. For this 10 Ton "torpedo" to reach the current speed record of 763 miles per hour it required 100,000 horsepower! That's two F-4 Phantom engines at 50,000 horsepower each! How many of these 16 piston reciprocating engines would it take to produce the kind of horsepower needed if you really want speed as your main issue? It would take 63 of these W-16 engines shown to develop the same amount of horsepower!

So if top speed is what they really want to boast about, it's time the industry started using a top speed engine like a gas turbine. Instead, what the public gets fed as state-of-the-art power for the world's fastest street car is a complete joke. It's not really even in the same class.

None of this matters in the slightest to you and me. These cars are not just for rich people, but stupid rich people. What I find amusing is the fact that rich people might be rich, but they let themselves get ripped off even worse than you and me. That's why it is imperative that we remain awake to the fact that 21st century automotive "engineering" has rewarded us with over-engineered piston engines and nothing more.

And it needs to be noted that even expensive cars fleece the buyer with plastic parts and chrome coating technology. The amount of metal or "car" gets less and less with each passing year.

What does a 2 million dollar car with a 16 cylinder piston engine truly represent; unbridled attachment to gasoline! It also proves a piston engine can be made with so many special parts and alloys it can cost in the millions!! All this to supposedly go really fast or to make people think you can go really fast, which we can't unless we're on a track.

The relentless programming by the media needs to be broken. As we continue to look more closely at every "performance" vehicle we must ask ourselves if the vehicle is even safe for human beings to travel in, much less at higher speeds, when we're still in the same lane as large trucks.

Pictured above are two new $300,000 Ferraris that were out racing and got in a crash at 70 to 90 miles per hour. It doesn't look like you get much safety for $300,000. In fact they don't look any different than two cheap compact cars that we've all seen spew plastic parts all over the highway when they collide. Notice how the passenger door of the center vehicle is crumpled in.

Well folks this is the summary of what we got for all of our innovations during the past 120 years; paying major tribute to the Auto/Oil Industry. The tribute is a yoke that we bear every day. Weekly fill-ups are just one part. Added to this is car registration, insurance, maintenance, tires, batteries, depreciation and interest fees. And it all goes to support an inefficient system designed around petroleum products.

The fact is today's supposedly "modern" petroleum-powered piston engine cars are a disgrace. They serve the memory of mechanical contraptions that should never have been our chosen design in the first place. The price we pay for simple and necessary transportation is completely out of proportion.

Today's compact cars in the United States average about 25 miles per gallon. And around 1920 a $500 dollar standard Ford Model T got 29 miles per gallon. Of course, auto historians will quip, "Wait a minute; cars go a lot faster today. Those early model T's only had a top speed of 45 miles per hour".

And there you have it folks; more proof that the automotive vehicle system that we have today was originally conceived around a 45 mile per hour top speed.

Felix Wankel At age 17 he told friends that he had dreamt of constructing a car with "a new type of engine, half turbine, half reciprocating. It is my invention!". True to this prediction, he conceived the Wankel engine in 1924 and won his first patent in 1929.[1]

# CHAPTER 8

## EV and Hybrid Cars

As the world is nearing an environmental crisis from the production and disposal of lithium ion batteries, we should discuss the viability of the EV and Hybrid vehicle before we continue any farther with this concept. It needs to be reiterated that lithium ore was in limited supply before the advent and embrace of battery-powered vehicles. Now we have created a worldwide environmental crisis.

The fact is battery-powered cars have serious shortcomings that need to be addressed before the world proceeds with a mass production of the components. For one, there currently is no plan in place to recycle these lithium ion batteries after they reach their service life. This is only about ten years.

With virtually every major car manufacturer latching on and endorsing a system which is not viable technology in the long term, we can only conclude that every major car manufacturer is part of one giant corporate club. Oh, you don't think so. Step back a moment and consider the fact that Big Auto, on a worldwide basis, exclusively endorses the use of piston engines in cars and trucks. And notice too that they all burn gasoline. But as you know by now there are a hundred better choices of engine designs and a thousand better choices for fuel. So why do they all use and continue to use this same combination?

There is only one explanation for why this is the case: Big Oily controls the auto industry, worldwide.

## EV Battery-Powered Cars

Now since Big Oily controls the auto industry, guess who is in control of the electric car industry? And it is therefore not a coincidence that a transportation system that relies on battery-powered cars will not serve to reduce the amount of petroleum burned overall. That's because 61% of electricity generation is from coal, natural gas and petroleum, and only 20% is from renewable resources like hydro, wind and solar. Only 19% is from nuclear energy, thank goodness!

I don't care how sophisticated batteries are today, they are merely storage units. In most cases they are storing energy that has been produced using coal, oil or gas. And since batteries do nothing, in an of themselves, to produce energy, at no juncture does Big Oily market less petroleum.

They can call it "going green" and brag that our vehicles are electric powered, but never forget it's a system that they designed and selected for us. And sadly, because of these vehicle's short range combined with charging wait-time, these vehicles will eventually give electric cars, in general, a bad name. In fact, we're seeing that already with the newer, more expensive models of EV vehicles that have recently hit the market, failing to mitigate the problems of short range and slow charging.

When the public finally comes to the realization that not only do batteries not provide the level of service required, but in addition have no feasible way of being recycled or disposed of, it will become obvious that the system is doomed to fail. And when this is all said and done, instead of making piston engine powered cars look inefficient and outdated, the ill-conceived battery idea will only serve to reinforce and renew the public's demand for piston engine powered cars. This is exactly what Big Oily wants!

### Tesla Motors

With that overview, It's time to get down to business about this supposedly remarkable battery-powered car called the Tesla. First of all, there is nothing "Tesla" about the Tesla automobile. The original Roadster, before it was named the Tesla, was designed by Martin Eberhard and Marc Tarpenning in 2003. At this time Elon Musk was not even part of the company, which at that time was named "Silicon Valley Motors" or something like that. You can't find this on the web anymore.

Make no mistake about it; the most notable thing about the "Tesla" car is the Tesla name itself. There is no connection between Elon Musk and Tesla technology other than the fact they both use an electric motor powered by alternating current, which Nickola Tesla invented in 1888.

Tesla's unique form of transmitting electricity to an electric motor through the atmosphere at very high frequencies is what true "Tesla" technology refers to. Thusly, his car design would never have relied on batteries. If it was real Tesla technology there would be not only be no need for a battery but the vehicles would never need charging either. This would give them unlimited range. So why is Elon Musk able to use the name "Tesla" when his car does not utilize Tesla technology?

The story is, and believe me it sounds like a story, that in 2004 Eberhard and Tarpenning, the original founders of what was to become the Tesla Roadster, attracted a 6 million dollar investment from Musk. He, in turn, was granted a "chairman of the board" position.

The story goes that sometime around 2006 Musk purchased the name "Tesla" from another man who lived in Sacramento, California for $75,000. Why this person in Sacramento would have legal rights to the name in the first place is not explained. Now why he would sell it for such a small amount is insanity.

At any rate, the original Eberhard and Tarpenning "Silicon Valley Motors" acquired the name Tesla Motors for mere peanuts, and the rest is history. In October 2008 the "Tesla" Roadster entered limited production. And by the way, shortly thereafter both Eberhard and Tarpenning were gone from the company.

I can't help but surmise there is a sinister plan afoot, such as the reason Elon Musk has been permitted to use the "Tesla" name. I fear that it is to later discredit not only the electric car concept but the Tesla name itself.

**Why The Battery System Is Not Viable**

The current premiere electrical "technology" hinges on the development and use of lithium for high output batteries. We should at least know what lithium is.

As with all alkali metals, lithium is highly reactive. Lithium is thus flammable and must be stored in a vacuum atmosphere or inert liquid such as purified kerosene.

When cut, lithium exhibits a metallic luster. When exposed to moist air, it corrodes quickly to a dull silvery gray color and then to a black tarnish.

Lithium never occurs freely in nature but only in ionic compounds, which were once the primary source of lithium. Due to its solubility as an ion, it is present in ocean water and is commonly obtained from brines. The Salton Sea region has one of the world's largest known reserves of lithium, supposedly enough to power batteries for more than 50 million electric vehicles. But first it must be extracted from hot geothermal brine loaded with toxic material. As of August 2022 this process has never been done before to scale.

The nucleus of the lithium atom is unstable. For these and other reasons, lithium has critical applications in nuclear physics. In 1932, the transmutation of lithium atoms to helium was the first fully man-made nuclear reaction. Lithium deuteride serves as a fusion fuel in staged thermonuclear weapons.

Lithium has several industrial applications, including heat-resistant glass and ceramics, lithium grease lubricants, flux additives for iron, steel and aluminum production, lithium metal batteries and lithium-ion batteries. These uses consume more than three-quarters of all the current lithium production. As a result of America's transitioning to electric vehicles will require more than three times the current amount of lithium currently produced globally. If production is tripled these mining operations will cause water shortages, indigenous land grabs and ecosystem destruction within several countries where it is currently mined.

For battery-powered car lovers, this may not seem like such bad news. However, we're just getting started. After a bit of research I found 14 imperfections within the current design of battery-powered vehicles. As you will note, each of these is an absolute "deal-breaker".

1. An electric vehicle does not need to carry its own energy. This has been demonstrated with the use of charged rails, overhead wires, cable cars, trolley cars, induction coils and Tesla coils. So the concept itself is ill conceived.

2. A 220 Volt level 2 EV charger installed at home can add 6 times the load of a normal house. The addition of Level 2 EV chargers consume 7,200 watts compared to the average house which is only consuming 1,200 watts. In short, neighborhood electrical grids can only charge up a fraction of the EV cars that would be there.

3. Charged batteries are extremely dangerous. When the vehicle is involved in an accident, such as with a tree stump or other vehicle, you can easily dent the battery. When the battery is dented it short-circuits inside. It then begins to heat up, usually catching fire within minutes. They are very difficult to put out. They are extremely dangerous in vehicle accidents and sometimes the occupants don't get out in time. On top of this is the concern of a freeway pileup occurring in the future, causing a fire that can't be put out.

4. If you get flooded the car's energy-charged battery becomes a time bomb due to relentless corrosion of the contacts after immersion. For instance, battery-powered

cars that survived the recent Hurricane Ian in Florida are now catching fire on their own while sitting. If the vehicle is in a garage it can burn down the whole house. The fire department in Florida has put out a warning in this regard.

5. If you get caught on the highway in a snow storm you're going to run out of heat, and then possibly expire from hypothermia.

6. If batteries were charged from solar or hydro power the system might make sense. However most of the time they are charged from coal and gas fired plants so this does not save petroleum.

7. There is currently no way to dispose of used lithium ion batteries.

8. The system is actually more costly. Consider that replacement batteries are required after 9 years. For example, a Tesla battery is $23,000. All this expense and yet you would normally only consume $15 to $20 K worth of gasoline during this same time period. And you haven't even calculated in the costs of charging at home and charging at stations. So it's actually much more expensive to go EV than stay with combustion.

9. Premature obsolescence. By the time your electric car needs a battery, that model battery may not be available. Your whole vehicle could become worthless. That's already happening in France. Or your car may not be as valuable as a replacement battery; such as the $24,000 Chevy Volt which now has a replacement battery cost of $30,000.

10. Battery production uses more fuel than the battery saves. It takes 500,000 lb. of ore to produce just one battery. Using diesel powered earth-moving equipment to mine the necessary amount of ore will consume 4 times more fuel than a conventional car would consume during the 9 year lifetime of a battery. Therefore, lithium ion batteries are a debacle of environmental management.

11. There's now a worldwide shortage of lithium. According to an Australian mining report, current world demand for lithium hydroxide prices are set to rise from $17,370 a ton in 2021 to $39,900 in 2022, $61,200 in 2023, then moderate back to an annual average of $48,500 in 2024. Therefore, in order to go to lithium ion technology Big Auto will have to dramatically increase the price.

12. Payload is reduced because of the extreme weight of the battery. For instance the Ford F 150 Lightening is 1,500 lb. heavier than the standard truck 5.0 liter V-8! The extra weight requires a stiffer suspension. The stiffer suspension adds further to the weight, which takes extra energy to accelerate it up to speed. The extra weight also requires heavier tires which produce more drag on the road at highway speeds. In a recent test a fully charged F 150 Lightening was only able to tow a trailer for 150 miles.

13. Too much space is required for recharging stations. Consider that cars take an hour to charge and that a gasoline fueled vehicle takes only 5 minutes to charge. That means charging stations will have to accommodate each vehicle for 12 times the amount of time. This equates to needing 12 times the number of charging bays as fuel pump bays to get the same job done.

14. Degenerated human health; research has shown that there are serious negative health effects from the electromagnetic fields produced by large batteries in close proximity to the occupants.

In short, the battery-powered vehicle concept is a sham. As discussed, true Tesla technology sends the energy through the atmosphere and thus these battery powered car have nothing to do with Nicola Tesla's invention. What they are doing is destroying the "electric car", just like they did in California in 2004. That story is coming up.

And also note: bullet trains in China and France are not battery powered even though they never touch the rails. They use induction coils which could be similarly placed in our highways, alleviating the need for charging and giving us the range we need. But for some reason, the industry is stuck on batteries.

**Covering Up Other Concepts**

The act of covering up or destroying better concepts than petroleum piston powered contraptions is nothing new to Big Oily/Auto. They did the same thing with the Chrysler turbine and the NSU "Wankelspider" in 1964. And now they're going to use "Tesla" to destroy the electric transportation concept . Score another victory for Big Oily.

The fact is there are countless other ways to propel a vehicle. If you don't believe me then check out just one of them; the Rory Johnson electric motor, which developed 500 hp. and would run on a single charge of deuterium for years: The full story is in Chapter 20. http://www.rexresearch.com/magntron/magntron.htm

Now, today this is very relevant as this actual Tesla technology is just a patent-release away. I have heard much about the release of 6,000 patents that the U.S. Patent Office is holding up on the merit of "National Security". It's been rumored, in just a few months, when the world finally gets official disclosure of our corrupt behind-the-scenes governments, including the existence of life on other planets and extraterrestrial beings, all of these patents will be released.

**Hybrid Vehicles All The Same**

First off, why they still make a hybrid vehicle which does not plug into house current is just a clever way to make people think their car charges itself as efficiently as a coal-burning electric plant. It's not even close. Thus, all hybrids should be "Plug-in".

Energy taken from the grid is only 12 cents per kilowatt hour. In comparison, when you generate electricity on your own using a gasoline powered generator, it requires approximately $1.20 per kilowatt hour. So the difference, grid vs. generator, is roughly 1/10th the cost of charging from your car's engine.

Now, although it appears that today we have an interesting choice of power packages, with engines combined with electric motors that produce upwards of 800 peak horsepower, the real eye-opener is that we are at the pinnacle of car complexity. There are so many electronically controlled mechanisms on these new hybrids there is almost no way any one person can ever fully understand them and thus become a master at repairing them. Believe me, that's part of the deception.

From the Mercedes down to Kia, today they all have hybrid technology, incredible as it seems, at about the same level of performance. And also note that all of the models go about the same distance, and they all have gas mileage figures within a close proximity.

The only way that all of this mechanical and electrical complexity could have evolved into these peculiar power mechanisms, that are already designed so thoroughly, is through organized collusion. Why else would they, or could they, have come up with almost the exact same configurations of the engine, starter, generator and battery? It is obvious that the design is being shared amongst all of the major world auto manufacturers.

Today, the standard design parameters of all hybrid designs are roughly as follows: (2 L piston engine, turbocharged, 100Kw elec. motor, battery for 20-50 miles, fuel capacity for 250-400 miles, etc.). This is the sort of "base model" that all of the other manufacturers appear to shoot for.

If you purchase a 2022 Prius like the one shown above, the current package for the engine and electric motor is a combination of a 2.0 liter four-cylinder engine and two electric motors that draw power from an 8.8 kWh battery, which together produce 122 horsepower.

Another common package, for a sport utility vehicle, such as the BMW X5 45e shown below, is a 3.0 Liter 6 cylinder turbocharged engine and a 110 horsepower electric motor drawing power from a battery for a combined total of 389 horsepower upon peak demand. Except for the Porsche Cayenne and a few other exotic designs all of the other car maker's designs fall somewhere in between.

The Toyota Prius has provided the most reliable service of all the hybrid vehicles I have had time to review. Reports from YouTube reveal that a used Prius is still a good deal as the engines, clutches and starting mechanism are lasting upwards of 250,000 miles. As for the battery, it will only last 8 to 10 years before it needs replacement and the current cost to replace one is $4,000.


Now please don't let me give you the wrong impression! It's impossible for me to support hybrids as serious contenders for the long-term just as it is impossible for me to support the continued use of petroleum asphalt as the primary road material. And even if they proposed using these vehicles on granite rock roads I would still refuse to endorse them for the simple fact they are much more complicated than a propulsion system needs to be and hardly get better mileage than a standard engine and definitely less mileage than 10 diesel sedans currently offered in Europe. In my humble opinion, they will go down in history as being the most over-designed cars of modern times.

As I stated, all of these new hybrids are remarkable engineering and electronic mechanisms but I must also point out the obvious collusion of similar technology within the overall program. The first one is the lack of diesel engines in any of the hybrids. The second is the lack of a smaller engine design such as the Wankel, Rampressor, Liquid Piston, MYT or other being applied to any of the offered models. The third is the fact that none of the Big Oily/Big Auto car companies have been allowed to make any quantum leaps in fuel mileage or range.

Isn't it about time that we had a "1,000 miles-between-fill-up" car? Without a doubt car manufacturers could do it today. Unfortunately all of them are adhering to strict design parameters dictated by Big Oily. So here we are, just like 1920, still stopping and filling up every 300 miles or so, a statistic that's remained unchanged for over 100 years. And it just might be that we are all being used for the sake of cigarettes, snacks and soft drink sales and wasting valuable time refueling.

## Stop Start Mechanisms

One of my biggest drawbacks of piston engines as a mode of power has been the fact that the engine had to be kept running while stopped. Since the introduction of the Toyota Prius in 1997, the integration of the large electric motor into a stop-start mechanism has served to significantly improve fuel mileage. This is because the engine can be completely shut off at a stop. Finally!

Around ten years after the Prius debuted Big Auto began installing a stop-start device in all of their standard combustion-engine-equipped vehicles. They did this by merely employing the existing starter motor. Now when this type of start-stop mechanism was expected to perform many more starting cycles, it was anticipated it would wear out prematurely in its new role. This was because an existing starter motor plus some electronic circuitry was undersized compared to a hybrid vehicle, where the starter windings are 7 inches in diameter or more.

A second point to consider about Start Stop is that if you're going to be driving in traffic for very long, like in a downtown area, then with a Hybrid you can simply go to "EV" mode (all electric), and now you are not stop-starting your engine at all. It was at this point that the argument for a new car purchase swung in favor of the Hybrid vs. a standard combustion engine because of anticipated breakdown of the starter motor. Now, five years later, I must report that this has not been the case as the stop-start standard sized starter motors are holding up just fine.

This is due in part to the system being "smart", and thus not trying to engage the system when the system is cold, as this is when most starter wear occurs. An engine that was running just seconds ago will start easily and quickly. Thusly, in today's modernized vehicle, before you are able to use the Auto-Start/Stop system it makes sure that the car's engine is fully warmed up. On top of this it is claimed that manufacturers are putting improved bearings into the motor so that they can handle 250,000-300,000 start cycles compared to the previous 100,000 cycles.

And it needs to be noted that Mazda is using a technology called i-Stop, that doesn't rely on the starter at all. Instead, it fires one of the cylinders of the engine to get things rotating. It does this by knowing which cylinder has a piston at top dead center when the engine shuts off. Now, when the driver wants to restart they let off of the brake pedal which activates this fuel injector and spark plug. This causes the engine to rotate and start, just from the help of combustion rather than an electric starter motor.

The development of a reliable stop-start mechanism has been the most positive vehicle improvement from the hybrid program.

## Green Technology?

So now, with more and more hybrids and EV vehicles being built it may look like the public is finally getting ones that utilize the latest in physics and electric technology. But we have already seen what an impractical design the battery-powered concept is, and now unfortunately, the gasoline/electric hybrid designs are destined to be in the same boat; a boat that should be abandoned.

What should be in their place are vehicles which either utilize true Tesla technology, which sends the power through the air, or fuel cell powered vehicles. The current hybrid and EV designs to not equal the range of a piston powered car, especially ones equipped with a small diesel engine. This is problem 1.

But it gets worse. You can't call a technology "green" when the fuel it runs on turns all plant life brown. So here is the number one red flag; the fact that all of these new super-designs continue to run on the most toxic fuel on the planet; gasoline. We should at least have a non-toxic fuel running in tank cars and pipelines along lakes and seas in the 21st Century. We should at least have a fuel that does not produce deadly carbon monoxide gas when its burned in a piston engine downtown in the city. The sad truth is, we have neither.

A better fuel should have been developed right alongside the development of computer-controlled engines, 7 speed transmissions, direct fuel injectors, exhaust gas sensors, smog reducers, automatic lights, radar detection, extended-vision cameras and computer-controlled breaking. Why wasn't it? Has there really been no progress here or is Big Oily just stuck on an old game plan? Do they just prefer to keep selling us the same toxic formulas because of profit? Do they want us all ill and dumbed down? You can decide for yourself.

If you're thinking that you are helping to reduce carbon pollution on the planet by buying into the current "green" technology, you need to realize up front that you are being seriously shortchanged in your efforts. Yes, your "hybrid" vehicle will help to reduce your fuel consumption some, and if you plug it in every night and only drive short trips, for a while it will outshine a standard automobile. Just understand that the current hybrids sold in the United States are not a valid attempt by the automakers to significantly reduce fuel consumption nor save the environment.

In the meantime, don't expect your new vehicle it to be revolutionary. Never forget that all of the savings in fuel costs are at the whims of the overall reliability of the vehicle itself, which is now much more complex. Never forget that vehicle propulsion mechanisms don't need to be mechanically complex. And don't forget to factor in the cost of a new battery.

## Volkswagen's 300 MPG Car

Now it's time to put our current hybrid offerings from Big Auto to the test. Going back to 2014, the results of Volkswagen's two cylinder diesel prototype proved beyond a shadow of a doubt that car manufacturers could easily double, triple and even quadruple existing mileage and range barriers with existing diesel technology.

Here's the original article:

Not Allowed in America Because It's Too Efficient
Peak Oil News     October 2014

"You won't find the 300 MPG Volkswagen XL1 in an American showroom, in fact it has even been denied a tour of America because it is too efficient for the American public to be made widely aware of. Plus oil profits are too high in America with the status quo in place. No tour has been allowed for this car because the myth that 50 mpg is virtually impossible to obtain from even a stripped down econo-box is too profitable to let go of, and when it comes to corporate oil profits, ignorance is bliss.

Though the XL1 can be plugged in to deliver a 40 mile all electric drive, it does not need to be plugged in EVER to achieve 300 mpg. And it does not cheat in any way to achieve the rating; it weighs over 1,700 pounds, has normal tires and delivers a very good driving experience with a governed top speed of 99 mph.

The XL1 could reach a top speed in excess of 110 mph absent governor and turns in a 0-60 time of 11.5 seconds which is by no means leisurely for a car designed for efficiency. The XL1 in no way cheats on performance to hit its rating. It is simply the car we should have always had, and have had taken from us in the name of oil profits.

Though the XL1 can hit 300 mpg under ideal driving conditions, its combined mileage is usually a little over 200 mpg, and if you do city driving only that will drop to a minimum of 180 mpg under the worst driving conditions.

Cost is not the issue either. Even after being hand made with "exotic" materials in an intentionally limited edition, the Xl1 still only costs $60,000.


There is a lot more of a market for this car than 2,000 units at that price. For the bottom line is a 1,700 plus pound Xl1 can get 300 mpg. This indicates that a 3,400 pound Chevy Truck should be able to deliver at least 150 MPG. The XL1 lays the mileage scam bare, with every hybrid that gets 40 mpg and every truck off the line that gets 20, Americans are getting the shaft and do not realize it."

I'm sorry to inform you that as of 2023 only 250 of these cars have been built. It was produced on a limited basis for a selling price of $160,000 but now are only available as a collector car purchase, so good luck! We are waking up though. This is solid proof that they can dramatically increase fuel mileage beyond what the best hybrid will ever deliver.

## The Paradox Of Today's Hybrid Designs

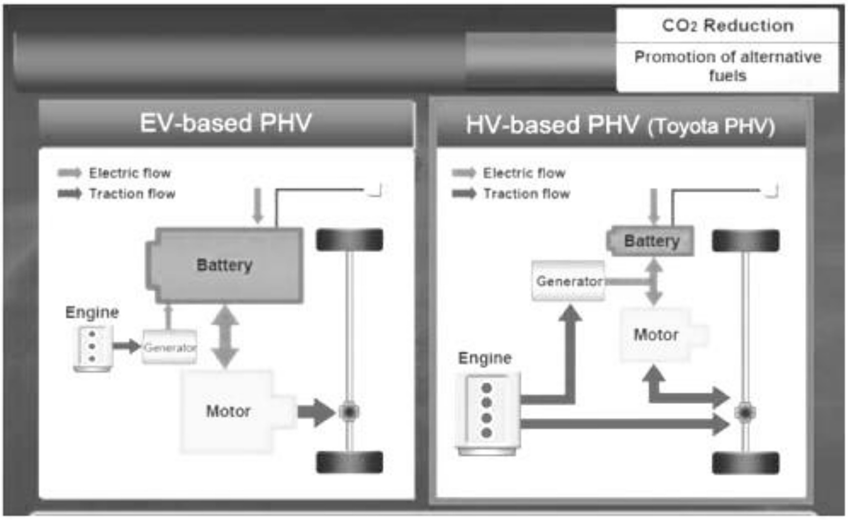
Today's typical hybrid designs offered by Big Auto suffer from a glaring design paradox, and that is this: it is impossible to significantly improve gas mileage using a full sized engine. This is illustrated on the following chart. Here, two different hybrid concepts are compared.

The first concept employs a small 3 cylinder engine running at variable rpm depending on the battery load and charge. In this case the small engine always powers a generator, and the battery always powers the drive motor; there is no gearing required to connect the engine to the rear wheels. At highway speed, with maximum load on the battery, the engine runs at its rated load.

In the second concept, such as the ones present in the Prius and other hybrids currently on the market, the design employs a larger engine so it has enough power to power the car mechanically on its own. While the engine is running and providing power to the transmission, which is 90% of the time, it is also charging the battery.

The savings in fuel mileage occurs when the vehicle comes to a stop and the engine completely shuts off. Then, when you accelerate again the motor either pushes the car or restarts the engine. Which one occurs depends on how hard you press the gas pedal.

In stop and go traffic this can really save on fuel. At highway




speeds, however, the engine will be providing all of the propulsion force, and thus your vehicle will be getting the same fuel mileage as a similar car equipped with a 2 liter engine.

At top speed, for both cars, you will have the maximum need for propulsion to overcome wind friction, tire drag and rolling resistance. Now in car 1 you have a smaller 1 liter engine running at about full load to maintain speed. In car 2 you have a 2 liter engine running at only ½ load. Which one will get better mileage?

As you have already read, a piston engine is a continuous high-friction resistor. The engine mechanism itself requires approximately 30% of the energy it gets from the gasoline it burns just to make the engine spin at operating speeds. This is exactly why downsizing the engine that is used (for charging) to the bare minimum displacement is crucial. And this is why the vehicle with the smaller engine will get better mileage.

Now what about acceleration using just a 1 liter engine? How is that going to cut it? This is when the reserve juice in the larger storage battery comes into play. That battery can supply all the acceleration power you need. It can't do it for very long, but in short spurts it can equal or exceed the acceleration using the larger 2 liter engine.

An honest engineering effort to produce a viable engine-electric, "Hybrid" car would employ an engine that is approximately 1/4th the size and use electric drive constantly, thus eliminating the need for a clutch, transmission and spline. As you will read in subsequent sections, we have had this electro-mechanical technology since the 40's when it was first used in the railroad industry. Today's hybrid cars demonstrate the refusal of the automakers to discard oversized reciprocating gasoline engines.

## End Of The Road For The Battery Concept

You have learned that the performance of all of these crazy designs could be exceeded just by using a small turbo-charged two cylinder diesel engine. And actually the whole petroleum-engine-Hybrid-concept could be replaced by more revolutionary systems such as hydrogen fuel-celled electric vehicles, actual Tesla technology, the Rory Johnson deuterium motor and the list goes on. At the very least we should be powering our vehicles via induction coils in roadways like they do with the bullet trains.

This clearly dictates that the future of our transportation system needs a full discussion, especially before we commit to a decade of constructing expensive batteries that cannot be recycled. And we must also insist that our future roads be made of granite geo-polymer material that resists wear and sunlight instead of asphalt. If and when we do finally replace this inferior road material would be the perfect time to install wires, induction coils, magnets, etc. in our roads and redesign our vehicles with electric motors which can pull power anywhere off the highway grid.

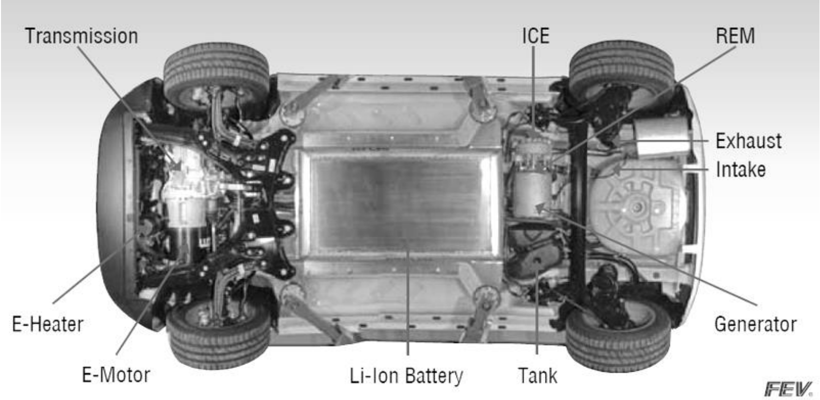
It is time to think outside the box and to have many questions answered before we make any further commitment to hybrid vehicles. For now, knowing that the replacement costs of a battery, whether it be a hybrid or EV can equal $30,000 and more, we should stay away from both of them! The car manufacturers have made it more than obvious they plan to scam the public with exorbitantly priced electric vehicles and batteries.

## The Wankel Hybrid FEV Concept

Now let's take a look at where we should be. This section is dedicated to the discussion of a vehicle concept that utilizes a vastly superior hybrid design than the typical ones offered by Big Auto today. This is the type of technology that we should have today, at a minimum.

We have to go back a full 8 years to review this design, which by the way, has gone absolutely nowhere since. The reason? The concept offers too much of a leap in fuel mileage savings! So since 2015, when Fiat designed and built this Wankel-powered prototype it has remained undistinguished .

Called the FEW, the prototype utilized a small Wankel engine to power an electric generator. This in turn fed into a battery, which then supplied power via copper wire to the motors geared to wheels.




The FEV with Ion Drive mounted into a Fiat 500. Note the separation of engine from the drive train. Ease of engine access makes repair/replacement a snap.

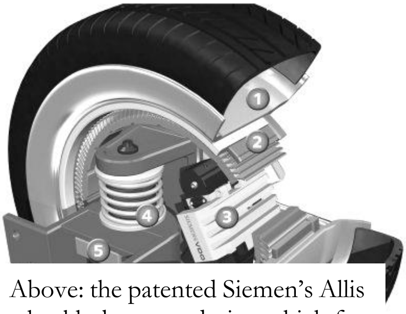
There was no need for a driveshaft, transmission or final drive.

The picture above shows the underside of the prototype FEV which demonstrates a superior hybrid concept. The compact Wankel engine is direct-coupled to a generator. Both are located underneath the car's back seat. The motor and transmission are placed just in front of the front wheel axles. The car's battery is located right in the center down low where it should be. Most importantly; **the engine is never mechanically connected to the drive wheels.**

This is a true hybrid. The design replaces the big clunky piston engine with a small Wankel engine (about 1/5 the size of the Mazda RX 7 Wankel engine). The resulting package is compact and lightweight so as to provide a potent gasoline or diesel powered generator that can be easily fitted into an existing electric car. They call it a "range extender", meaning it can charge batteries while on the go using its own fuel.

The main improvement in the car is the fact it is free of a large, heavy piston engine, drive shaft and torque converter. This is the proper way to build a true hybrid car as there is absolutely no need for a mechanical connection between the engine and the wheels.

It could be made even better with the revolutionary concept of incorporating wheel hub motors in place of a gear reducer and planetary drive. This would make the vehicle even lighter and more efficient.



Above: the patented Siemen's Allis wheel hub motor design which for some reason, they have never brought to market.

Audi has also researched the design. The only reason it has not been road tested and developed already is for the same reason Fiat's FEW has not been further developed. Big Oily wants fuel consumption and fill-up intervals to remain the same. Big Auto is placating the public with battery-powered "electric" cars.

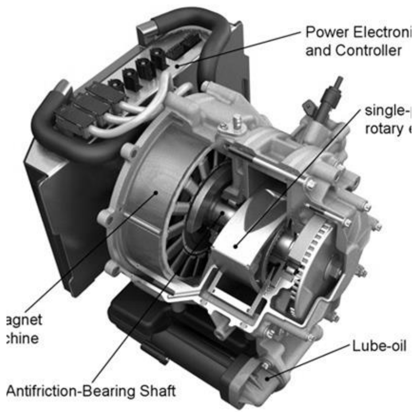
These two prototypes employed scaled-down Wankel engines that put out plenty of horsepower. In the case of the FEV, the engine was 295 cc and put out a maximum of 60 Kw, which is over 100 Hp. The Audi was smaller at 265 cc and put out 75 Kw in short bursts, giving it upwards of 150 Hp. This more than confirms the Wankel engine in scaled down versions performs well and could have a very bright future, provided any auto manufacturers will be allowed to offer them to the public.

In the Fiat FEV prototype, when the batteries are down to 30% the Wankel engine automatically comes on arresting further battery draw. In this state, with the engine supplying approximately 20 hp., the minimum gasoline mileage at steady state 60 mph is over 100 miles per gallon. This kind of performance, with a dead battery, represents the minimum performance level every powered vehicle on the road should perform at in the 21st Century.

The combination of this kind of drive with a charging system, that takes power off the grid, would easily take the mileage to over 200 mpg. Going to a two stage diesel could probably double that to 400 mpg. Imagine how the use of a diesel Wankel engine into the hybrid concept would revolutionize the car industry? With a 20 gallon fuel tank this vehicle would easily push the range limits above 1,000 miles between refueling.

Consider that if a small Wankel engine/electric FEV could deliver the same mileage as the Volkswagen EL1 a 20 gallon tank could get you 4,000 miles. Imagine that! Look folks, this is totally achievable using today's standards in engineering, manufacturing and design. They just flat out don't want us going farther between having to stop for their darned fuel!

At right is an advanced Wankel powered generator package for an automobile. Note how this type of engine can be made so much smaller than a comparable piston engine, yet this one-rotor design provides over 100 Hp. and fits within a space of just 4 cubic feet. Don't expect to see it until Big Oily has lost their grip.




## More About Wankel Engines

Since we tend to key on the discontinued Mazda RX-7 and 8, as if this represented the whole Wankel engine market, few are aware of the many applications that Wankel engines are used for today. For instance the military not only uses the Wankel design but has air-cooled ones of 40 to 100 Horsepower for drones.

For example, a 40 BHP UAV Engine from advanced innovative engineering only weighs 22 lb. Rotary motion is harmonious with high rpms. High rpms equates to higher horsepower. These scaled down Wankel engines deliver both.

Now, where the Wankel engine comes into a whole new level of power is with the addition of a turbocharger. Keep in mind that a turbocharger in itself is a rotary engine. In this case it's in the form of a turbine being fed high pressure exhaust gas.

The Wankel can also be built with a separate rotor just for charging. Rolls Royce experimented with this idea and the results were so impressive they had to discontinue its development.

## Who Killed The Electric Car?

Did you know there was a movie made about an innovative electric car that appeared in California in 2004? It was made shortly after California's zero emission law was rescinded. You didn't know it, but in the few years prior to that, GM was actually forced to produce 50 zero emission cars under a California Congressional mandate law that required major auto manufacturers to produce some models of cars that had zero emissions. Known as the Chevrolet EV-1, it turned into a smashing success.

As the few lucky "owners" would later exclaim, the EV-1 went down as the best set of wheels they ever owned. Sporty performance and very economic was acclaimed by each one of its owners. Unfortunately, the EV-1 pilot program turned into a similar charade like the Chrysler turbine of 1964, being that even though it was a smashing success it was dropped as fast as it was begun.

The plan by Big Oily, working through its lobbyists and lackey engineers, was to get the legislation changed back to 1920's mode as soon as possible. In short, they wanted the whole electric car idea to fizzle. So by a clever act of planning, none of the Chevrolet EV-1 manufactured and marketed to customers were ever sold to the car "buyer". Instead they were loaned to the "buyer". Those who signed up for one soon found themselves happy to have one. But General Motors had the ability to recall them at any time.

You guessed it! As lobbyists worked over the city council with false performance reports and reasons to drop the program, the eco-law was rescinded. Shortly thereafter, GM put out a work order that designated all EV-1's be returned to them for further

modifications. After the disgruntled owners turned over their EV-1's, they were crushed flat and put on a train car for the trip to a scrap yard. In the end, all but one was shredded, later finding its way into a museum, but without its engine, batteries or electronic controlling mechanism.

They were later seen and photographed after being further modified by General Motors. It doesn't look like GM had plans for a positive modification.

## Summary

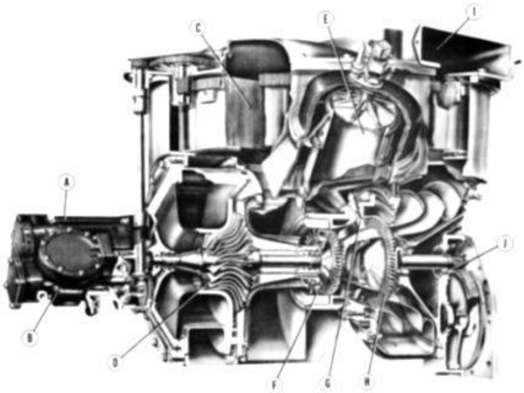
The Big Oil Auto Conglomerate is fooling the public. Electric powered vehicles should be cheaper than their piston powered counterparts, not more expensive. Serious hybrid contenders should be equipped with diesels, Wankel or better, with batteries that are rebuildable and recyclable.

They know that if all of our cars were powered off an electrical grid that they would in effect be running off coal, natural gas, fuel oil and nuclear energy that was consumed in a high-efficiency steam turbine power plant. They know that it would make our transportation system at least 10 times more efficient than it is now. If Big Oily would just be good sports, and be content to live like brothers, and supply their gasoline to power plants out in the country rather than to a million gas stations in town, they could keep a good portion of the business and have a good reputation to boot. But Big Oily is Big Greedy and they know it.

# CHAPTER 9

## The Chrysler Turbine Car

Another great example of a superior engine can be found in the turbine engine design via Chrysler research during the mid 50's and up until the early 70's. And wouldn't you know that just when this whirring miracle was perfected the department was terminated.



Early Chrysler turbine engine, about 1954

It now appears the reason the turbine program was terminated was because it was successful beyond Chrysler's wildest hopes. The Turbine engines Chrysler built outperformed their piston counterparts in virtually every category plus they were 200 lbs. lighter in weight. In addition they did not need a clutch or transmission nor did they need a radiator or cooling system. Like all turbine engines, they could run on gasoline or kerosene.

Are you kidding me! This thing was a car owner's dream! The Chrysler Turbine Car is legendary. The first one appeared in a tired-looking Plymouth Belvedere that would have suited grandma just fine.  That was in 1955.  Refinement and testing continued until about 1965 during which time 200 lucky people got to take part in a one year test of a Chrysler turbine-equipped car.


I was around 10 years old then and even I was anxious for the new "rocket" engine powered cars to start showing up on the street.  But as time went on the news faded.  Without the public knowing, the turbine program was on silent hold and would soon be silently dropped by Chrysler.

A few years later Chrysler's turbine technology was transferred to the U.S. military to power the latest and heavily armed Abrams battle tanks.

About the only thing the public heard about the turbine car's future was that the whirring engine was sluggish from a start. Considering what a remarkable advancement it was; one spinning shaft with blades verses a throbbing crankshaft with piston throws and valve clatter, this was the most unlikely development imaginable.

On top of this, every customer who tested one reported being delighted with the performance.  Many made sure to inform Chrysler that they were put at the top of the list of the first actual buyers of a turbine car.

The wishes of the oil industry were achieved; the turbine car has been forgotten.  Now is the time to revive it.  And the best way to revive it is to go back to 1940 when the United States was manufacturing turbine driven mechanisms by the submarine load. You just didn't know it because you didn't know what was powering our navy's torpedoes.  The case in point, as you will soon see, is that the United States can manufacture turbine engines in quantity and price to meet any demand any time it wants.

## The Mk-14 World War II Torpedo

I can well remember the day when I talked my father into going on board a World War II submarine of the type and class that he had served on during the war. Reluctantly he agreed to take a tour of a fully restored Class 2 submarine named the USS Pampanito that was permanently docked in San Francisco at Fisherman's wharf. It was 1989.


This is what I learned. The design and engineering aspects were very impressive. This narrow heavy ship that could submerge included around 90 men, 16 torpedoes, 4 large diesel engines and generators, AC-DC motors, batteries, fuel, ammunition, food supplies, etc. I got the impression that sailing one of these things was complicated and totally unforgiving if you made a mistake. In addition, I could see by looking at the materials and craftsmanship that our engineers back then had come up with innovations and designs that would boggle the minds of most engineering graduates today.

We spent some extra time looking at the engine room, which sported four double crankshaft engines built by Fairbanks Morse crammed into an engine room the size of a one car garage. But it was the dockside museum that peaked my interest the most. This occurred when I stopped to study a display which featured a cut-a-way of one of the Pampanito's torpedoes.

Inside it was a micro turbine, the design of which stopped me in my tracks. For the first time I was looking at a small compact impulse turbine, pancake in shape and fitted into a tiny space. You can see it in the picture below near the top and right. It spins atop the vertical shaft just below the end bearing.

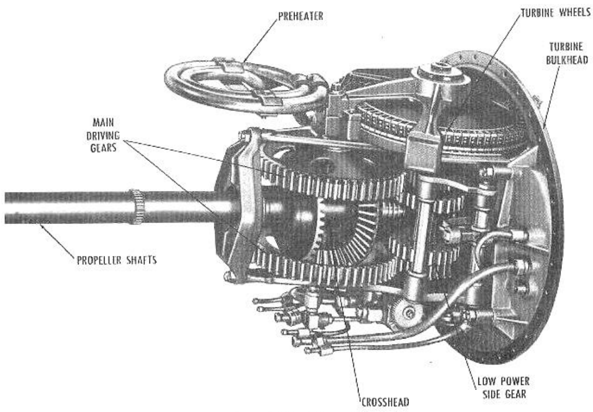


FIGURE 12E1. Main engine.

I had seen so few turbine engines in my college days that this was indeed a revelation. In the past as an engineer with Mobil Oil I had seen many large industrial turbines. As a result I was under the mistaken impression that turbines could only work if they were very large and connected up to a coal plant or natural gas pipeline, etc. But in this case I was looking at a complete turbine that was fitted into a tube only 21" in diameter. And I got to see all of the necessary and amazing parts including the tank and flask that fed alcohol and water to combust and produce superheated steam. Wow! And it all fit within a 21 inch diameter tube that operated under water.

These torpedoes were mass-produced by the tens of thousands during WWII. This speedster will more than raise the eyebrows of any modern automotive designer who has the guts to actually study one. Once you have seen this kind of compact power mechanism you will never again look upon your car's clunky piston engine with admiration. That's because this design puts piston engines back in time 100 years and exposes current vehicle power mechanisms as a fraud.

I should mention that it is because of the Freedom of Information Act that these documents became publicly available. Now anyone with the slightest interest in developing a rotary or turbine engine for automotive and truck use should review this revolutionary power concept before going any farther with a prototype. It would not be difficult to design, manufacture and mass produce them once you have these 70 year old drawings.

Using **compressed air, methanol** and **water** to produce

## Super-Heated Steam Without A Boiler!

The key to the torpedo's power system was the use of a compressed air tank in conjunction with water and methanol alcohol. By using compressed air from a tank, from the get-go the system had high enough combustion temperatures to turn water into super-heated steam. The size requirement of the air tank took up a significant amount of space and was filled with compressed air at 2500 psi, then fed through a regulator at 500 psi. Therefore the ignition chamber was **never below 500 psi.** With the addition of water in the combustion flask it would produce super-heated steam along which multiplied pressure from the combustion of methanol. This dramatically increased the power.

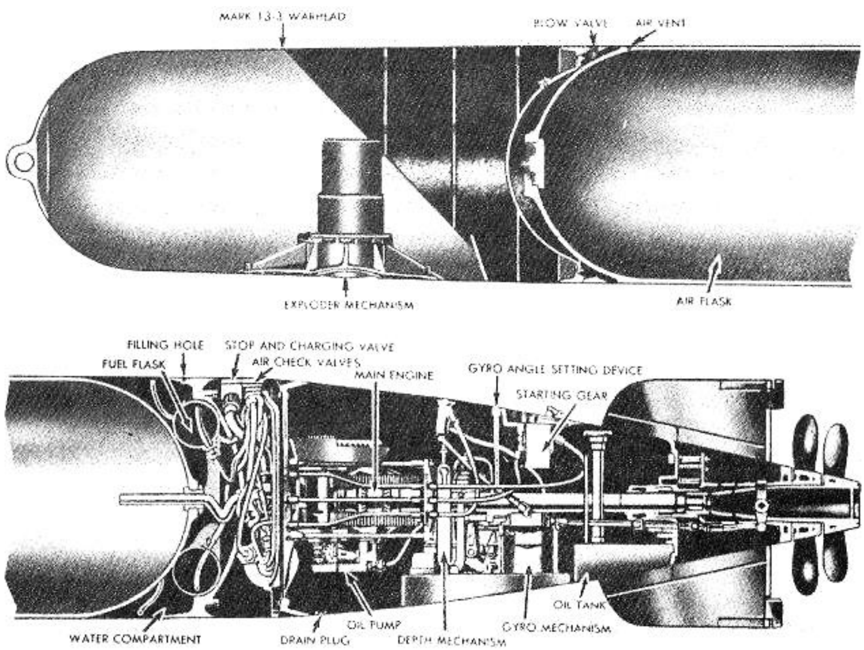
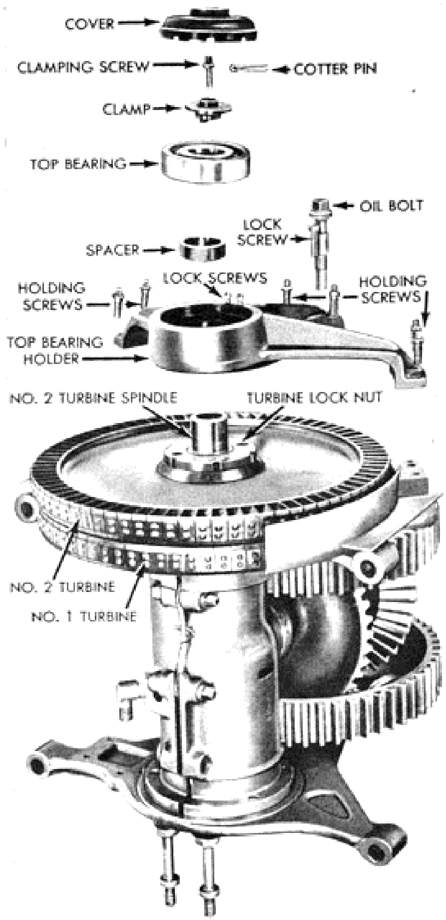


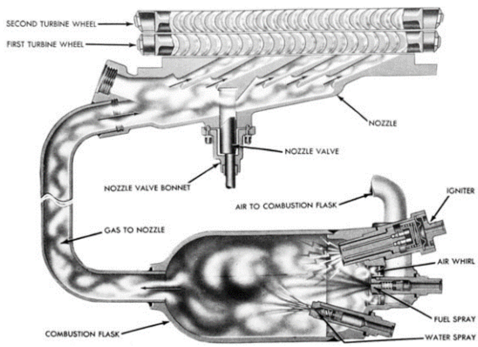

FIGURE 12H1.—The Mark 13 torpedo.

The turbine designed for use with the 21-inch Mark-14 torpedo was known as a <u>wet-heater</u> type. It carried a 600 pound warhead and could travel at 46 knots 4,500 yards of range. It could also be set to run at 31.5 knots, which extended the range to 9,000 yards.




The primary fuel was methanol. The primary expander was water. The combustion driver was the spark ignited flask that was pressurized with gobs of oxygen-laden air. The combustion gasses produced 50% more power. In short, this was nothing short of a brilliant way to create and harness the power of superheated steam. Note; This cutaway shows the two turbine wheels which rotate in opposite directions. They are geared together in an ingenious way that keeps them synchronized and turning in opposite directions. This gives the torpedo just the kind of fast thrust it needs by providing two propeller shafts as output; one inside the other so you end up with counter-rotating props.

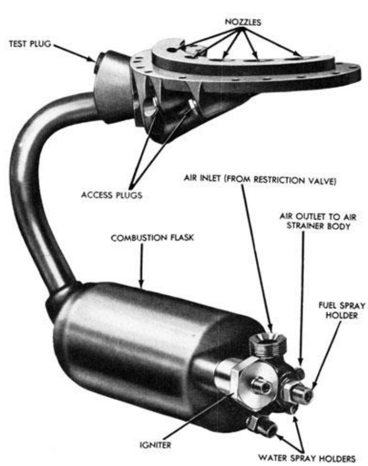
The gearing shown is thus a bit more complicated than what you would need for a vehicle. But there are only two turbine rotors in this engine which reveals that they can be built simply and cheaply. The turbine rotors are estimated to be less than 10 inches in diameter. Overall this turbine engine is obviously much cheaper to manufacturer than a piston engine.




Combustion Flask and Nozzle Unit left and bottom; note the presence of an inlet for air, fuel and water. Fuel and water get burned together to produce super-heat steam! In the diagrammatic view, note the cupped turbine blades. This is not rocket science here; one directs the pressure toward the other which spins in the opposite direction.

For the first time I finally understood how a wet-heater torpedo is **a super-heated steam engine that does not require a steam boiler.** In this case methanol is the chosen fuel because it contains oxygen in its liquid state. Therefore, when it is ignited, it releases additional oxygen required for the combustion of hydro-carbons into water and carbon-dioxide. The oxidized fuel and water is converted with heat and pressure into super-heated steam which is converted to rotary motion using dual impulse turbines.

This principle was applied to torpedoes because they were manufactured under tight security and were not made public and as a result only governments and militaries were able to purchase them. Imagine if a public utility company could have bought one and taken it apart. They could have gone on to construct 100 megawatt steam powered turbine generators powered by methanol and



water that would not have required giant boilers running on coal or oil for steam.

## Automotive Adaptation Of This Design

The use of methanol to produce super-heated steam was used as early as 1908 in the Mk 7 torpedo. The igniter was plumbed into a double acting piston engine. It was the United States Navy's first steam-driven torpedo and it had an incredible range of 6000 yards going 35 knots.

The Mk7 was 18 inches in diameter and was the primary torpedo of World War 1. They could be fired from both destroyers and submarines. These were basically piston engines that combusted fuel as well as creating super-heated steam for added expansion. This methanol-water combination demonstrated a power multiplication many times greater than typical gasoline combustion designs.

The Chrysler Turbine used two turbine wheels spinning in opposite directions that were not geared together. As you can see from the drawings, the gearing mechanism in this torpedo design provided two output shafts, geared together, one inside the other turning in the opposite direction. This provided for counter-rotating props at the stern of the torpedo.

Of course the auto industry could adapt the design of this turbine engine, and they could do that by adding a supercharger for compressing an air tank.

This brilliant work of engineering does leave me wondering why the submarine itself was not given the same level of technology as the torpedo! Here's another glaring idea that was not put into operation. It is obvious that those who funded and managed the wars did not want to have 50 knot submarines.

This turbine design would have also made the perfect power device for counter rotating propellers used in high-speed or high-lift turbine-driven aircraft. The use of methanol plus water in turbine powered torpedoes produced even more power. Unfortunately the public has never received methanol-steam technology nor the use of compact turbine engines even though they were mass produced in great numbers before and during the war.

## Development Of The Chrysler Turbine After World War II

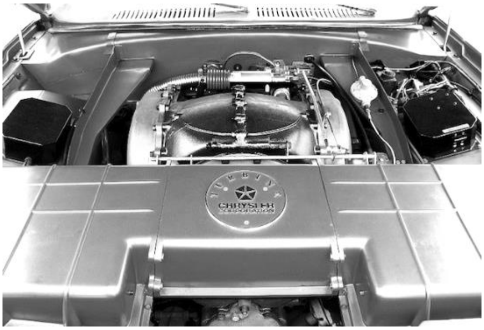
It was toward the end of World War 2 when Germany produced the game-changing Messerschmitt ME 262 jet engine powered plane. In addition to this engineering milestone they had produced the V-1 turbine powered cruise missiles that flew over the English Channel and dropped upon English cities and towns. So the allies saw and learned of the designs, having confiscated prototypes from the Germans.

From this point forward it would be impossible to stop nations such as England, France, Russia and the United States from developing similar turbine engines. And there was a certain amount of paranoia within each nation because the leaders knew that as soon as one of the other countries began developing turbine engines all of the countries would need to develop turbine engines.

Thusly the U.S. had to make sure that they had a turbine engine design ready to manufacture in the event other industrialized nations went into production with one on their own. Chrysler was chosen for this project and they produced a winner. I later found out that Rover in England produced a turbine engine for England even before Chrysler, and there were probably others as well. But as it turned out, both Rover and Chrysler were told to hold off on the production of turbine powered cars and for no apparent reason no other nation went in pursuit of the turbine engine concept.

Take any piston engine ever made and this one will get better mileage, accelerate faster and last much longer. On top of this is the admission by Chrysler themselves that they possessed all of the necessary materials and manufacturing processes necessary to manufacture this engine in unlimited numbers. But you know the story.

Several gas turbine-powered road cars as well as race cars appeared, notably at the Indianapolis 500, Formula 1 World Championship and the 24 Hour du Mans. And the oil embargo of 1972 helped generate renewed interest in the turbine because of its ability to reduce emissions and run on many types of fuel. This fizzled. It was rumored that Chrysler was on the verge of starting production after its M-body New Yorker turbine car was presented in 1981. It never came true.




Note the clean installation of the turbine as far aft as possible to get the weight inside the space between the front and rear axles. This would have given the car much better handling -than with the larger and heavier v-8 engine which would have extended further forward and over the front axle. Note the cover toward the front which hides the fact that there is no radiator.

After all was said and done, Chrysler sold off its subsidiary company "Chrysler Defense" which included the M1 battle tank program. Chrysler stated that this move obliged a condition of loans granted in 1979 by the U.S. Government. Subsequently the M1A1 / M1A2 Abrams tank went into production with a 1,500 Hp. gas turbine engine while production of the Chrysler, a fully researched and engineered turbine powered car never occurred.

Today the gas turbine engine is confined to aviation, the military, naval vessels and railroad locomotives in Canada and a few other foreign countries. In the meantime the public has been kept placated with engine designs left over from the turn of the century.

The facts reveal again how the public gets stuck with having to use gasoline, a fuel that was never a good fuel choice but simply one that is abundant and profitable. Now consider this: **as early as 1954 the United States stood on the eve of a fuel revolution.** This is because the turbine is a kerosene-burning engine and thus the auto industry was poised to begin the replacement of gasoline with kerosene and diesel fuel. This would have been a huge gain for the commuting public and it took demented corporate wishes to stop the development. It would have made our transportation system much safer for the simple reason that kerosene and diesel fuel are virtually impossible to make explode in an accident. The industry's refusal to give us this engine has resulted in the public being exposed to dangers from gasoline explosions and fires, and it has required Big Oily to cover-up car crash fatalities involving passengers who were burned. Because the media does not report it, most continue to overlook this horrible flaw in the world's choice of auto fuel. The media further throws the public off by voicing concerns about fuel costs and oil embargos instead of addressing the overall safety of the system itself.

## A Worthwhile Review Of The Chrysler Turbine

This is how successful I think the Chrysler turbine development program was: Chrysler engineers, using available materials and innovations, discovered through their our own research and efforts, produced a basic transportation vehicle that could go 100,000 miles between maintenance intervals, travel 1,000,000 miles between overhauls and get 50 miles per gallon. This is not only a realistic statement but does not take into consideration the revolutionary breakthroughs already discovered in formulations of turbine fuels mixed with water.

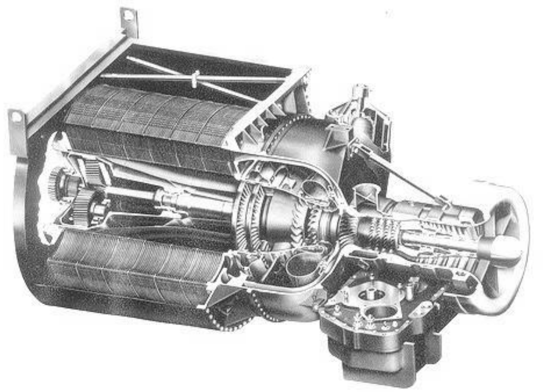
The performance of the turbine made every other car look and sound like a model T, but they never tried to show it off. They looked about as souped up as a standard car used for commuting. There is nothing on the exterior, other than the odd-looking rectangular shaped exhaust pipes, as to give the public a hint as to what is under the hood. Why didn't Chrysler want to build a little bit of public curiosity? For example, the turbine was air cooled so the only thing behind the grill is a lot of empty space. This could have been streamlined into a wedge or nosecone, or made into an interesting air-scoop and combined the exhaust with two oversized nozzles. That would have given this car the futuristic look that it deserved.

Above: example of the Chrysler Turboflite prototype when it was unveiled in Washington DC in 1961 which featured "advanced power and advanced styling." The car was later displayed at auto shows in New York, Chicago, London and Paris and received wide public interest. This car would have sold, big time!

## A Quote From Chrysler

*"The adoption of a gas turbine power-plant in a car imparts a unique personality and makes its experience unforgettable, both for the driver and the passengers. The total absence of any kind of mechanical noise or vibration in the passengers' compartment is surprisingly combined with fierce, effortless performance on demand, never before possible in a road car. To the outside world the rumble of a conventional reciprocating engine, as more or less emitted by all cars, is instead substituted by the characteristic whir that is associated only with air-travel."*

Here is absolute proof a turbine engine will dramatically outperform every piston-powered configuration out there. We should have gotten this engine.



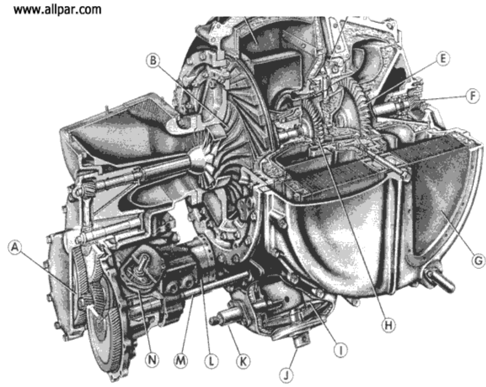
AGT1500 GAS TURBINE ENGINE

Left: The Chrysler turbine today: The 1500 Hp. gas turbine engine for the Abrams tank, shown at left. And at right the Abrahms tank into which these engines are utilized.

Fighting in a war, you get a turbine. After fighting in a war, you get a thumper.

Third-generation
Chrysler gas turbine

www.allpar.com




At right: the gas turbine design by Chrysler at the third stage of development where gas heat exchangers were fitted to take the heat from the exhaust and transfer it to the intake. This results in higher overall combustion which results in more complete combustion of the fuel thus increasing mileage.

## The Advantages Of The Turbine As Summarized By Chrysler:

On the next page is Chrysler's "Summary of Turbine Powered Cars Displayed to The Public" on July 16, 1962:

> **"Today, it is obvious that the advantages of the gas turbine over the conventional engine are indeed real. Some of these advantages are:**
>
> *The number of parts is reduced by 80%.*
> *Low temperature starting difficulties are eliminated.*
> *The engine will not stall with sudden overloading.*
> *Operates on a wide variety of fuels.*
> *No warm-up period is necessary.*
> *No cooling system; anti-freeze is not needed.*
> *Oil consumption is negligible.*
> *Exhaust gasses are cool and clean.*
> *Instant heat is available in the winter.*
> *Tune-ups, for the most part, are eliminated.*
> *Engine operation is vibration free.*
> *Engine weight is reduced.*
> *Maintenance is reduced, considerably.*
> *Engine life-expectancy is much longer.*"

It just doesn't quit: the great and exciting news just keeps coming at you. These must have been exciting times for the car industry! Certainly this was enough positive testimony to get this engine installed as an option in at least one model car! Gosh! I wonder if it would have sold? You bet it would have sold!

So the press wrote the Chrysler Turbine up as sluggish. Was this really true?

## What It Was Like To Drive One:

An article from the Chrysler Blowtorch

> *"Gas turbines go great if you know how to drive them. But most people didn't including most auto journalists. A gas-turbine engine develops maximum torque at stall. So if you want flashy acceleration from a turbine car you drive it the way you would a dragster with an automatic transmission. You sit with your left foot firmly planted on the brake and your right foot holding the accelerator to the floor, the engine whines its way up and within a second or so the tach needle touches 52,000 rpm. At that point you slip your left foot off the brake, the rear wheels start squealing, the car flies forward and you're off on a royal ride. Driven that way, the typical gas- turbine automobile will turn 0-60 mph in about 5.5 seconds and do the quarter mile in the 13's. It never occurred to most people who were lent the Chrysler-Ghia gas turbines back when they were new to drive them that way and Chrysler did not tell anyone the same. So what happened was that a lot of people, including journalists, reported that gas turbines felt sluggish.*
>
> *Chrysler's retired chief engineer of research and development, George Huebner, said that back in 1963 he'd gotten complaints from people in San Francisco who'd been lent turbine cars for three-month tests. Some said the turbines felt weak on San Francisco's steep hills. Huebner made a special trip to that city and staged a demonstration drag race between one of the Ghia turbine cars with himself behind the wheel, and one of Chrysler's more potent muscle cars of that day, a big-block Dodge. This was on the streets of San Francisco. The turbine car easily outran the Dodge and Huebner recalls that the turbine car became airborne at cross streets, just like Steve McQueen's Mustang in Bullitt."*

Conclusion: In 1920 America was poised to switch from gasoline to alcohol. With the advent of the Chrysler turbine in 1955 America was poised to switch from gasoline to kerosene/diesel and others. Neither sluggishness nor manufacturing cost were ever valid reasons to not make the Chrysler turbine engine the standard power plant from the 50's onward. This would have given the public safer fuel choices than gasoline, ones that would not explode in crashes. And the turbine engine would have put an end to carbon monoxide and smog in our air.

Executive engineer George Huebner; was part of a group of engineers who began exploring the idea of powering a car with a turbine after World War II.

Chrysler unveiled its second turbine car, a 1956 Plymouth, on March 23, 1956; Huebner drove it 3,020 miles from New York City to Los Angeles. Along the way the car only required two minor repairs; neither of which were engine-related.

# CHAPTER 10

## The Indianapolis Turbine Cars


A PERSON CAN learn the true potential of turbine engines by reviewing the history of their presence at the Indianapolis 500 races during 1967 and 1968. Prior to these years there had been several cars entered that were equipped with turbine engines, and they did demonstrate the potential to outperform the best piston engines. Unfortunately, the couplings of the engine to the drivetrains were not tested to take the rigors of the full race and broke down before the race was finished.

But the turbine rage began to build after that. The most spectacular display of performance would be the STP car, #40, driven by Parnelli Jones at the Indianapolis Speedway in 1967. This sole turbine-powered entry brought into the racing world of speed and power two important advantages:

1. A turbine engine has much more power, pound for pound and/or space for space, than any piston engine made.

2. Kerosene could replace methanol as racing fuel because it offered superior fuel mileage and safety from explosions and fire.

I'll bet you weren't expecting this second advantage. And there was another nagging concern about this engine; that being the turbine car would not require a pit stop to complete the entire event! This particular piece of information is crucial to understanding what happened to this superior engine.

## What? No Pit Stops?

The automotive engineers who today design for major car companies are merely placating relics from the past that consume petroleum and make a roaring sound. Either their memories have dimmed or they just don't care anymore. Their curiosity has been high-jacked as they have allowed themselves to write off the turbine engine because of media-promoted misconceptions about its design and manufacture.

They refuse to do some homework and to think on their own. Mass production of the Mark 14 torpedo during World War II proved beyond a shadow of doubt that powerful turbine engines can be mass produced from common metals, but few will read research that is outside the "box" of their chosen profession.

We have seen from Chrysler how the turbine, when adapted to a car, did in fact outperform a piston engine in every category. How did the car builders let such a revolutionary design slip away? Why did they accept the turbine's fate because of some doubts about the manufacture of turbine blades or some possible concern about sluggish performance?

The real reason the engine was disappeared is because a popular component of motor racing is pit stops and pit stops are a crucial component of racing events. The turbine powered car of 1967 did not need to make stops for fuel.

Racing events are a crucial link between the public and the oil/auto industry. Everything we watch at the racetracks is for the purpose of legitimizing the crazy transportation system of the 20th and 21st Centuries. In short, Big Oily needs the racing industry to be exactly what it is and to continue on exactly as it has.

And since there has to be something for the fans other than seeing cars zooming along at 200 miles per hour, further entertainment is achieved by watching jump-suited crewmen feverishly change tires and refuel cars as if the outcome of the race really depended on such perfect choreography. Meantime racing "experts" behind authoritative microphones gleam their approval and glorify their roles.

It makes for a great story and a lot of drama. Major tire companies get their names displayed over and over. Big Oily is there as Shell and Mobil; the ones who formulate and provide fuels per the race track's instructions. Then to help pay for costs, every race entry has a logo representing corporations like Walmart, Verizon, Target, etc. plus ones for cigarette, beer and soft drink manufacturers. In short the Indianapolis 500 motor speedway event is one of the largest watched public events in the world.

Therefore, don't expect race officials to change their recipe for getting people to watch and endorse their show any time soon. But now here is where the mind control needs to be broken. Oh, you are not mind controlled? Then you still think these cars really do need to come to a stop in the middle of a 500 mile high speed race. This is exactly what they want you to think; so try to stop thinking this way! For if you praise the actions of the crews for performing tire changes and fill-ups, then you are a spectator who has become part of their marketing plan.

Now here's another subliminal program for our everyday lives that is hidden within the pit stops at Indy and that is the notion that it is ok to have to stop for fuel. I mean fuel is so important that no matter how fast you are going or how much of a hurry you are in, when it's time for fuel you're in good company. Maintaining pit stops for re-fueling during the world's premier racing event gives us added strength to continue refilling our cars just like we have been doing for the past 120 years. As a result we have all accepted the fact that routine fuel stops are of utmost necessity, no matter how fast we and society are moving!

We've been served this notion at the race tracks by watching cars that are designed to accelerate quickly and stop as quickly as possible as the main priority. This is to necessitate getting in and out of the pit area and back up to speed as fast as possible. This part of the "race" is thus all about having massive braking and raw acceleration.

Remember, the pit crew has to work at breakneck speed in order to re-tire and re-fuel their car while it is in the pit area and stationary. Do you think it ever occurred to one of these race entries to try and tune their car so that it would go the whole distance without needing to be re-fueled or re-tired? That's what happened in 1967 with this new turbine engine design that could go the entire distance of a race without refueling.

## More Subliminal Theatrics At Indy

Perhaps even more glaring than fuel stops are tire stops as having to change tires in a 500 mile race in the 21st Century is so outmoded. I can only laugh at today's race officials making a big deal out of changing tires that should not need to be changed. The sad fact is that over the years tire life has gotten only marginally better.

Tire sales are spurred by racing propaganda via subliminal false advertising. For the tire-buying public, pit stops confirm that tires wear out even in races where you're only going 500 miles. They wear out because the rubber wears off from hard driving. We tend to believe what we saw and heard. So when our tires wear out we're already programed to suck it up and buy new ones. The turbine racer would have eliminated the tire industry's best subliminal advertisement.

## A Waste Of Energy And Speed

To win a 500 mile race, cars should be designed to travel from point A to point B in the least amount of time. The most effective way to reduce that time would be to eliminate the time spent bringing the vehicle to a stop, refilling it then bringing it all the way up to speed again.

When a car starts from a dead stop and enters a 200 mile per hour race, as in coming out of the pit area after a routine pit stop, a huge amount of fuel is burned in order to accelerate all of its weight back up to top speed. Racing at high speed is all about utilizing your energy to get to a distant point as fast as possible. Now when you stop the car you throw all of this energy away. That means you have to make it all back up again.

So as you can see it doesn't make sense to come to a stop during a speed race but it sure is good for theatrics!! Let's see what it costs in terms of distance: According to Wiki it takes 8.4 seconds to speed up from 0 to 184 miles per hour and it takes 5.8 seconds to slow down from 184 mph. I cut the totals for acceleration and braking in half and added the time to an average pit stop of 14 seconds. This totals a minimum of 21 seconds. At 200 miles per hour this equates to 6,200 feet of distance which is well over a mile. To make a long story short; if you're not more than a mile ahead of your nearest competitor, don't make a pit stop before the end of the race or you're gonna lose!

The most efficient way to go 500 miles in as short a time as possible would be to build a car with a larger fuel tank and combine it with a more efficient engine. In this way the car could make the entire distance without stopping while maintaining an average speed above that of the average race? The record average lap speed at Indy is 239 miles per hour set in 1996 by Arie Luyendyk. This is most impressive; however the average track speed to complete the 2016

Indy race, the fastest in Indianapolis history by Tony Kanaan, was only 187 miles per hour.

The most straightforward way to win Indy is to design a car that can go at least 190 miles per hour and not have to stop during the race for fuel. But that would not be racing to the fans. They are used to seeing the flags come out that squeeze the cars back together again so that it can become another horsepower dash down to the end of the wire. That's ok. But just understand that this is all theatrics and that makes Indy an amusement park. Indy cars are amusement park rides and should have nothing to do with the public's transportation system.

Looking closer at the annual spectacle we have come to love and revere, we start to see the real purpose of Indy type car racing is to validate petroleum, petroleum consuming piston engines and petroleum tires. The turbine engine would have exposed the folly that high speed racing vehicles must make stops for fuel and tires. It would have caught on like Indian pipe tobacco because the fact is no driver out there on the race track trying to win a race ever wants to bring their vehicle to a stop and then let some dudes work on it while he just sits there.

The racing circuit's embrace of turbine engines also would have educated the public with regard to kerosene and diesel fuel. The public has a misconception about kerosene and diesel (virtually the same thing) in that it is perceived as being of a lower octane fuel than gasoline, when in fact actually the opposite is true. But the fact that an engine running on kerosene would not only out-accelerate the best piston engines of the day but substantially increase fuel mileage as well was no doubt an oil company PR man's worst nightmare.

## Methanol And Ethanol Use At Indy

The fuels used at the Indianapolis Speedway have varied over the course of its running:

| | |
|---|---|
| Pre 1964: | Gasoline |
| 1964-2004: | Methanol Alcohol |
| 2005 to present: | Ethanol Alcohol |

After the 1964 crash that killed two drivers in a fiery explosion, methanol was chosen to take its place in order to reduce the risk of explosions using gasoline. Later in 2005 Ethanol was selected over Methanol to provide better fuel mileage than what Methanol produced. As you can see, Indy cars use Ethanol at the present time.

Both of these acts by the Indianapolis race committee confirm that the use of gasoline was never a worthy choice of fuel for Indy type cars in the first place. And it wasn't just fire safety that caused race officials to change to alcohol fuel. The fact is, when it came time to boost the horsepower to the higher levels needed to reach the higher speeds, they needed a better fuel. Just as methanol was used in the Mark 14 torpedo because of its ability to ignite and combust so rapidly, racing piston engines received a horsepower boost just by switching to it from gasoline.

The trick to getting more power out of a piston engine is to get more oxygen into the combustion chamber so that you can burn more fuel, and this is exactly what they accomplished by switching to methanol. This is because methanol has within its chemical makeup a certain amount of oxygen that gasoline has none of. To make a long story short, gasoline needs twice as much air to burn the same amount of fuel than if it was using methanol. The auto/oil sponsors get away with this piston engine horsepower "trick" without the public knowing that it was the methanol fuel itself that was responsible for the gain. With oxygen as part of its liquid formula, about twice as much fuel can be crammed into the combustion chamber than gasoline.

What this means is that all of our cars could be "race" cars if we just switched them from gasoline to methanol! Since methanol has oxygen within its molecular structure, a double-rich fuel mixture will completely ignite and burn to produce power. The fact is piston engines used at Indianapolis would simply not produce enough power to allow the speeds they are achieving if they were still using gasoline. The public does not know this nor do they know that methanol is an oxygenated fuel and is the reason for the extra horsepower from these piston engines.

Contrast this with the kerosene burning gas turbines that could be set up at Indy to run on gasoline, diesel fuel, methanol or kerosene. Kerosene was chosen because it is practically impossible to get it to explode in a crash.

Both gasoline and kerosene/diesel have approximately the same latent heat of combustion, with gasoline having about 10% less than kerosene or diesel. None of these fuels are oxygenated like methanol and ethanol. Therefore, since none of the cars at Indy today utilize turbine engines, all of the cars at Indy are using oxygenated fuel.

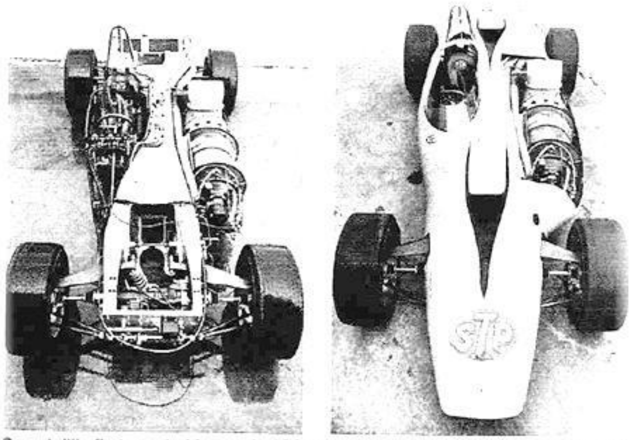
The turbine engine could utilize a non-oxygenated fuel AND still produce much more power than the best piston engine running with an oxygenated fuel! This is solid proof of its superior design. Now let's take a fun read about the 1967 Indianapolis 500.

## The 1967 Indy 500

**Article by Dan Bolton**

"The 1967 Indy 500 was probably the most anticipated running of the race to date. All eyes were on the day-glow red STP turbine car driven by Parnelli Jones. The car was the brainchild of STP president Andy Granatelli, and threatened to revolutionize the sport. A combination of a gas turbine helicopter engine and the Ferguson 4-wheel drive system pioneered on the Novis that Granatelli had previously entered, made the car look ungainly but it was capable of running faster race speeds than the competition.

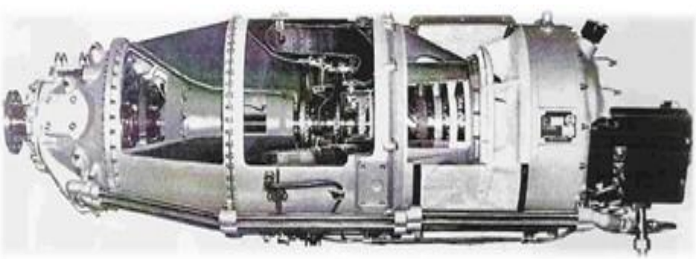
The STP turbocar showed promise and it was turning competitive if not record-shattering speeds. The main advantage, as Granatelli saw it, was the tremendous torque available from a turbine engine. A turbine produces torque very quickly in its power band. It actually achieves peak torque with its output shaft stalled.




Granatelli's first gas-turbine car in 1967 used a massive "backbone" frame, with the driver seated on one side and the gas-turbine engine on the other. This was necessitated by the long engine length. Ken Wallis designed the car, using the Ferguson 4WD system. Photo courtesy of STP.

The turbine engine also ran very smoothly, had about 80% fewer parts than a comparable piston engine, could run on fuel with a higher heat value than alcohol fuel used in a conventional piston engine and thus provide better fuel economy, and could provide faster acceleration off the turns than a conventional piston engine.  Combined with 4 wheel drive, this meant that the car could theoretically find its own "groove" at the Speedway.

There were a few drawbacks.  The turbine engine needed cool ambient air temperatures to operate efficiently and there was more lag time between throttle application and delivery.  The powertrain was also very hard on the gearbox.  But these problems were nothing a competent driver couldn't overcome.



The helicopter turbine engine: much longer than the Chrysler turbine.

Granatelli had found that driver in Parnelli Jones. Parnelli tested the car in early '67 at Phoenix and fell in love with it. It was so smooth and quiet that he could hear the brake calipers grabbing the rotors and the gears engaging.

1967 would go down in Indianapolis Motor Speedway history for more than the Turbocar, however...for one thing, the rear-engine car was the weapon of choice for virtually everybody. And, it soon became apparent that whatever advantage the European contingent for the past two years had held over the field was all but erased.

Dan Gurney was on hand with his Eagle, Mario Andretti had a new Brawner Hawk, and A.J. Foyt had his own Coyote. Each car was powered by the same basic Ford engine that had been dominant for several years.

The Turbocar was the main center of attention, though. It wasn't as fast as the other cars, but it was consistent. While the Fords were turning laps in excess of 168 mph in practice, Jones was 2-3 mph slower. The car didn't seem to be living up to the "hype" that Andy Granatelli had so vociferously inflicted on the media. Either the car was a bust or there was "sandbagging" going on.

Since the car reportedly cost around $ 600,000.00 to build; the engine alone cost over $ 100,000, it was easy to conclude that Parnelli wasn't showing his full hand. Thus rumors began to float around that the car was really capable of lapping the track at 180 mph, and that it could run the full race without a pit stop.

In qualifying, Dan Gurney set an early mark of 167.224mph. Mario Andretti eclipsed it at 168.982; with one lap at 169.779, fastest of the month. Gordon Johncock would round out the front row at 166.559. Jones would turn in an average of 166.075 to start 6th...his first two laps were identical at 166.482, which could have been an indicator of the car's maximum performance capabilities.

It was not a pole run but it did spell trouble for the competition. Jones had made his qualifying run in full-race trim, with a full load of fuel. And he could run 166mph all day long if he had to. The others couldn't begin to match that pace.

The pace lap of the 1967 Indianapolis 500. Andretti is on the pole, A.J. Foyt is directly behind him in 4th position. Parnelli Jones in the turbo-car is on the outside of the 2nd row. He would lead the race by the 2nd turn on the first lap.

At the drop of the green flag Mario Andretti jumped to an early lead with A.J. Foyt close behind. Andretti nailed it big time to stay in the lead but singed his clutch in the process. Meanwhile, Parnelli took the turbo-car to the outside of the track in turns 1 and 2, passing all 5 cars in front or on the inside of him and took the lead coming out of turn 2.

It was that quick. Parnelli pulled to a 12 second lead over Gurney and Foyt by the 18th lap. Then the rain-laden skies finally opened up, causing the race to be red flagged. Andretti was in the pits with a broken clutch, but was allowed to repair the car as long as it stayed in the pit area.

The race was restarted the next day, with Jones taking up where he left off at the front of the field. The skies were clear and the air temperature was 59 $F^0$. This was ideal weather for the turbine engine.

Jones would hold a 25 second lead by 52 laps when one of the most bizarre incidents in Speedway history would occur...Lee Roy Yarbrough, a successful NASCAR racer, would spin for the 2nd time; and this time directly in front of the turbo-car. Parnelli would also spin trying to avoid Yarbrough, but the two cars did not touch even though they came within inches of each other.

Dan Gurney would take the lead, but Jones would pass him within a lap. It looked like Parnelli Jones would bring Andy Granatelli and STP their first Indy 500 victory. The green flag flew again on lap 197. Then the most shattering thing happened to change the entire complexion of the race. The Turbo-car suddenly slowed down on the backstretch! A cheap transmission part had supposedly failed causing the turbo to be in neutral.

After leading 171 laps, a six dollar ball bearing in the gearbox had failed, dropping the car into neutral. As a stunned STP pit crew pushed Parnelli coasted the car into the garage area as A.J. Foyt went into the lead. Parnelli Jones and the STP Turbocar would be credited with 6th place. A.J. Foyt would go on to say that the turbine car had twice as much horsepower as any other car at the track and should be banned. He also said he would run one himself if he were forced to. In reality, the turbine didn't have any more horsepower than any other car at the track, maybe not even quite as much as some of the Fords. But it was much lighter than the piston engines it ran against, weighing only 250 pounds. While producing 540 hp. the lighter weight allowed for a 4 wheel drive system.

The turbo-car looked a bit bulbous and cumbersome, but it was one of the lightest cars on the track, at 1450 pounds. There were a few entries made after these years but by then the turbine engine had been so severely air restricted that it could hardly run. So American spectators only got two short years in which to watch these engines and how they performed, and luckily for us the actual history has been well recorded.

There was one turbine that competed in 1967 and five entered in 1968 of which three competed. Thankfully these six prototype turbine powered cars provide us with enough information such that we can now make an honest assessment of turbine engines verses reciprocating engines ourselves. The results showed clearly that there were serious reasons why the Indianapolis Speedway Racing Committee literally banned them from the sport of motor racing." (end of article)

In the meantime the public had no idea that a ruling by a track speedway committee was going to forever define car racing in the world as a piston engine powered event. This was for the public a most unfortunate act, for there was absolutely no doubt after seeing these gas turbine cars perform, they were far superior to anything that piston designers could muster now or into the future."

## The 1968 Indy

Since the potential speed and fuel mileage of the turbine powered Indy car had shown an ability to revolutionize the sport of motor racing, Granatelli brought three turbine powered entries to the 1968 Indianapolis 500 hoping to win. At least that is the story. Perhaps he already knew at this point that his entries would never be allowed to win.


The Lotus "wedge" in 1968 featured the turbine in the center and behind the driver. This was the car that Joe Leonard would drive to within lap 191 while leading the race, only to snap a fuel pump shaft when he floored the throttle at the end of a yellow flag. His teammate, Pollard, had the same thing happen to his turbine at the same time.

Could it have been a coincidence, when the same part failed in two similar cars at the same time in the same race, and when both cars were leading the race?

I doubt that he could have accepted the outcome of the previous year tear-jerker, when a sure victory had been snatched away on the last laps, because "the transmission slipped into neutral". He must have been smart enough to know and to fear the hidden tentacles of the oil/auto industry; therefor he must have held extreme suspicions that the car had been sabotaged.

The 1968 Indy 500 was going to be a more precarious ride than the year before. Relatively arbitrary limits had been set for turbines back in 1967 but this year the USAC had tightened the rules for the air intake capacity. Still, Granatelli entered his "wedge" turbine cars and in addition Carrol Shelby entered 2 turbine cars. Before Shelby's entries ever raced, however, they were withdrawn over the subject of air intake. This happened because the two entries utilized a variable intake venturi that confused the race officials and sent them into an investigation that resulted in Shelby withdrawing them.

With three turbine-powered cars entered as the 1968 Indy race progressed it looked that once again a turbine powered car was poised for victory. And to make matters even more secure, toward the latter part of the race there were still two turbines vying for the trophy. As late as lap number 191 Joe Leonard was holding the lead and his teammate Art Pollard in another turbine car was in second. But then, just like the year prior, a simple part failed in both of them. And no I didn't make this up. Both of the turbine cars shut down within moments of each other.

And the press reported the failures of both turbines as a reliability problem! They went on to report that both Leonard and teammate Art Pollard had attempted to accelerate too quickly after the last yellow flag had just been lifted. They called their maneuver a "lurch". It happened on lap 191 for both cars. Each of them had "lurched" their cars too fast and this action led to the fuel pump drive shafts snapping off of both of them.

You will recall that just the year before Parnelli Jones was leading the race in a turbine powered car with just three laps to go when his car was suddenly shut down. This is a most obvious pattern, one of which must have caused a massive amount of suspicion. Jones was leading the race at the time and did not have to push his engine at this juncture. He was just lumbering along when his transmission supposedly failed.

Now it seems more than just odd that such a small part of such critical importance would completely fail on two separate cars at this same juncture a year later in the same race! The odds of this simple part supposedly breaking at this moment are miniscule, and now for it to happen to two more turbines the next year is beyond the probability of mere coincidence.

## Controversies Regarding The Breakdown Of Indy Turbine Cars

The rise and fall of the Indy turbine cars reads like a perfect script if you were writing for the purpose of destroying the people's conception of the turbine engine. When you review the events it becomes obvious that the oil/auto industry had too much riding on this type of racing to let it become dramatically revolutionized by a fuel-saving design that was lighter in weight and could use multiple fuel types. As for what happened mechanically to Parnelli Jones in 1967 and to Leonard and Pollard in 1968 the story has sabotage written all over it.

Failure would not have been acceptable. This means that key people would have needed to be secretly amongst the officials to insure that a turbine powered car would not win the Indianapolis 500. They would have had orders and they would have carried them out.

In my research it turns out that controversy is nothing new to the Indy Turbine Car Program. Here is some more than interesting history from the 1968 event:

> "Ken Wallis was the guy who designed the turbines for Andy Granatelli in 1967 the previous year. Lotus teamed up with Andy and STP and brought 4 of their "wedge" turbines in 1968. Additionally two turbines were entered by Shelby despite the new USAC rule limiting the inlet area on turbine-powered cars.
>
> Jimmy Clark, who was excited about driving the Lotus turbine, had died in April of '68 in an F2 event. Mike Spence was chosen to drive one of them. He died in practice. That combined with the questionable legality of an air inlet that increased in size as speed increased, caused Shelby to pull his entries.
>
> Parnelli Jones and Jackie Stewart were set to drive the turbines as well, but injuries (Stewart) and backing out thinking that the turbines wouldn't be fast enough because of intake restrictions (Jones) led to replacement drivers Joe Leonard and Art Pollard.

> The turbine cars qualified well, including Leonard on the pole, Graham Hill in the middle of row 1 and Pollard in P11.
>
> At the drop of the green flag, Joe Leonard in the #60 STP Turbine leaped into the lead, with Bobby Unser in second and Roger McCluskey up to third at the end of lap 1. About this time Bobby Unser is hard after Leonard when he passes to take the lead.
>
> After 110 laps, Graham Hill loses a wheel and smashes into the turn two wall, bringing out the second caution. When Bobby Unser makes his last pit stop, his car is stuck in high gear. As he leaves his pit struggling to reach racing speed both Leonard and Ruby pass him.
>
> With only 16 laps to go Joe Leonard still has the #60 turbine in first place. Now on the backstretch Carl Williams hits the wall. This brings out a caution flag, which is to be the final one. After the track is cleared the green is waved on the 191st lap.
>
> At that instant, both leader Joe Leonard in STP turbine #60 and teammate Art Pollard in STP turbine #20 lurched—and then began to slow down. Both cars' engines suffered identical snapped fuel pump drive shafts. Unser sweeps by into the lead with Dan Gurney inheriting second place."

As we review the facts and attempt to apply some logic to the mystery note that the mathematical odds of a fuel pump failing would not have increased just because the throttle was opened too quickly. That's what race drivers do with their throttles all the time, since it is all about quick reflexes, and that means quick steering, braking and throttling. And this is exactly what fuel pumps are designed for; to pump fuel immediately when asked. So the act of one of them failing has nothing to do with a driver supposedly reacting to the gas pedal too fast.

Now the fact that two such incredibly unlikely failures occurred at virtually the same time in the same race makes this an open and shut case. The only way this could have occurred is via a remote-controlled destruct mechanism that was placed on both of the car's fuel pumps. That's the only way to insure that a critical part will fail at a specific time. It looks like both pumps were activated by the same sending unit. This level of sophisticated sabotage is typical of the CIA.

## Additional Comments About Turbine Cars And Indy

And so Indy has remained piston-playground Indy. A turbine powered car would never be allowed to win and thus could never become a winning design. The next year NASCAR ensured that no turbines could ever compete with the piston engine cars in the future because they restricted the air intake to the point where it was hopeless. Car developers and engineers were upset for a while, however the public accepted the new regulations, forgetting they had seen a superior design after a few years.

The turbine-at-Indy story could possibly include murder as there are several drivers who died driving these turbine cars during the short era and limited number of times that turbine powered cars raced. In addition, it seems that there were an abnormal number of crashes that occurred resulting in damage to turbine powered cars when they were performing well.

There was the unexpected spin out by a NASCAR driver, his second spin out of the day on lap 58 right in front of Parnelli Jones in 1967 that caused both cars to spin completely off the track. Luck and miraculous driving kept Jones and the turbine car in the race.

American's held their breath. Millions felt lifted in spirit as they contemplated a future world, enhanced by this new technology and how it would soon be coming to the public sector and maybe even show up at auto dealers.

Jones and the turbine car were rocketing toward the finish line leaving every type of piston engine ever conceived in a wake of quiet hot air. Unfortunately, Americans were to be served a holiday dinner that was parched and tasteless as the media falsely touted how the turbines just couldn't be as reliable as the good ol' screaming piston engines. I was about fifteen then as I watched the suds get poured over A. J.'s head instead of Parnelli Jones'.

Americans had to witness the sudden shutting down of a superior car just when it was virtually guaranteed to win. Today I wonder, was Jones or Granatelli ordered to put the 1967 turbine car into neutral? Did somebody have one of his children kidnapped at the time? Will we ever know? One thing we definitely do know is that these engines were far superior to any piston engine designed then or before and would thus expose the piston engine for what it is: a mechanism that flies apart when you turn up the rpms to anything resembling a turbine.

Top left: Parnelli Jones at the 1967 Indianappolis 500. At right the famous car no. 40 in a pit stop. Note the exhaust gas chimney to control the heat upwards while in the pit area. Lower photo shows Jones in the lead.

# CHAPTER 11

## Big Oily

PERHAPS I KNOW a lot about engines and fuel because I worked for a major oil company right out of college after I graduated with a degree in mechanical engineering. I was placed in a division that developed and marketed industrial and automotive lubricants as a field engineer. I documented the performance of special lubricating oils as they were used in many types of piston engines, steam turbines, gas turbines and certain manufacturing processes.

The engines and turbines were of various sizes, some of them gigantic in comparison to anything that you would normally see. It was very interesting to me. Thus, from the beginning I was of the belief that petroleum fuels were a reasonable and necessary form of energy.

In 1976 while working at the oil company on one occasion I visited a chemistry lab to learn about oil specifications and testing procedures. While there a couple of the guys showed me some old newspaper clippings they had saved from the early 1900's and I am grateful to them for having done so. These were "oil shortage" headlines dating back to the 1920's. What was most interesting is that the same headlines were parroted every 10 years after the first gloomy oil prediction. It was a lesson about Big Oily I never forgot.

About two months later I would be on an orientation trip to the company's headquarter in New York. Here I was told by several proud oil executives how they knew about these earlier oil shortage predictions that appeared in large newspapers like the Los Angeles Times. And they knew it was just a story that had been repeated over and over and had never come true. They knew there was never any real truth to the predictions. And they all felt that what Big Oily had done to mislead the public was a clever, effective marketing ploy that benefitted everyone who worked there.

Over the years I thought more about their crass comments and lack of moral consciousness gradually coming to the realization that from the very beginning the oil industry had engaged in gross deception and fraud. This may not seem like such a big thing until you consider the number of people in the world who have been negatively impacted by the exorbitant costs that have been imposed upon them. Today after many years have gone by it is now painfully obvious these companies did not become more honest over the years. In fact they have become anything but.

It is more than crucial that such purveyors of energy be honest and planetary conscious. But they are not. If you don't believe me then take the most recent example of Big Oily arrogance by looking at the way BP handled the Deep Water Horizon's Macondo Well disaster in our American gulf waters. See the gamble they were willing to take; the possibility of polluting the world's oceans. Look at the risks they were willing to take when drilling in 5,000 feet of water from a platform that was not even anchored to the sea floor!

When a sizeable volcano of oil blew past the top casing and came to the surface remember how they refused to try to recover it by skimming? Remember how they chose to burn it into the atmosphere and how they also used a toxic chemical dispersant called Corexit to sink it? They allowed toxic crude and chemicals to enter our air and oceans as if neither of them are toxic to plants and animals. Big Oily does not care a thing about plant and animal life.

Now that you know "them" better, take a look at what they have brought us: convoys of tankers filled with toxic crude oil crossing the world's oceans in endless procession. They arrive at oil terminals located in the harbors of what once were pristine inland fishing grounds. Attached to them are leaky pipelines that connect with the refineries. And these connect with the stations that connect with the piston-engine- powered cars.

The piston engine is a design provided us by the oil industry. It runs on a product that was never meant to come out of the ground and burned in the first place. It gets incredibly poor fuel economy and pollutes the air, water and waterways wherever it is used. Better fuels such as water enhanced and alcohols were successfully tested over a century ago that didn't produce harmful byproducts like toxic PCB's in our roads and brain-numbing carbon monoxide in our air. So we shouldn't be where we are with regards to the world's premier energy.

## Constant Consumption Of Petroleum Products

Meanwhile the car buying public has been jerked around from one trend to another. One of these trends hit a zenith during the 50's and 60's with the gas-guzzler Lincolns, Cadillacs, Chevy big blocks, Chrysler Hemis, Ford Cobras, etc. During these times fuel mileage was hardly a concern. Then the 70's came; we got hit with a supposed oil embargo, and fuel mileage became a major concern.

During the 80's we had slower cars because smog and exhaust emissions were now being targeted and our engines paid for it. By the 90's smog regulations began to give way to more fuel efficient cars, but just as we thought our vehicles were going to get better mileage, along came All Wheel Drive and the SUV. Without knowing it we witnessed the gradual metamorphosis of our standard transportation vehicle into larger, boxier vehicles equipped with an extra live axle, differential, transfer case and four wheel drive. The trend to the SUV and All Wheel Drive basically negated all attempts to increase our vehicle's fuel economy. Add to this other gas gobbling features such as boxy front ends and oversize wheels. Thus from the standpoint of fuel economy we have gone nowhere.

I hope it is obvious to you that Big Oily has fooled us again. It has not been by accident that our revised standard vehicle designs have negated all the previous gains made by supposedly more efficient engine designs. We all had to pay higher prices for these "higher" tuned engines, but the automobile industry has made absolutely zero progress in fuel mileage.

I invite you to look back over the years; from the first Model T to the latest Ford Explorer so that you will clearly see that fuel mileage is unchanged. This is positive proof that the car and truck manufacturers are in lock-step with the oil industry. The worst part is we have had to stand by as corporations continue to promote outdated designs that rely on substandard, air-quality destroying fuels chosen for us.

Anyone living near a city who takes an honest look at their air quality soon becomes painfully aware of the haze and smog. It is painfully obvious Big Oily cares nothing about our health. Instead they continue to insist that virtually every car in every country use a piston engine design that specifies either gasoline or diesel.

## Oil "Shortages"

At the turn of the century if you were a farmer living in Texas and struck oil you would have been paid as little as three cents per barrel for the toxic crude that gushed up from beneath your land. That means if you had a well that produced 10,000 barrels per day for about five years, you would end up being paid $450,000. So it was definitely possible to get rich, but the volumes of crude that were extracted are mindboggling. And thus it wasn't long before a problem arose, as there was too much crude oil available and not enough demand for it.

**American Oil Industry Tidbits:**

1850: Kerosene is distilled from crude oil
1859: Drake's well in Pennsylvania begins the oil drilling era
1898: 1st refinery is built in Texas
1902: Spindletop Hill is struck, producing 17 million barrels. Prices drop to $.03 /bbl.
1919: The term "Peak Oil" appears, predicts shortage in 3 years.

You might find it interesting to note that just as World War I was ending the first oil shortage was predicted. Since there was so much petroleum consumed during the war, one can only wonder why they could have predicted an oil shortage just as oil usage had taken a dramatic drop.

Actually the picture in 1919 was the exact opposite of the one they conveyed. Crude production was out of control after the war. There was a surplus of gasoline at the refineries. Since for each barrel of crude 40% of it is gasoline, the industry had way more gasoline than they could handle. I have heard reports from people who saw them burning excess gasoline in long trenches in those days just to get rid of it.

## Peak Oil

The war was over and they needed personal automobiles with gasoline engines to be mass produced quickly to make up for lost sales, but the cars hadn't been built and sold yet. This created a massive glut of gasoline. Big Oily reasoned that as long as the public knew there was lots of oil being struck all across Texas, Arkansas, Oklahoma, Pennsylvania, California and others there was little hope of getting paid a very high price for it.

So these clever thinking oil dudes came up with the idea of

"Peak Oil". This term subliminally prophesized the end of oil as if it would be in the end of days. It was conceived as a way to depict petroleum as a crucial component of every modern society, while at the same time making us worry that it might run out. In reality, the amount of crude down deep in the earth, was endlessly abundant.

It is illogical to believe that petroleum is really in short supply when they have found every imaginable way to waste it. But to counter logical thought the term Peak Oil is provided. It calculates and predicts the maximum rate of crude oil production that can be sustained for the next 20 years.

In reality "Peak Oil" is an erroneous concept piled on top of the biggest lies of all time. Lie no. 1 is: *There is only so much petroleum on earth and it is getting harder to find.* Lie no. 2 is: *We need 10's of millions of barrels of oil every day to run the nation's electrical and transportation needs.*

The first lie started with the story about dinosaurs. Well it was a darn good story because since they are extinct none of them are around to dispute it. And the story is that as these dinosaurs grew to massive size and that when they died the oil-laden flesh from their bodies provided the basic element of petroleum. Later their partially decomposed tissue became buried up to 20,000 feet down, sometimes even between solid rock layers of the earth, which is where it "cooked" into oil.

Hmmm. Today in the U.S. domestic production is 6,000,000 barrels per day. This has been going on now for over 100 years. Would you like to try and calculate how many dinosaurs that would be? Let's say each dinosaur contributed one barrel of oil; that works out to 219,000,000,000 dinosaurs that had to die and get buried before they got eaten. Do you really think this was possible?

The second lie started as soon as they made the decision to select petroleum powered mechanical contraptions over electrified ones. In order for them to perpetuate this backwards decision, they have had to shut down every other viable energy source, such as the Tesla Tower, Tidal power, Wave power, Radiant energy, cold fusion and hydrogen fuel going back to the earliest days of steam power.

The proclamation of an oil shortage was a very effective campaign as it got the public looking at oil companies in a sympathetic fashion. This sympathy has worked wonders for the oil industry for the past 100 years to the point that today's CEOs are retiring with hundreds of millions of dollars in pensions while many Americans are being swindled of theirs.

Peak oil is an effective campaign because it cleverly puts the blame back on the consumer and paints the oil industry as a helpless oil prospector without prospects. What a bunch of hypocrisy when you consider how they have methodically kept water-enhanced fuel and oxygenated fuel out of the marketplace. But bleating hypocritical language is nothing new, and thus the Peak Oil pundits continue to excrete misguided language such as;

> *"The world is developing a demand for petroleum at a faster pace than new oil fields are being discovered, and at this of increase in demand, the world will soon face an oil shortage".*

We should be laughing about this but the fact is it has gone on for over 100 years. During this time they have depicted the public as a gluttonous oil-consuming mass with fuel demands that wouldn't quit. Systematically every week you would hear a warning about petroleum inventories tightening up and that prices were sure to be on the rise as a result. The media constantly broadcast the notion that we had just years before the hammer was gonna come down. And we all knew that if and when it did, it would be our own fault for wanting larger cars and driving too many RV's.

I've been a sucker like everyone else. I was once appreciative of the oil industry and believed that American corporations in foreign lands to secure oil was patriotic. I actually believed that these foreign oil reserves enabled the United States to keep the energy reserves it had. Today however I have no doubt as to who conjured up and promoted such an obviously untrue story as an oil shortage back in 1919. Today these heartless people leave us standing in the cold as we purchase gallons and gallons of their overpriced fuel.

But I'm just scraping the outside layers of this multi-layered crude-to-gold game. Today the oil industry has become the world's most impersonal hosts by making us fill up our vehicles and complete the sales transaction all by ourselves without them even having to say "hello". They do this even though the difference between their production costs, which are approximately $2.00 per barrel, and the selling price, which is approximately $3.00 per gallon, representing an increase of 6,000%. We put up with this treatment because they have truly managed to convince us with terms like "oil shortages" and "peak oil".

As a matter of routine restocking of the people's mistaken worries, it is important that the public be reminded of it every ten years or so. This helps maintain the sympathy factor for Big Oily, who are perceived as doing everything scientifically possible to meet the demands of the world. But think about this: If the possibility of running out of crude oil had been the least bit true, would military generals and government leaders the world over have developed military machines that relied on petroleum products that were in the control of a few millionaires?

It was always a mistake to believe that an Arabic country could cause skyrocketing gasoline prices and supply problems here in the United States. This is because virtually every large transaction between oil companies and producing governments is done under signed contracts. For example, if a country like Saudi Arabia wants to do business with a big producer like BP or Exxon-Mobil, then they are going to have to sign a contract that stipulates the supply for 25 years at a price of $2 to $2.50 per barrel. That's about 6 cents per gallon, by the way. Don't be tempted to believe an oil company ever pays "spot market" price, or even close for the crude they make our products out of.

## A Petroleum-Powered World Equals A Toxic World

Crude oil is so toxic it should be left in the ground. Instead our jet planes run on it. Our Navy runs on it. Virtually every highway vehicle runs on it. Our building materials are made out of it. Even our clothes are made of it. Our crops are fertilized and coated with it. Our highways are topped with it. Our foods are packaged and sealed in it. Almost everything manufactured has parts made out of it. That's because whenever they can substitute a plastic part in place of a metal or organic part they have done so.

If petroleum is really in tight supply, why do we waste it making furniture and car bumpers? Even "disposable" items, such as plastic bags, are made from petroleum which is not suitable for a landfill. If they are made from petroleum, they are not biodegradable; yet they classify them as disposable. This is total hypocrisy however no public outcry over our government's endorsement of them occurs. That's because Big Oily owns the press and the media.

## Dirty Oil From Canada

Just in case you didn't know, the United States does not rely on an Arab speaking country for its domestic oil/energy supply. The largest supplier of crude oil to the United States is Canada. Remember that the next time you see a price increase at the local gas station.

Here's a clipping from Oil Today:

> "Canada is the largest exporter of total petroleum to the United States having now reached 2,829 thousand barrels per day. The second largest exporter of total petroleum is Saudi Arabia with 1,479 thousand barrels per day. Canada supplies almost double the amount that Saudi Arabia supplies but that in itself is not the biggest part of the story regarding Canadian dirty oil. The biggest part of the story in Canada's oil binge is big bad bitumen; Canada's exploitation of tar sands oil.
>
> This project threatens the fifth largest watershed in the world with toxic pollution. The fact that the extraction of tar sands has never been a necessary contributor to the world's consumers substantiates a continued willingness and desire to ruin pristine forest habitat by the oil industry.

> Tar sand oil contains significantly higher levels of toxic pollutants than standard crude oil taken from underground. So what says TransCanada and partners as they have proposed to build the Keystone XL pipeline, a 1,700-mile pipeline through five Midwestern U.S. states from Alberta to Texas and ship 700,000 barrels of tar sands oil a day for refinement into products likely to be exported. Hold onto your stomach as you read on:
>
> The environmental havoc already underway from extraction in Alberta is no secret. To produce one barrel, extractors level the forest, dig up four tons of earth, consume two to four barrels of fresh water, burn large amounts of natural gas and create toxic sludge holding ponds. Alberta's booming tar sands production is polluting the Athabasca River and converting forests and farmlands to wastelands. The Keystone XL pipeline will increase production of this dirty fuel by 50 percent. Canada is promoting a dirty fuel to the rest of the world to burn, thus increasing emissions multi-fold worldwide."

As a result of these figures, the EU has requested that fuels from tar sands should be designated as producing 22% more greenhouse gas emissions than regular crude oil. In addition:

> Canada has numerous pipelines located in both rural areas, urban areas and across different terrains. These require ongoing surveillance and maintenance to ensure that they continue to operate according to the National Energy Board Act. Pipeline incidents such as gas leaks and oil spills have occurred across Canada resulting in over 50 pipeline incidents."

This is shame beyond reproach when you consider that Canada is the second largest country in the world behind Russia and has vast landscapes, three oceans, tundra, plains, mountains, boreal forests, wetlands, rivers, lakes and coastline. You have to ask yourself where they managed to find such plan which devastates so much land needlessly. In the meantime we are now the recipients of the poorest quality fuel products ever produced in the modern age.

# Polluted Tar

Up to and well into the 1950's oil producers within the United States were able to dump heavy residuals along with many toxic chemicals directly into the ocean. When this was finally stopped because of obvious pollution practices that were extraordinary, Uncle Sam "gave" us highways to everywhere, and America's highway program went into full swing. A priceless explanation is provided below:

## The Great Highway Program (Fortune Classics, 1958)

> "In the automobile-dominated vision of many Americans, progress is paved with concrete and asphalt. The new national highway program has been proclaimed "the greatest public-works program in the history of the world," yet it has been undertaken without partisan dispute. Its awesome statistics awe practically nobody. Within the span of a single generation, the country will build the 41,000-mile Interstate network of high-speed, controlled-access super-highways costing some $40 billion, bringing the total the nation will spend to enlarge, improve, and maintain its roads to more than $100 billion. Americans may be impressed by the imposing engineering challenge involved, but to a remarkable degree they look on the program as only that -- an engineering feat. Like better schools, it is regarded as a thoroughly good, nonpolitical program that everybody will support and that will clear up this traffic mess once and for all, it is ardently hoped."

I hope you took note of the last sentence which seeks to convince the reader that the great highway program was going to clear up a traffic mess once and for all! In reality, the exact opposite has occurred; they expanded the traffic mess! Today cities like Los Angeles have freeway systems that crisscross and wind through the valleys endlessly. One section of the I-405 has thirteen lanes going in each direction. In November of 2016 one of the worst grid lock of travelers I have ever seen occurred on this highway as all lanes of traffic were backed up for as far as the eye could see with people seeking to get out of town for the Thanksgiving holiday. What a pathetic waste of people's time and health in the 21st Century!

The truth of the matter is most of Big Oily's heavy residual material has been laid down as asphalt for highways since the early 1950's. This happened when our government fell prey to the corporate lobbyists who made it look like Americans were getting a good deal. In reality highways sprang up along coastlines, lakes and waterways that were covered with asphalt without the public knowing the material was too toxic to be disposed of in a landfill.

It is time for the world to understand that petroleum asphalt is a lousy road material for the simple reason that oil evaporates under prolonged sunlight leaving exposed gravel stones which crack apart allowing leaks. Therefore, cities, states and governments that invest in this highway system have just guaranteed themselves a future of never-ending highway resurfacing costs. For this reason alone, the world has to get away from asphalt as a road-building material.

Geo-polymer granite stone has been fully developed and is the obvious road building material for the future. In the meantime the standard excuse the industry uses to justify constantly resurfacing dilapidated asphalt roads is to exclaim that the road surfaces are lost to tire wear. But just look at any old asphalt road that has not been resurfaced recently and you'll find that the sunlight and rain have taken away the tar leaving only pebbles everywhere on the surface of the road.

The sun will do this to every asphalt road no matter if it has heavy traffic or no traffic at all and thus the entire surface will look worn after much of the tar is vaporized. This is why our roads should be built of materials with the longest resistance to breakdown caused by sunlight radiation. Geo-polymer granite fits the bill nicely.

I was greatly impressed with the cut stone roads left behind in the former empire of Rome, several of which are still in use today. We could learn a lot from these roads as they represent a level of technology that is both older and more highly advanced than Roman civilization. Today the condition of these roads is a bit rough but by comparison most of the roads we are building today are worthless in 20 years unless they are resurfaced.

For most, these concepts will be hard to accept, but once we become enlightened through discovery we become free of deceptions harbored through ignorance. By having a fuller grasp of the subject we can begin to let go of something that we think is so valuable when in fact it has been from the beginning a yoke of servitude to Big Oily. I'm not advocating that any person actually try to make it through life without using an automobile. For the time being we're all quite stuck with this form of transportation. But perhaps from this day forward we won't tolerate another monstrous car payment, exorbitant insurance and poor gas mileage for what you now know is just a clunker design 100 years out of date. Be happy; you can save a fortune by just keeping the car you already have or by buying a used one. As soon as you do this, you have ensured yourself economic success. Or, just continue to be a valuable contributor to:

**The Cheap Oil From Earth Money Machine**

The plain fact is; all of our current transportation vehicles have been designed for the purpose of meeting the business plan goals of Big Oil. Shown below is the **world oil consumption overview.**

Total World Petroleum Consumption, 2010 : 85,294,571 barrels/day 85,294,571 X 42 gal/bbl X $4.00/gal:
**$14,329,483,928 /day**

I don't want to make you too nervous, but the fact is Big Oily has as a basic part of their plan to always be increasing volume; never decreasing volume. This is why neither the automakers nor the oil producers have done anything significant to help ease our transportation costs. That's simply because in order to reach $14 billion barrels per day they have to not only sell a huge volume of finished petroleum, but sell it at inflated prices.

The petroleum game is larger than the treasuries of most countries, thus you can be assured that there is going to be steadfast resistance to change it or reduce it by those who currently control and benefit from it. And so it should come as no surprise to you to learn that their plan for the future is for more of the same. Recent projections state world oil consumption will increase to 119 million barrels per day by 2020.

You must know what you're up against before you decide to take any action that is directed against this industry as it knows every technique imaginable to discredit and defund you if you expose any of their corrupt actions. Their system cannot function unless all of their petroleum-related systems function. Think twice before you market a product that replaces or reduces the usage of it. The failure of any one, such as the battery or ethylene glycol market, could cause the whole system to break down for want of a way to store or reprocess harmful and toxic by-products they can no longer get rid of.

Always keep in mind there is a constant parade of tankers in motion out upon the high seas, bringing us more petroleum to

shackle our society with. Meantime, Big Oily conveys the image that the product comes at a high cost when the fact is the vast majority comes at very low cost.

In 2021, U.S. crude oil production equaled about 11 million barrels per day, while crude oil imports totaled about 3 million b/d. They also report that the total consumption of oil in the U.S. is approximately 20,000,000 barrels per day. This doesn't add up as it leaves the U.S. with a shortfall of 6,000,000 barrels per day.

So it looks as though the U.S. is importing about 9,000,000 barrels per day and is thus sending about $263 billion dollars a year out of the country. Whoever set this system up is guilty of embezzlement, but treason is a better sentence for it.

## Serious Reasons Not To Use Crust-Produced Petroleum

There are even more serious reasons as to why the world should shed itself of Big Oily, and here is the long and the short of it. There are two types of oil; god-made and crust made. God-made oil includes any fatty acids or lipids of any living thing being plant or animal that is grown using sunlight, atmosphere and a few earth elements. Crust-made oil is dark thick goo which accumulates underground within the rock layers of the earth by a natural process.

You will learn in the next chapter how god-made oils produced on this planet can be substituted for any and every crust-made oil. Thus for industrial applications involving lubrication or combustion the two are interchangeable. That is one of the biggest secrets concerning global energy and the ruse of crust-produced petroleum being a necessity, much less being in short supply.

However there is another big secret that Big Oily insists not to be known and that is crude oil is a mixture of toxic petrochemicals, whereas god-made organic fats, oils and solids do not contain any toxic petrochemicals. As a result of using crust-produced petroleum in place of organic-produced oil a myriad of chemicals that pose serious health concerns to animals and humans are introduced into the environment.

Gasoline and diesel fuel are prime examples of complex mixtures of petrochemicals that contain a sizeable percentage of neurotoxins which adversely affect the cognitive function of the human brain. Dizziness, euphoria, nausea, blurry vision and headaches are a few of the short-term effects of such compounds as benzene, toluene and xylenes. The symptoms can be a lot like a very bad case of alcohol poisoning as they gradually foul up the workings of the nervous system. Benzene, in particular, has been tied to adult leukemia and other cancers. Benzene does this by entering cells and damaging DNA material.

The fact is we would be much better off using organic, god-produced, fatty acids and lipids, and not crust-produced hydrocarbons. Crude oil really should be left in the ground.

## The Misperception Of Hydrocarbon Energy

The public has been fed a serious misconception about the use of crust-produced hydrocarbon energy because we have been led to believe that gasoline is perfectly inert. Since the advent of the gasoline powered car in 1887 up until today, after many years of trials, uses and research regarding the world's premier transportation fuel, we are expected to forget all of it and just stay with toxic gasoline!

We are a confused group when we sit with our cars idling next to us while we speak to a neighbor. Later our neighbor berates us for burning of a plastic garbage bag in our outdoor burn pile. We all think that it's ok to idle your car for hours but everyone knows that plastic is bad and is clear cut disregard for our air and environment. And so we callously burn gallons and gallons of a nearly identical composition of hydrocarbons and toxic petrochemicals seven days a week as if it has no effect on air quality. So let's take a look at vehicle emissions: as of 2016, per Car and Driver, these are the definitions of vehicle emissions:

1. **Sources of Vehicle Emissions**
   *"The power to move a motor vehicle comes from burning fuel in an engine. Pollution from vehicles comes from the by-products of this combustion process. In addition, volatile organic compounds (VOC) escape through fuel evaporation. As vehicle exhaust systems have improved, evaporative emissions have become a larger component of total vehicle VOC emissions."*

2. **Exhaust Emissions**
   *"The combustion process results in emissions of volatile organic compounds (VOC), oxides of nitrogen (NOX), particulate matter (PM), and carbon monoxide (CO), which are released from the tailpipe while a vehicle is operating."*

That's it? What exactly are VOC's again?

## "VOC's", Volatile Organic Compounds:

Listed in this chart on the next page are 34 different VOC's present in gasoline that are all covered under this general category. Many of them have been studied and shown to impede human reproduction, increase lung ailments and trigger the development of cancer, making them an open door to poor health and a crime against the population. The fact that they are all categorized under one acronym is more than a major red flag for anyone who knows botany and zoology.

Now that you have the knowledge of these potentially carcinogenic chemicals that are present in all petroleum fuels, plastics, tires, paints, packaging materials, etc. you can see that it is impossible to classify any petroleum derived product as really being safe for humans. Just try to imagine all of the necessary laboratory testing that would have been required in order to properly study and monitor the potential effects of these constituents on all of the life forms of this planet. It would have been a nearly impossible task.

| Compound | Boiling Point |
|---|---|
| n-butane | -0.5 |
| n-pentane | 35 |
| n-hexane | 69 |
| n-heptane | 98 |
| n-octan | 126 |
| 2-methylpropane | -12 |
| 2-methylbutane | 28 |
| 2-methylpentane | 62 |
| 3-methylpentane | 64 |
| 2-methylhexane | 90 |
| 3-methylhexane | 91 |
| 2,2-dimethylpentane | 79 |
| 2,2,3-trimethylbutane | 81 |
| 2,2,4-trimethylpentane | 98 |
| cyclopentane | 50 |
| methylcyclopentane | 72 |
| cyclohexane | 81 |
| methylcyclohexane | 101 |
| benzene | 80 |
| toluene | 111 |
| ethylbenzene | 136 |
| m-xylene | 138 |
| p-xylene | 138 |
| o-xylene | 144 |
| 3-ethyltoluene | 158 |
| 1,3,5-trimethylbenzene | 163 |
| 1,2,4-trimethylbenzene | 168 |
| 2-pentene | 37 |
| 2-methylbutene-2 | 36 |
| 2-methylpentene-2 | 67 |
| cyclopentene | 44 |
| 1-methylcyclopentene | 75 |
| 1,3 cyclopentadiene | 42 |
| dicyclopentadiene | 170 |

The cavalier use of fuels that contain VOC's continues and much of the reason is because they are never acknowledged by the media. The fact is childhood cancers have been linked to higher levels of exposure to car exhaust VOC's. Researchers have found that higher numbers of children have died from cancer in pollution concentrated areas such as near transportation highways. Part of the study was to see if exposure to such pollution while in the womb was or could cause cancers to develop in childhood. Their studies have concluded that the highest risk of cancer for children occurs by living within 0.3 kilometers of a chemical emissions concentrated area and within 1km of a highway transport hub.

Professor George Knox from the University of Birmingham in a comprehensive effort to find any correlations between the two compared the postal addresses of 22,500 children who had died of cancer in Britain between 1955 and 1980 to emissions hotspots for specific chemicals. Hotspots were identified from maps of atmospheric pollution levels. The chemicals included carbon monoxide, particulate matter, nitrogen oxides, 1,3-butadiene, benzene, dioxins, benzo-pyrene and volatile organic compounds. Emission sources included hospitals, bus and train stations, heavy transport hubs and oil installations.

The findings confirmed that emissions from vehicle exhausts, particularly diesel engines, were among the primary culprits of the increased deaths. Close proximity to an emissions source such as a bus or coach station put a child at 12 times the risk of dying from cancer.

Never forget that humans were never supposed to breathe the exhaust pollutants of crust-produced petroleum. Now that our traffic has become congested we are paying for it with degraded health. The continued use of it in today's traffic system is madness.

First of all, the cleanest hydrocarbons produced on the planet are grown by utilizing sunlight in conjunction with atmosphere and earth minerals. In a miraculous reaction, Carbon Dioxide gas is converted by plants which combine it with water thus to produce organic hydrocarbons. It is important that you understand that most of the material for this production comes out of the carbon in the air and the hydrogen in the water.

The best part is that when you turn organic fats into fuels and burn them, they convert back into exactly the same molecular forms such as carbon dioxide, water and nitrogen. This further confirms that if we are to continue to use hydrocarbon as a fuel then we should produce this fuel using a bio-fuel process rather than pulling it up from underground along with all of the pollutants.

## "Mineral Oil" Is Just Petroleum Oil That's In Our Foods And Bodies

Here's another confusing Big Oily acronym that needs to be cleared up. The term "mineral oil" is a brilliant piece of advertising and PR dreamed up by the oil industry.

Now when you look on the label of a bottle of baby oil for a list of ingredients you will find the term "mineral oil". What is this magic oil? Does it come from within solid rocks like a stone with a heart of pure mineral as the name implies? No. It comes from the same barrel of crude that produced the gasoline you burn in your car!

Now in order for an oil to be approved as a mineral oil it has undergone a distillation process to get just the right viscosity and then undergoes a chemical extraction process to remove the most harmful toxins. At this point, what once was black heavy crude oil looks nice and clear. This makes it easy to think that we can safely rub it on our skin.

It is thus assumed that "mineral oil" is safe for the human body. However, since it was produced from crude petroleum which in turn contains neurotoxins in complex chemical form, it shouldn't be used unless it has to be used. This means that Baby oil is not really safe enough to be used on our babies. We can use it a few times with no observable ill effects, but we should not use it long term. And we should not rub it all over our bodies at once nor should we eat it.

In this case, with hundreds if not thousands of organic oils such as tea tree or eucalyptus oils as better substitutes, we can easily see that it should not be used on human skin. But now here is another sad truth: the public is in fact eating "mineral" and "Baby" oil. This is happening because the majority of food processors use petroleum-based substances in the everyday manufacturing of their food products. This means that the public has been eating a certain amount of petroleum oils for a very long time.

At various stages of processing foods the current USDA laws allow for the application of petroleum- derived products such as processing oils, releasing oils and preserving oils. As a result today within the human population the presence of crude-derived material is confirmed by laboratory blood tests of people all over the world which reveal a portion of its pollutants are in our bodies.

Scientific literature indicates that there are at least two dozen adverse health effects linked to exposure to these crude-oil derivatives called mineral oil. New research indicates that these fat-soluble hydrocarbons are accumulating to disturbing levels in our bodies and affecting newborns by contaminating breast milk.

One autopsy study performed in 1985 revealed that 48% of the livers and 46% of the spleens of 465 autopsies analyzed showed signs of mineral-oil induced lipogranuloma. This is defined as: *a nodule of necrotic, fatty tissue associated with granulomatous inflammation or a foreign-body reaction around a deposit of an oily substance*). This indicated widespread pathological tissue changes associated with exposure.

Infants, of course, are at much higher risk for adverse effects associated with mineral oil exposures due to their relatively far higher body burden (lower body weight vs. chemical exposure) and less developed blood-brain-barrier and detoxification systems in comparison with adults. Also, children have been found to accumulate higher levels than adults, either due to their higher consumption of de-dusted grains and glazing agents on confectionery products, or their inability to detoxify it as efficiently.

And yet within the United States the FDA continues to approve "mineral oil" for use in cosmetic products as well as food additives in levels of up to 10 mg per kilogram of body weight per day. For a 150 lb. adult this is the equivalent of 680 milligrams a day, **or 248 grams (over half a pound!) a year.**

Of course you will never have these facts mentioned as a possible reason for the skyrocketing cases of cancer. So now I will attempt to fill in the complete picture of the oil industry and what their policies have wrought upon the human population.

## What Has Big Oily Wrought?

For the past one hundred years Big Oily has horded energy like a king lords over his peasants. Unfortunately Big Oily does not understand the concept of lordship and thus can't imagine actually trying to be of a positive service rather than a controlling force.

We could easily be consuming natural oils at every stage of our food processing and manufacturing, and thus we would only have natural organic oils in our bodies, but don't wait for the media cowards to mention that the public is being fed polluted foods instead. The sad fact is Big Oily has promoted toxic oils in our foods the same way they have promoted carbon-monoxide in our air. This more than indicates that they want petroleum chemicals in our bodies.

Part of this reasoning might stem from drug company plans; helping the population to get sick and thus having to purchase pharmaceutical drugs for which to treat our hapless souls. Perhaps it is a dumbing down technique. Perhaps it is part of an extermination plan. Perhaps it is a bit of all these and more. The fact is that there are many byproducts from the oil industry that are in foods, beverages, soaps, and pharmaceutical drugs manufactured today.

Yes, that's correct. Petroleum derivatives are used in drugs, and these drugs are used to treat petroleum-induced sickness! According to the Code of Federal Regulations Title 21, mineral oil may be used for the following uses in ingestible products:

> *"The World Health Organization classifies mineral oils (in untreated or lightly treated industrial-grade form) as Group 1 carcinogens to humans. The OSHA fact sheet on mineral oil also references research from 1991 indicating that it is carcinogenic to humans.* Additionally, a study published in the Journal of Investigative Dermatology in 2009 found that *commonly used moisturizing creams containing mineral oil are tumorigenic when applied topically to UVB-pretreated high-risk mice. The brands studied were Dermabase, Dermovan, Eucerin, or Vanicream, which millions of Americans apply daily to their skin."*

Considering the fact that our food supply is now saturated through with "food-grade" petroleum, it is no wonder that a study published in the journal of Food and Chemical Toxicology in 2008, found that **"mineral paraffins might be the largest contaminant of our body, widely amounting to 1g per person and reaching 10 g in extreme cases."**

If these chemicals truly produce serious health issues, then the public should be showing signs of ill health. Well is this not in fact

| | |
|---|---|
| 1. As a release agent, binder, and lubricant in or on capsules and tablets containing concentrates of flavoring, spices, condiments, and nutrients intended for addition to food, excluding confectionery | Not to exceed 0.6% of the capsule or tablet. |
| 2. As a release agent, binder, and lubricant in or on capsules and tablets containing food for special dietary use | Not to exceed 0.6% of the capsule or tablet. |
| 3. As a float on fermentation fluids in the manufacture of vinegar and wine to prevent or retard access of air, evaporation, and wild yeast contamination during fermentation | In an amount not to exceed good manufacturing practice. |
| 4. As a defoamer in food | In accordance with 173.340 of this chapter. |
| 5. In bakery products, as a release agent and lubricant | Not to exceed 0.15% of bakery products. |
| 6. In dehydrated fruits and vegetables, as a release agent | Not to exceed 0.02% of dehydrated fruits and vegetables. |
| 7. In egg white solids, as a release agent | Not to exceed 0.1% of egg white solids. |
| 8. On raw fruits and vegetables, as a protective coating | In an amount not to exceed good manufacturing practice. |
| 9. In frozen meat, as a component of hot-melt coating | Not to exceed 0.095% of meat. |
| 10. As a protective float on brine used in the curing of pickles | In an amount not to exceed good manufacturing practice. |
| 11. In molding starch used in the manufacture of confectionery | Not to exceed 0.3 percent in the molding starch. |
| 12. As a release agent, binder, and lubricant in the manufacture of yeast | Not to exceed 0.15 percent of yeast. |
| 13. As an antidusting agent in sorbic acid for food use | Not to exceed 0.25 percent in the sorbic acid. |
| 14. As release agent and as sealing and polishing agent in the manufacture of confectionery | Not to exceed 0.2 percent of confectionery. |
| 15. As a dust control agent for wheat, corn, soybean, barley, rice, rye, oats, and sorghum | Applied at a level of no more than 0.02 percent by weight of grain. |
| | ISO 100 oil viscosity (100 |

The chart above is a current list of all places where petroleum-based oils can be used in food plants and for what purposes.

the case? Do we not have more people than ever before that are sick, on medications, needing operations, becoming disabled, relying on drugs day in and day out. And our children, who are more vulnerable, are experiencing disorders and cancers at an all-time high.

The oil industry inadvertently put a harmful plan into play when they replaced God-given organic fats and oils with polluted ones to burn in our cars and trucks. They completed the circle by programming us with the belief that it is worthy to put petroleum into our bodies as well, since they are now willing to feed us petroleum. The fact that our government stands by and does nothing to stop it implicates our government as being a part of the oil industry machine.

Federal and private organizations, like the FDA, AMA, USDA and many others have helped write corrupt laws allowing Big Oily to contaminate the nation's food. Today, all of our oceans, lands and rivers need to be healed of their toxic ailments. In the meantime the human population is living in precarious times.

# CHAPTER 12

## Biomass Fuel and Free Energy

THE STIRLING ENGINE is so simple and unique that this book would not be complete without including it. Although Robert Stirling is credited with the invention of the Stirling Engine in 1816, it was originally drawn by Henry Wood in 1759, improved by Sir George Cayley in 1807, and later redesigned and manufactured during the Civil War by Robert Ericsson. But for some reason Stirling's name was the one chosen.

Thanks to Ericsson, beginning in 1862 at least 3,000 units of different sized models equipped with pistons up to 30" in diameter were manufactured and sold during a three year period. Ericsson was also the designer of the Monitor; the Yankee steel battleship which was one of the most unique naval vessels of all time. The Monitor featured a single rotating turret that was mounted to a deck that was flat and barely above the water. Because of its height limitation, the Monitor required a unique compact steam engine for propulsion. Ericson solved this extreme limitation by utilizing a single cylinder to power two pistons. This was a one-of-a-kind engine and could only have been designed to such perfection by an engineer possessing extraordinary talent. Ericson's life-long interest in Stirling engines underwrites the value of their design.

## The Stirling Engine

The Stirling Engine is a piston engine, thus you are probably wondering why I am promoting any piston engine at this stage. Let's solve that by calling the Stirling engine a mechanism for converting anything that will burn into rotational horsepower. Think about that for a moment: "anything that will burn". Anytime you find an alternate fuel or an engine that can run on something other than gasoline, you have helped to supplement the world's energy needs. The Stirling engine promises to pave the way to a non-reliance of petroleum products for transportation, heat and electrical power. Now there are some other noteworthy attributes about the Stirling engine which make it a serious contender for powering the world's transportation mechanisms:

> The Stirling engine has already been manufactured in the thousands and in many different countries. It can be built by average people in a third world country.
>
> Like the Steam engine, the Stirling engine can harness any form of heat energy. Unlike the Steam engine, the Stirling engine does not require a steam boiler or recovery condenser.
>
> The Stirling Engine is more thermally efficient than a combustion piston engine and nearly as efficient as a steam plant. This is because it uses air in a sealed unit rather than having to intake and expel it.

**The Stirling engine gave mankind** a method to produce rotational power for electrical generation from any material that can be burned. If it is waste material or free material, it becomes a form of free energy. This is an important concept every future engineer involved with powered devices and/or bio-energy needs to understand.

A steam generator also performs this function, but the steam plant itself is a costly endeavor that requires a highly pressurized system. Such a system is dangerous if it is not well engineered and over-built.

The Stirling engine is simpler, but even more importantly; it does not require any form of petroleum to run. Here are just a few examples of what it can run on: Sawdust, grass, wood chips, waste paper, shredded plastic, used oil, crude oil, shredded tires, dried manure, shredded garbage, coal, olive oil, kerosene, linseed oil, paint thinner, old paint, coal tar, methane, hydrogen, carbon-monoxide, lard, deep fat fryer oil, bacon grease, etc.

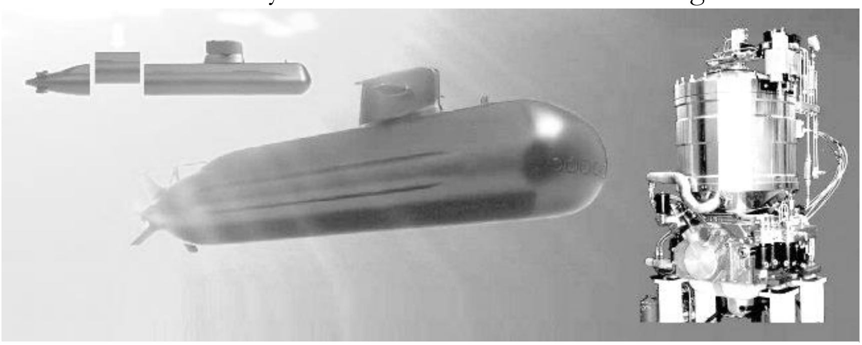
You can see that there are many outlets from which you will be able to acquire fuel at about the same price as garbage and thus for any person attempting to live off the land and at the same time be able to produce an overage such to be able to hold a reserve and later invest in improvements. This would enable a business to be successful without having to be hooked up to an electrical grid. This may not sound like much to you, but for someone living in a 3rd World Country it sounds like an answered prayer.

Now let me explain that the actual driving force of the Stirling engine is not necessarily from heat of combustion but instead from temperature differentials. For example the difference in the combustion of grass clippings: $1500^0$F and a room temperature of $60^0$F would yield a temperature differential of 1440F$^0$. We could therefore make the Stirling engine even more efficient by utilizing cold sea water to increase this temperature differential even further, and in this case we could also be using it to heat water.

To understand the Stirling engine is to understand that temperature differentials from the hot end of the machine to the cold end expand and contract the gasses inside the pistons. Pistons are connected to a crankshaft to receive the higher pressure and convert it into rotational output.

As has been pointed out earlier, the Stirling engine is not an engine that ever went into mass production beyond the units Ericson built during the 1800's. Stirling engines were in fact researched by both NASA and Chevrolet during the 1970's. They got gas mileage figures of 60-70 mpg in normal-sized passenger cars like a Celebrity. The only reason they aren't utilized is because of their fuel flexibility and increased efficiency.

The industry would like us to believe the Stirling engine offers no benefits beyond the standard combustion engine. Well if



**More than 20 years of operational service**

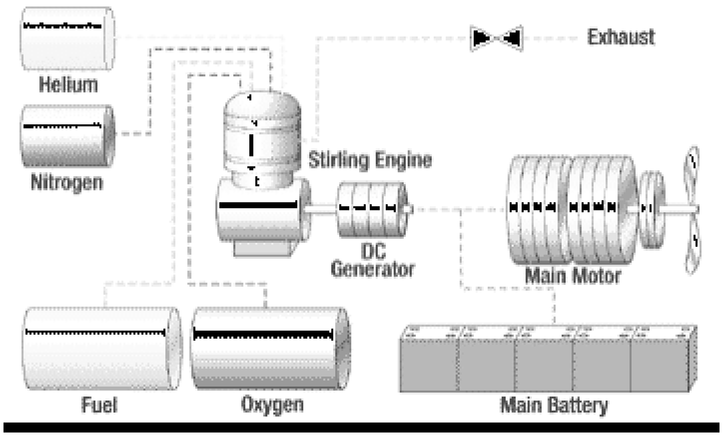
In 1988 Kockums fitted a Stirling engine in the Royal Swedish Navy submarine HMS Näcken to achieve air-independent propulsion. The submarine was placed in dry-dock and cut in two. A fully outfitted eight-meter Stirling AIP section was then inserted. The 20 years of practical sea-trials that followed were extremely satisfactory, resulting in the installation of Stirling AIP systems in all of the new Gotland Class submarines. I wish I could get a look at the inside of that engine!

the Stirling engine doesn't outperform a combustion engine, why has one recently been adapted as an on-board generator for submarines deployed by the Swedish Navy?

What they have come up with is an air-independent propulsion (AIP) system and its use of Stirling engines burning pure oxygen and diesel fuel in a pressurized combustion chamber is the main feature. Since the combustion pressure is higher than the surrounding seawater pressure, this allows the exhaust products, once dissolved in seawater, to be discharged overboard without using a compressor.

Oxygen is stored in liquid form (LOX) in cryogenic tanks.

Submerged endurance is primarily determined by the amount of stored LOX, and from what I can tell; this system can rival the abilities of a nuclear powered sub. Thanks to this recent article we now know how a non-nuclear submarine is able to remain underwater for such a long duration, and we have even more confidence in the Stirling engine design.




The Stirling AIP System shown at left for the Swedish Gotland Class Submarines relies on liquefied oxygen to combust standard diesel fuel. I would guess that they use a more exotic fuel such as Hydrazine or Triptane, 2,4,4 tri methyl pentane, etc. The Nitrogen and Helium tanks might have something to do with the final exhaust gas mixture before it is discharged into the ocean such that it dissolves, etc.

If the Stirling engine is good enough to make a diesel-powered submarine more efficient then you can bet it would make a car, truck or locomotive more efficient as well. It follows that if the car manufacturers really wanted to give the public a quantum jump in fuel economy, they would power all of their hybrid vehicles with a Stirling engine rather than the typical 1.4 Liter gasoline version chosen. We could use the Stirling engine to reduce oil consumption world-wide. Oil companies could still supply much of the fuel. Nobody would have to be laid off. But this isn't good enough for the oil gooks. They place ever-increasing profits above everything else.

**Bio-mass Fuel Made Simple**

What is Bio-mass fuel? One simple form of it is dry grass clippings. In this simple state it performs effectively as fuel to power a boiler or Stirling engine. Thus we can make steam to power a steam engine that is connected to a generator, or we can power a Stirling Engine which makes rotational power directly. If it is easy to produce electricity from grass, it is easy to produce electricity from anything that will burn. Now let me re-introduce the concept of **free energy**.

The grass was grown from the energy of sunlight. Since the energy of sunlight is provided to our earth free of charge, by utilizing grass for heat we effectively tapped into a free source of energy which is unlimited.

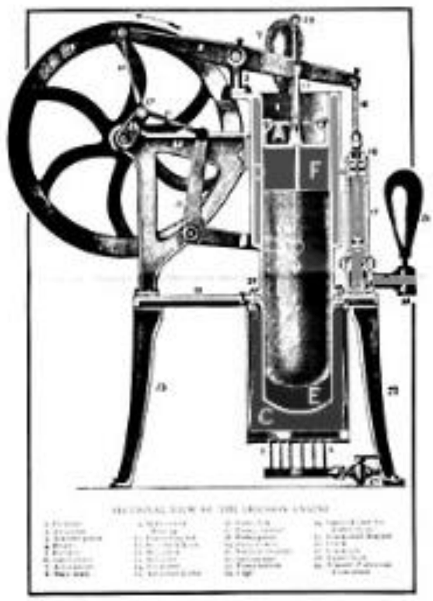
Another way to look at solar or free energy is to analyze the source of energy that powers a hydroelectric dam. In this scenario the sun's energy is utilized to evaporate water from the oceans and lands, then to collect it into clouds and then drop it back on the land at a higher elevation. We are able to tap into this water as it comes flowing back down from this higher elevation. The **energy** from it is free. It was lifted up free of charge by **sunlight.**

The Stirling Engine, by running off of biomass fuel which is fuel provided free from the sun, thus can provide free electricity. This free electricity can be used to power irrigation pumps to thus irrigate and produce more crops, but also to power machinery thus to process the crops. In addition it can provide heating and lighting. Remember, biomass fuel is produced by sunlight, which is free and unlimited. Discarded weeds, hulks, seeds, pits, straw, grass, wood chips and trash are all free.

This is the Biomass-Free Energy Equation. It produces a system which is more than self-sufficient. Any person can take a Stirling engine to a land with arid climate. They can start by burning all of their dried stalks, clippings, trash, waste oil, etc. to produce electricity and let's say that in this case they use the electricity to pump more water for crops and livestock. During the next year this pumped water will combine with sunlight and earth to produce more grass, higher crop yields and livestock growth than the year before.

Over the course of a few crop cycles the land will be producing more crops than before and with enough power left over for lights and machinery. It is easy to see that any farmer's life would be greatly improved by this simple engine. This is why the Stirling engine was heralded by the scientific community as being one of the greatest inventions of all time back in 1862.

*The Ericsson Engine*

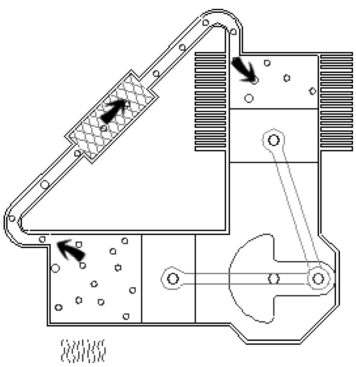



**Two Cylinder Stirling Engine Operation**

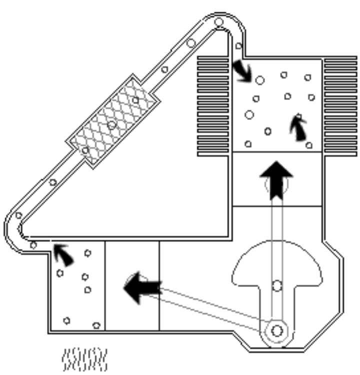
The Stirling engine's basic design utilizes two pistons which work together transferring the cylinder gas back and forth, over and over again, in a loop. The engine is a sealed unit. It only requires the first charge of gas that is put inside it. More modern designs utilize multiple cylinders in a continuous loop at higher pressures.

The Stirling engine utilizes thermal gas expansion and contraction. By heating the gas in one of the cylinders and cooling the gas in the other cylinders, a contraction-expansion process is induced. In this case however, there are no valves, sparkplugs, camshafts, etc. Remember, the Stirling Engine is powered by the expansion and contraction of gasses, and this renders it more efficient than a combustion "pressure only" design.

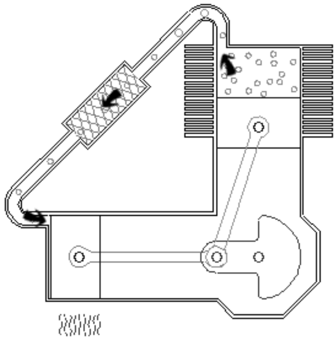
**Expansion** Most of the gas in the system has just been driven into the hot cylinder. The gas heats and expands driving both pistons inward.



**1. Transfer** The gas has expanded (about 3 times in this example). Most of the gas (about 2/3) is still located in the hot cylinder. Flywheel momentum carries the crankshaft the next 90 degrees, transferring the bulk of the gas to the cool cylinder.



**2. Contraction** The majority of the expanded gas has shifted to the cool cylinder. It cools and contracts, drawing both pistons outward.



**3. Transfer** The contracted gas is still located in the cool cylinder. Flywheel momentum carries the crank another 90 degrees, transferring the gas to back to the hot cylinder to complete the cycle.

The Stirling engine features a *regenerator*, illustrated by the chamber containing the hatch lines. The regenerator is constructed of material that readily conducts heat and has a high surface area, typically a mesh of closely spaced, thin metal plates. When hot gas is transferred to the cool cylinder, it is first driven through the regenerator, where a portion of the heat is deposited. When the cool gas is transferred back, this heat is reclaimed; thus the regenerator "pre heats" and "pre cools" the working gas, dramatically improving efficiency.

**Modern Stirling Engines And Availability**

As of February 2017 I can find no companies or dealers who have Stirling engines to sale to the public other than in India or Pakistan. If you need one of these engines today, the best bet is to manufacture one to fit your needs from the plans and guidelines that are included at the back of this book in Appendix 8. Or perhaps copy one of the many model Stirling Engine designs that are available from Ebay. In the meantime, in

A Stirling engine portable generator that was manufactured in the 1960s virtually every country laws are on the books for the sole intent of thwarting all attempts to manufacture and mass produce this engine.

**Wood-Fired Stirling Engine Powered Plant**

Four Stirling engines in a row. Photo: Stirling DK

**Danish Stirling**, a provider of energy systems based on biomass fueled Stirling engines, has commissioned a first four-engine biomass-powered Stirling plant at the wellness and spa resort in Tabarz, Thuringia, Germany. The plant is fueled with fresh wood chips supplied from the local region and is capable of generating around 4,000 Megawatt of heat and 1,000 Megawatt of electricity annually. This will provide the center with the heat and electricity to run the facility on its own. This new system consists of four cascading Stirling engines. This is great news folks. The plant is up and running. Stirling engines are as real as the earth's future is bright.

At right, my own Stirling Engine which I purchased from Pakistan for $500. I mounted it into a wood burning stove to show how the Stirling engine can convert ordinary heat from burning trash into rotational power. The "Hot" end extends down into the stove about 8 inches. This is where the larger of the two pistons goes up and down into the heated section. This unit was an interesting prototype but would need to be scaled up with a larger crankshaft to be used for electrical generation.

## The Relationship Between Bio-Fuels And Petroleum Fuels

I have come to the realization that my college education at a major university where I took a degree in mechanical engineering did a poor job of training me to be a really useful engineer. To me being a useful engineer would mean that I would go on to devote my time and ideas and calculations toward the improvement or invention of a mechanism that would help persons to more efficiently or more easily perform tasks that were needed, appreciated and useful to mankind.

I had received little instruction regarding bio-mass fuel other than the conversion of land-fill garbage into burnable material back in 1976 when I graduated from college. You'll read in the following sections some of the things they could have taught me and you can judge for yourself what kind of positive impact this knowledge would have had on my career as I entered the oil industry. As it was, after another eight years working for the oil company I was at the exact same spot as my limited knowledge base allowed me to believe. That was; there was only one energy material that was abundant enough to satisfy world demands; petroleum of course!

Now that I am motivated by the prospect of a better world coming about via the collective HUMAN CAPABILITIES of the planet being applied in the most positive way to benefit the most people, the prospect of true innovation and human ingenuity gives way to reality. Thus I have been able to put these important concepts into simple terminology.

For example, many people know that fertilizer is made by the aerobic breakdown of organic matter, but few people know that the gasses produced during the process are virtually identical to the chemistry of hydrocarbons taken from deep down within the crust. Few people know there is absolutely no reason to go mining for hydrocarbons deep beneath the earth and oceans when it can all be produced above ground and as part of efficient agriculture and animal farming.

Future engineers will work toward the betterment of mankind and thus a knowledge of bio-mass energy will be crucial, because, only from the knowledge of bio-mass energy can any meaningful evaluation of petroleum energy verses all other available earth energies be performed.

One of the reasons our colleges have spent decades doing a poor job training future engineers is because they turned out monotones of manmade engineering instead of the harmonies of the building blocks of organic chemistry. This should be taught and the possible applications discussed relating to every type of energy on earth, as well as for every element and molecular form, whether it is plant, animal or mineral.

## Petroleum Is A Hydrocarbon

Organic chemistry is chemistry that is based on the carbon atom. Petroleum is a family of gasses and liquids; all of which are composed of hydrogen and carbon atoms, and thus they are classified as organic chemicals.

Where do hydrocarbon molecules come from? They come from NATURALLY GROWN MATERIAL from every plant and animal life form on the planet. Every plant and animal on the planet is made of hydrocarbons and thus every plant and animal on the planet produces hydrocarbons when it grows.

Now don't get nervous about having an energy shortfall. If all attempts to produce energy organically fail, then we can always extract more crude from the Earth's crust to make up the difference. **But you will get toxic pollutants as a reward.** Therefore, it is not advisable to pump hydrocarbons out of the ground.

Since we've been told that petroleum is still the most viable fuel for our needs and the only economic solution to world demand, we continue to go along with it. But few of us know that we get toxic pollutants as a reward. As a result even few people realize than surface produced organic material for combustion should be prioritized above petroleum.

The following sections of this book will clearly delineate the near unlimited source of hydrocarbon "fuels" which are available on Earth. From this point forward you will have an enhanced perspective of the energy resources of this planet as a whole such that you will never be able to be swayed or victimized in your future endeavors to connect and harness these now available forms of energy.

Now instead of going along with the old story that claims petroleum is a non-renewable energy source you will kindly point out that this is a contradiction of extreme magnitude, and that it has been the big con of the century. Do not think for a moment that the hydrocarbon oils, lipids and fatty acids that are naturally grown on this planet as a result of water, carbon dioxide and sunlight are not every bit as qualified to combust and lubricate, and they do so as well or better than petroleum.

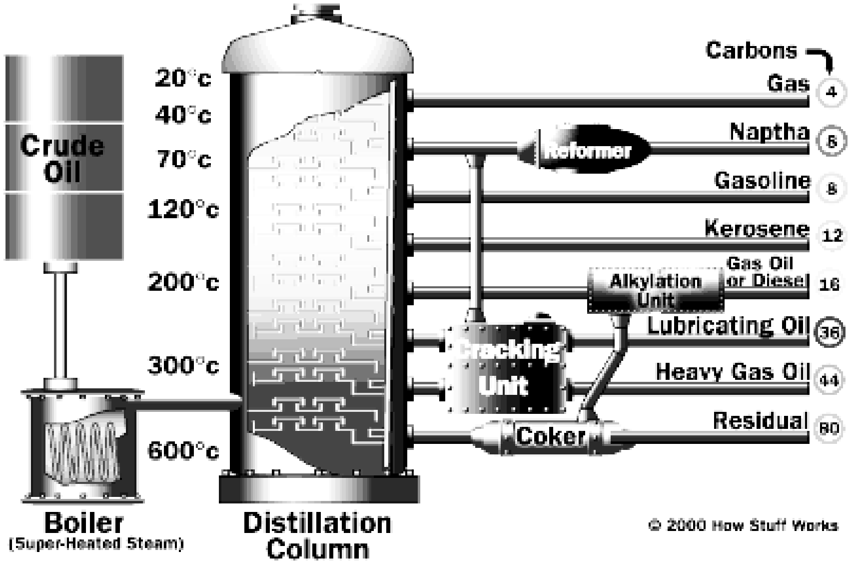
Folks consider in a nutshell what the situation is that we currently face: Farmers grow the same stuff on the surface of the planet that mindless-insane oil companies pull out of the ground. The only difference is their stuff is polluted and our stuff isn't.

In order to pull off this stunt they have had to control alcohol, outlaw hemp, discard coal, discard wood sawdust and factory wastes that could be feedstock for steam and ignore all vegetable and animal fats and oils as if they were not candidates for hydrocarbons at all.

In the process they produce a myriad of petroleum products with different names and specifications as if they are something really special or unique. It was not until their monopoly was in place that we started paying our hard earned cash for lubricants, fuels and additives at the price of honey.

For the past century what farmers grew on the surface is what we should have continued using. We could have all been involved in the production of it and none of it would have contained the horrible toxins that all grades of crude are polluted with. And that's the situation we're in.

## Organic Hydrocarbons Vs. Gasoline




Above drawing of a typical distillation column; the most important element of a crude oil refinery. **Note: Gasoline is falsely represented as being a single fraction here.**

In normal petroleum distillation, crude oil is heated until it starts to boil. These different products, such as gasoline, that come out of a refinery are defined by their boiling temperatures during distillation. The lightest compounds, those that boil at the lowest temperature, are the most light in molecular structure and thus the most volatile and dangerous.

As I showed in Chapter 1 in "The Selection Of Gasoline" gasoline is typically made from that fraction of crude oil that boils at temperatures between 100 $^0$F and 400 $^0$F. The typical Big Oily-supplied refinery diagram shown above is very misleading as it makes gasoline look like it is a single distillation range.

Gasoline is made up of hydrocarbons, which are carbon chain molecules that contain roughly two hydrogen atoms for each carbon atom. The typical gasoline formula they use is called octane.

It has 8 carbon atoms and 18 hydrogen atoms, and is written $C_8H_{18}$. Note, in actuality only a small fraction of the molecules within a gallon of gasoline are going to have this formula. Again, this strikes me as such a lose specification, considering that gasoline is accepted as state of the art fuel in 2023.

But aside from gasoline being so cantankerous to run in a piston engine, the wide specification of boiling ranges allows for an indeterminate level of types of compounds to be present. And, since every refinery processes different batches and types of crude oil, it is nearly impossible to know what compounds are present in the final product.

And do you know what? As a result of the endless chemical variations, Big Oily gets a break. Their chemists are not expected to provide accurate test data on all of the toxic constituents of the end products that get combusted in the public.

Even today in the 21st Century, only a fraction of the toxic constituents have been long-term tested. In reality, it was nearly impossible to answer all of the questions that should have been asked before we ever started to use gasoline in the first place because it would have been a near-endless process and it would have only yielded nail after nail into the coffin of gasoline as a fuel.

So sloppy incomplete testing was allowed for the sake of the oil companies, not for the sake of the people. And that is because even today there is gross and inaccurate misuse of the system since it allows for trace amounts of virtually anything to be present in our gasoline and thus ends up later in our air and water.

If our smog laws were really there to protect us, they would have prevented the use of gasoline from day one. The crass attitudes of the state and federal government was to over emphasize anti-smog and pollution control devices on our vehicles. By first endorsing as a fuel one that has such a broad range of molecular sizes and toxic pollutants in its makeup, the mandated smog laws have been a cover from the beginning.

Another problem with wide boiling range specifications for gasoline are the rates of vaporization, which of course are slower for the heavier molecules. In the past engineers have designed fuel systems that maximized fuel vaporization. In every case it was found that longer chain molecules take longer to vaporize properly before they are burned. And as you know, the lighter fractions cause detonation, thus limiting compression ratio.

It has also been proven that when you do achieve maximized vaporization of the fuel it dramatically affects the efficiency and fuel mileage of the engine. The longer a fuel has to vaporize with the air it is mixed with, the more finely dispersed the fuel vapor will become. Heating the fuel and pulling a vacuum on the vaporized air at the same time are typical ways to dramatically speed up the process. Good fuel vaporizers can double a car's gas mileage.

This would indicate that the modern fuel-injection systems are inefficient because fuel injection is a poor vaporizer. Check out the Pogue carburetor again. That was a superb fuel vaporizer!

## The College-Taught Combustion Of Gasoline

Here is the typical chemical formula for gasoline and its reaction with oxygen during the combustion process within a piston engine:

$$2C_8H_{18} + 25O_2 \Rightarrow\!> 16CO_2 + 18H_2O \quad \text{and}$$
$$2C_8H_{18} + 17O_2 \Rightarrow\!> 16CO + 18H_2O$$

The first equation is a theoretical chemical equation that only occurs in an ideal world. In the real world any piston engine using gasoline as fuel must run slightly rich. Thus, there is usually not quite enough oxygen available fast enough inside the engine to allow the reaction to occur completely, so there is also some carbon monoxide (CO) formed as well. This is the reaction shown in the second equation, and doesn't it look sick!?

As discussed in Chapter 4, gasoline's propensity to detonate unless it is supplied slightly on the rich side of a stoichiometric mixture makes the process of the second equation a done deal. And, as you might have already guessed, there are an unlimited number of formulas and variations of the amounts of carbon monoxide vs. carbon dioxide. These are the result of varying gasoline formulas, different compression ratios, different rpms, different throttle settings and loads, and the list goes on.

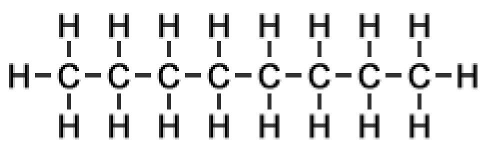
Never forget that carbon monoxide just happens to be one of the most lethal gasses that humans can be subjected to for the reason that our lungs prefer it over every other gas found in normal atmospheric air. It is much more hazardous than methane gas, propane and natural gas. These are gasses that our lungs can draw in and will not be absorbed, thus they cannot kill humans unless most all of the oxygen that was in a room is driven out of the room by their displacement. CO on the other hand is particularly poisonous, even in small amounts, for as we continue to breathe it we will steadily become more poisoned and thus asphyxiated.

Another one of the properties particularly nagging about CO is the fact that its density is almost the same as atmospheric air, meaning that it hangs around right where we live and breathe, or try to. In order to calm our fears about the possibility of being poisoned by CO the oil-funded-and-trained scientific community tells us that since CO production occurs rarely, only the first equation is used to delineate the chemical and thermodynamic calculations employed to analyze of the burning of gasoline within a piston engine! Maybe I shouldn't worry about it. Then again, maybe there is a depressed human state called "partial carbon-monoxide poisoning" that I have not been told about.

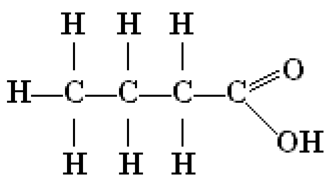
It turns out an article recently published corroborates this very thing. In it the author reported that scientists have documented that the inhalation of car exhaust has an anesthetizing effect on the human brain, and that this causes us to feel more relaxed in traffic. It went on to state how this might also help people to cope with the rigors of urban life and struggle in the cities. Gosh, thanks, but I think I'll live somewhere else where I don't need regular doses of anesthesia.

## The Miracle Of Living Organisms

Considering that human health is riding on the line here, the failure to ever address or remedy carbon monoxide from gasoline powered engines illustrates a text book case where politics won out over science. We will now take a look at the science that should have easily won out over the politics. We will now take a look at a scientific point of view and illustrate gasoline molecules next to organic hydrocarbon molecules. Within the two hydrocarbon molecules shown below; the one on the left is octane, one of the variations of gasoline. The molecule below octane is butyric acid, commonly known as butter.



Octane



Butyric Acid

As you can see from the formula, $C_8H_{18}$, Gasoline is composed of Carbon and Hydrogen atoms and animal fat is composed of Carbon and Hydrogen atoms with two additional Oxygen atoms at one end. The Butyric Acid above has only four Carbon atoms. If it was a diagram of a common fat or cooking oil it would have the same structure but instead contain 10 to 18 Carbon atoms. So even as the molecular chains get longer, the molecular structure for both of them is identical, except for the addition of two Oxygen atoms.

We have been led to believe that gasoline is a fossil fuel. A fossil fuel means that it came from the earth's crust where fossils are found. We have been led to believe that petroleum is a fossilized remnant of organic material that was originally grown on the surface of the planet, and that later became buried, deep within the earth for a long enough time to complete its transformation into an oily-like substance. What a great story. Now you know it's total rubbish since now you know that oils don't have to be "cooked" for millions of years in order to function as oils. Everything that Mother Nature grows is a suitable replacement for crust-produced petroleum. Letting it sit in the ground for a few million years does not improve it but in fact renders it horribly toxic.

When we grow plants with water and sunlight, hundreds of types of oils can be grown. Once they are grown, the oil is ready. And they will show the resemblance between the chemical structure and makeup of petroleum to the chemical structure and makeup of animal and plant tissue.

The resemblance of crude oil hydrocarbons to sun-produced hydrocarbons does not prove that the crude oil taken from the ground came from the surface in the first place. We have in fact been led to believe this but it is an impossible claim. With current world consumption at nearly 1 trillion gallons per year, don't you think this supposedly fossilized concentrate would start to get a little scarce? Just where did it all come from? Isn't it time to consider that it never came from surface-produced organic material in the first place?

Is it possible that crude oil is formed much deeper down where pressures are high enough to decompose rock and mineral into hydrocarbons?? If you are curious on this issue, go to the appendix and read "Stalin and Abiotic Oil", and be prepared to be amazed.

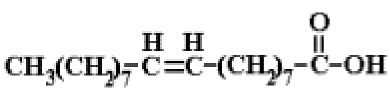
Now let's talk about the makeup of living organisms. Fatty acids consist of the elements carbon (**C**), hydrogen (**H**) and oxygen (**O**) arranged as a carbon chain skeleton with a carboxyl group (**-COOH**) at one end.

Butyric acid (butanoic acid) is one of the saturated short-chain fatty acids responsible for the characteristic flavor of butter. Now you might be inclined to think that because this molecule contains an OH plus an extra oxygen atom that it would be unsuitable for use as a fuel or lubricant, but this is indeed not the case. As we will see, the addition of these extra oxygen and hydrogen atoms only helps in the combustion process. Combustion is an oxidation reaction, after all.

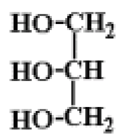
Here is the line formula for Butyric acid. There are four bonds for every carbon atom.

$$\mathbf{CH_3CH_2CH_2COOH} \quad \text{or} \quad \mathbf{CH_3(CH_2)_2COOH}$$

**Triglycerides** are the main constituents of vegetable oils and animal fats. Triglycerides have lower densities than water (they float on water), and at normal room temperatures may be solid or liquid. When solid, they are called "fats" or "butters" and when liquid they are called "oils". A **triglyceride** is a chemical compound formed from one molecule of glycerol and three fatty acids. I wish they would just call them fats or butters. The world would have a much better understanding of the link between Mother Nature hydrocarbons and crust-produced hydrocarbons.

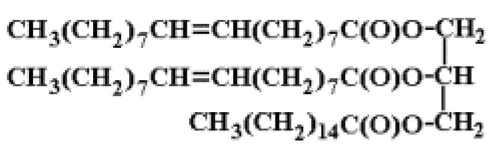


Oleic Acid



Glycerol or Glycerin

The triglyceride structural formula on the left is **typical of olive oil**. It consists of two radicals of oleic acid and one of palmitic acid attached to glycerol (the vertical carbon chain). I neither want you to memorize or understand these chemical formulas, but do note the presence of hydrocarbons predominate in both, and with the addition of oxygen atoms, they become much easier to combust.



Above is the molecular structure of tristearin, a triglyceride with three stearic acid radicals. Tristearin is found as a minor component in many natural fats. Again, this looks rather complicated, but a quick element analyses reveals it to be hydrocarbons with the addition of some oxygen atoms. And once again we have a hydrocarbon with some extra oxygen which is an enhancement.

Now have you any doubt after looking at these chemical formulas that these "Mother Nature" produced hydrocarbons with oxygen enhancement will combust as readily as petroleum hydrocarbons?

Organic chemistry is miraculous chemistry. It results in a perfect energy circle starting from $CO_2$ and $H_2O$ combining with other compounds containing Nitrogen, such as $NH_3$ (ammonia) and $NO_2$ (nitrite) and then combining using sunlight into living material made up of hydrocarbons.

As I have previously discussed the best way to visualize hydrocarbon fuel is to think of a collection of hydrogen atoms. In the combustion process we take the hydrogen atoms from the carbon atoms and combine them with oxygen. Mother Nature reverses this process for us. That is how sunlight is harnessed. Do not ever start to believe that sunlight is wasted. It is always engaged in the process of turning $CO_2$ and nitrogen-containing-compounds into hydrogen-rich-compounds.

This is why organic chemistry is important to the engineer, especially the engineer of the future who is designing new energy producing systems. Now you have an understanding of the scope of available types of energy forms to tap and stimulate for whatever energy demand it is that you are trying to fulfill.

The knowledge of the relationships between hydrogen, carbon and oxygen will enable you to find all the energy you need wherever you are. And if by chance you end up growing algae in aerated ponds to produce natural oils, you will know that their hydrocarbon structures will have some extra hydrogen and oxygen compared to petroleum. And you will know that this is actually an improved fuel compared to petroleum, not an inferior fuel.

Everything the sun grows is a superior type of hydrocarbon than what comes out of the earth's crust. What the sun grows is renewable energy. When Big Oily says crust-produced petroleum is a non-renewable energy resource they are acting as if the earth has no water, sunshine, plants or animals.

**Fatty Acid Composition Of Common Edible Fats And Oils.**

From the following chart note how carbon chain lengths are divided into saturated, mono and poly unsaturated types of fats. If they had just taught us this way in school we would have understood all these types of fats and why they had different effects on our bodies. Note also that since their hydrocarbon lengths fall within the range between kerosene and diesel hydrocarbon lengths they can be substituted as fuels for diesel engines. To make gasoline would require cracking down the molecules, but it would make more sense to just crack them into alcohols.

**Percent by weight of total fatty acids.**

| Oil or Fat | Unsat./Sat. ratio | Saturated | | | | | Mono unsaturated | Poly unsaturated | |
|---|---|---|---|---|---|---|---|---|---|
| | | Capric Acid C10:0 | Lauric Acid C12:0 | Myristic Acid C14:0 | Palmitic Acid C16:0 | Stearic Acid C18:0 | Oleic Acid C18:1 | Linoleic Acid (ω6) C18:2 | Alpha Linolenic Acid (ω3) C18:3 |
| Almond Oil | 9.7 | - | - | - | 7 | 2 | 69 | 17 | - |
| Beef Tallow | 0.9 | - | - | 3 | 24 | 19 | 43 | 3 | 1 |
| Butterfat (cow) | 0.5 | 3 | 3 | 11 | 27 | 12 | 29 | 2 | 1 |
| Butterfat (goat) | 0.5 | 7 | 3 | 9 | 25 | 12 | 27 | 3 | 1 |
| Butterfat (human) | 1.0 | 2 | 5 | 8 | 25 | 8 | 35 | 9 | 1 |
| Canola Oil | 15.7 | - | - | - | 4 | 2 | 62 | 22 | 10 |
| Cocoa Butter | 0.6 | - | - | - | 25 | 38 | 32 | 3 | - |
| Cod Liver Oil | 2.9 | - | - | 8 | 17 | - | 22 | 5 | - |
| Coconut Oil | 0.1 | 6 | 47 | 18 | 9 | 3 | 6 | 2 | - |
| Corn Oil (Maize Oil) | 6.7 | - | - | - | 11 | 2 | 28 | 58 | 1 |
| Cottonseed Oil | 2.8 | - | - | 1 | 22 | 3 | 19 | 54 | 1 |
| Flaxseed Oil | 9.0 | - | - | - | 3 | 7 | 21 | 16 | 53 |
| Grape seed Oil | 7.3 | - | - | - | 8 | 4 | 15 | 73 | - |
| Illipe | 0.6 | - | - | - | 17 | 45 | 35 | 1 | - |
| Lard (Pork fat) | 1.2 | - | - | 2 | 26 | 14 | 44 | 10 | - |
| Olive Oil | 4.6 | - | - | - | 13 | 3 | 71 | 10 | 1 |
| Palm Oil | 1.0 | - | - | 1 | 45 | 4 | 40 | 10 | - |
| Palm Olein | 1.3 | - | - | 1 | 37 | 4 | 46 | 11 | - |
| Palm Kernel Oil | 0.2 | 4 | 48 | 16 | 8 | 3 | 15 | 2 | - |
| Peanut Oil | 4.0 | - | - | - | 11 | 2 | 48 | 32 | - |
| Safflower Oil* | 10.1 | - | - | - | 7 | 2 | 13 | 78 | - |
| Sesame Oil | 6.6 | - | - | - | 9 | 4 | 41 | 45 | - |
| Shea nut | 1.1 | - | 1 | - | 4 | 39 | 44 | 5 | - |
| Soybean Oil | 5.7 | - | - | - | 11 | 4 | 24 | 54 | 7 |
| Sunflower Oil* | 7.3 | - | - | - | 7 | 5 | 19 | 68 | 1 |
| Walnut Oil | 5.3 | - | - | - | 11 | 5 | 28 | 51 | 5 |

## Fuel From Algae

*From the:* ***The National Renewable Energy Laboratory***

"During the oil crisis of the 1970s, Congress funded the National Renewable Energy Laboratory (NREL) within the Department of Energy to investigate alternative fuels and energy sources. Between 1978 and 1996, the Aquatic Species Program (ASP) focused on the production of biodiesel from high lipid-content algae growing in outdoor ponds and using $CO_2$ from coal-fired power plants to increase the rate of algae growth and reduce carbon emissions.

Prior to this program, very little work had been done to understand the growth process and metabolic composition of algae. As a result of the ASP there are now some 300 species, mostly diatoms and green algae, in a collection stored at the Marine Bioproducts Engineering Center that is available to researchers interested in developing algae as an energy source. (2) Some results listed in the Close-Out Report of the ASP are:

- Under optimum growing conditions micro-algae will produce up to 4 lbs./sq. ft./year or 15,000 gallons of oil/acre/year. Micro-algae are the fastest growing photosynthesizing organisms. They can complete an entire growing cycle every few days.
- One quad (1015 BTU or 7.5 billion gal.) of biodiesel could be produced on 200,000 ha of desert land (equivalent to 772 sq. mi., roughly 500,000 acres). (To produce one quad from a rapeseed crop would require 58 million acres or 90,000 sq. mi.)
- Algae contains fat, carbohydrates, and protein. Some of the micro-algae contain up to 60% fat. Once the fat is 'harvested'— some 70% can be harvested by pressing—what remains becomes a good animal feed or can be processed to produce ethanol.
- The desert test location in New Mexico had sufficient sunlight, but low nighttime temperatures limited the ability to achieve consistently high productivity.
- No tests were carried out on mechanisms and procedures for harvesting the algae nor on the extraction of oils from the algae.

**Let's See How An Algae System Works:**

GreenFuel Technologies in Cambridge, MA is field testing a closed system that uses the $CO_2$ in power plant flue gases (13% of flue gases in the test) to feed algae. In so doing, it significantly reduced the $CO_2$ concentration in the exhaust by 82.3% on sunny days and by 50% on cloudy days during the beta-test at the Cogeneration Plant at MIT. The process also removed 85.9% of nitrogen oxides.

A GreenFuel Technologies bioreactor in operation.

Not only will the GreenFuel Bioreactors reduce carbon and NOx emissions, but the company estimates the cost of a full-scale system installation to be 20% to 40% less than that of a comparable SCR system (pollutant scrubbers). But this is just a fringe benefit; the main benefit is the added production of algae, which in the secondary process is converted into methanol or hydrocarbon fuel. Using technology licensed from a NASA project, GreenFuel constructs triangular-shaped bioreactors from polycarbonate tubing two to three meters long and 10-20 cm in diameter. The hypotenuse of the triangles face the sun. Flue gases are introduced at the bottom of the hypotenuse and flow up while the media containing the algae flow in the opposite direction. From 15% to 30% of the algal media are harvested each day. The use of tubes in which to grow the algae overcomes the usual surface area limitation of ponds. In this case the turbulent mixing of the algal media with $CO_2$ in the tubes and the speed at which the fluid moves determine how fast the algae grow.

Algae can take (carbon dioxide), eat it, and produce oil. That's a simple fact that forever dispels the "oil is non-renewable" ruse.

**How Algae Production Could Meet Total U.S Fuel Consumption for All Vehicles**

Article: courtesy University of New Hampshire

"Michael Briggs, a physicist in the University of New Hampshire (UNH) Biodiesel group, calculated the annual equivalent amount of biodiesel needed to meet all US ground transportation needs. He assumes that all gasoline-powered vehicles could be replaced over time—the average life of a car in the US is 20 years—by biodiesel vehicles. He assumes no change in the current average fleet mileage, but does factor in that diesel engines are more efficient. With these assumptions he arrives at 140.8 billion gallons of biodiesel a year to meet US ground transportation needs.

Briggs used the numbers from NREL's Aquatic Species Program—that one quad (7.5 billion gallons) of biodiesel could be produced on 200,000 ha (roughly 500,000 acres) or about 780 square miles—to compute that 140.8 billion gallons of biodiesel would require 19 quads (140.8 ÷ 7.5). This would require about 15,000 square miles (19 x 780), or about 9.5 million acres—which he notes is only about 12.5% of the area of the Sonoran desert of the Southwest. So using algae as a source of oil for biodiesel with the NREL productivity assumption, the acreage required is less than 3% of the 450 million acres now used to grow crops.

Based on a UNH research project, Briggs then estimates the total cost of producing 140.8 billion gallons of oil (unrefined) for biodiesel at $46.2 billion—substantially less than the $150 billion that the US currently spends to purchase foreign crude oil. Thus the large-scale algae farms envisioned by NREL would generate many jobs and substantially reduce the US trade deficit."

Folks, let me interject into this report that I am not recommending that the U.S. start producing fuels in this fashion or at this scale. I provided the above article to document that the process to make fuels from organic material is not only known but is in operation as well. This is the route we should have gone 150 years ago.

The biggest problem with this proposal is that it requires that all gasoline vehicles be converted to diesel powered vehicles. This is a waste of time and money. If we must replace all gasoline engines, we should replace them with electric motors and fuel cells, not more reciprocating engines! If we want to continue to use these engines for an interim period we can simply convert them to alcohol. This would not require changing the engines.

## Small-Scale Algae-Fuel Production

*A Solaroof advertisement:* "Small-scale algae production in Solaroof greenhouses could allow small-scale farmers to produce their own fuels. Solaroof greenhouses dramatically reduce the amount of heat required to operate a greenhouse through the winter.

Most new commercial greenhouses use two layers of greenhouse plastic. The two layers are separated by an air space which is inflated by a small fan to provide more rigidity to help the roof deflect wind and shed rain and snow. The Solaroof greenhouse has two complete skins—one outside and one inside. During the daytime, this space may also be filled with air, but when the nights are cold or when the days are excessively hot, the space between the two skins is filled with soap bubbles.

The thermodynamics of heat transfer are such that any airspace more than about 1/4 inch has an R-value of 1. As a result, when the 12 to 18 inch space between the skins on a Solaroof greenhouse is filled with soap bubbles, it has an R-value between 20 and 40. During a hot summer day, the soap bubbles act like a cloud over the sun, leaving the inner skin of the roof cool, and appearing to the plants as if it were open sky. This can actually increase growth rates.

> Greenhouses can be modified to produce algae all year round. For small-scale operations to be effective, local co-operative biodiesel processing plants would also have to be constructed to convert the raw oil into fuel.
>
> A biodiesel cooperative in La Plata County, Colorado, just completed a feasibility study that found it feasible to construct a 1-million gallon processing facility there to provide biodiesel for the county and a handful of other large users.
>
> Algae can be grown in the desert instead of on arable land and nourished with undrinkable briny water or even sewage. It is possible that this approach would not displace food crops or consume precious freshwater. The efficient process in the article promises as much as 15,000 gallons of oil per acre per year, depending on conditions. Replacing all U.S. transportation fuels with algal oil "would take a farm roughly the size of Maryland".

In Chapter 18 is a thorough analysis of better fuels than gasoline or diesel. For example, it is much easier to produce alcohol as a fuel and it makes sense to do so anyway because the fuel is oxygenated and thus puts out a lot more power. Therefore existing engines could be made much smaller and fuel consumption could be dramatically decreased. This should definitely be a priority in the design of any new fuel source and system.

The use of algae for this large of an application is not the best possible solution. Still, it shatters the myth that we need big oil and that we get a fair deal.

## Plastic Trash To Oil 1, 2, 3

Just a few people's knowledge of this technique could create meaningful jobs, provide fuel and finance an incentive to get rid of all waste plastic. The technique that I will describe is a way to get oil from plastic trash. It is easy to construct the device and it allows third world countries a way to convert all of their plastic trash into an **oil that can be used as diesel, kerosene, lubricant, boiler fuel and even gasoline.** Here's all you need to do it:

1. **A thick walled crucible like container with a removable lid.** An insulated container will work best as it will resist heat loss and establish a more efficient operation.

2. A tube opening from the top, otherwise the vessel will be sealed.

3. **An electric heating element placed within the vessel. It will need to heat the contents to a temperature of 600$^0$F.**

4. A tube from the top will connect into a water bath container such that the outlet of the tube is below water level.

**Operation:** The vessel is opened and packed with plastic trash. Bottles are crushed, etc. to allow as much into the vessel as possible. The lid is bolted down and the heating element is activated. As the plastic contents reach 500$^0$F and above they begin to convert into a vapor. This vapor travels out the top, down the vapor tube, and into the water bath reservoir. The water will cause the vapor to form into an oil which will float to the top of the water in the reservoir where it is skimmed off to provide oil.

At right: an assembly of pipes and vessels that cooks plastics into a gas and then condenses the vapor into long-chain hydro-carbons that are converted into fuel.

"Agilyx, an Oregon-based start-up, has created a system that converts discarded plastic into crude oil. This prototype has been in development for 18 months, and the company says it hopes to start selling commercial versions in about nine months."

The total system is an assembly of pipes and vessels. It will cost around $5 million. It essentially cooks plastics into a gas and then condenses the vapor into a soup of long-chain hydrocarbons that can subsequently be converted into diesel, jet fuel or other substances. One factory module can turn 40,000 pounds of plastic into 5,460 gallons of oil a day which in today's market would be worth over $20,000 dollars. Larger modules are on the way.

A plastic-to-oil processing plant. It is not only a simple process but a viable supplement for gasoline and diesel.

Roughly a gallon of gas can be squeezed out of seven to 10 pounds of plastic. While refiners could process landfill oil into final products, trash companies could own and operate the machinery to make the basic feedstock. Many systems would be built up on landfills near large cities. Plastic is everywhere there is population.

## Nations Are Barely Recycling Plastics

The total municipal solid waste in the United States has grown from 88.1 million tons in 1960 to approximately 243 million tons a year today according to figures from the federal Environmental Protection Agency.

While virtually everything in waste heaps can ultimately be reincarnated, plastic is particularly attractive. Two trillion pounds of plastic now sit in landfills in the United States, accounting for around 25 percent of the nation's total plastic volume. The global volume of plastic grows 7 to 9 percent a year, according to industry figures. If a trash hauler wants to start generating methane from organic waste piles, the plastic has to be extracted.

Only a fraction of the plastic in landfills is easily recycled. In some nations, "recycling" plastic actually means burning it for fuel, which creates an even bigger environmental hazard. Kevin O'Connor, a researcher at University College in Dublin has created a genetically modified organism that can recycle plastic.

Other novel start-ups in resource recovery include Modular Carpet Recycling, which can extract commercially viable nylon from old carpet, and Lehigh Technologies, which has retro-fitted a mill for grinding expired pharmaceuticals to recycle rubber. How's that for a new source of rubber? Note that none of the processes above burn plastic. In each of the cases it is either catalytically cracked using heat or organically eaten and turned into bio material by microbes.

Plastic waste has a high energy value, but it should never be burned directly to produce heat to run a steam plant like you can using sawdust, dried grass, wheat husks, etc. Burning plastic is a sure way to add pollution to an already polluted atmosphere. Although this is better than burying it in a landfill, almost all plastics can be put in a machine to create oil that can be used just like regular oil. The process requires about "20 cents' worth" of electricity per gallon.

One example, the Envion Oil Generator, turns plastic into oil for less than $10 a barrel. Now these products can be burned just like first run petroleum gasoline, diesel fuel, kerosene, etc. You just simply distill them again just like at the refinery using a crude fractionating column to separate out the grades you want.

**Plastics In The Future**

Today, in Finland, all plastic trash is taken directly to an electrical power plant where it is shredded, cubed and burned. So what do you think we should do in the future to rid the world of plastic trash? Should we ban petroleum plastic altogether? Or should we continue using it and plan on converting it into oil again, meaning we would always collect it and direct it to a plastic recycling plant? Either way, we are going to need recycle plants for plastic, and for a third world country struggling to pay for the oil they are being overcharged for, they could be more profitable than a gold mine.

The ability of Big Oily to continue the story about limited oil sources and limited supplies has already come to an end in Russia where deep-hole drilling has yielded up oil reserves thousands of times larger than any discovered beforehand. What I am telling you is as real as is the moon orbiting the earth.

Cracks are appearing in the asphalt curtain that has shielded us from most of our discovered technologies for so long. The links between ordinary fatty acids produced by all living matter above ground to all those petroleum-derived hydrocarbons taken up from within polluted rock layers in the earth are becoming universally understood. And as you read further you will become acquainted with hundreds of unique forms of energy, one being a cold-fusion nuclear device now patented by an Italian inventor. His method of producing does not merely combine fuels and oxygen together to form a chemical reaction like combustion, his method goes a step further and taps into the energy of an atom's nucleus, thus it is a nuclear reaction.

Andrea Rossi, in his invention called the E-Catylitic Converter, reveals a way to convert nickel into copper, in the process yielding heat from one gram of nickel that is equal to the heat produced from 300 tons of petroleum. Nickel is the 6$^{th}$ most abundant mineral in the earth's crust. The world currently produces 20,000 times the amount it would need to produce in order to supply all of the world's energy needs. How's that for some serious energy?

Sadly, as of this date, February 2023 there is no further progress on the E-Cat Converter. It looks like Big Oily has successfully shut down the venture.

The sad truth has now become apparent; If we had cared just a little more about the protection and maintenance of earth's priceless life forms we never would have used petroleum in the first place.

# Chapter 13

## Steam Locomotive Development
### In the United States

WE DON'T SEE IT, but there a glaring contradiction that persists in our existing rail system. It is the fact that our locomotives are powered by a diesel engine even though the engine itself is connected to two rails of steel, which are conductors of electricity. The use of steel rails demonstrates the exact technology needed to transmit electrical power to every point on a powered grid, thus negating the need to carry fuel and generate power on board the vehicle.

The use of a charged rail system does away with the fuel and the engine be it steam, diesel, or turbine. If our trains were powered by light-weight electric drive motors driven from a distant electrical power plant where it is produced, we would operate at 1/10 to 1/100 the cost. But we lost the concept! Another concept we lost was the coal-powered steam train.

Now let me point out that as late as 1965 steam piston locomotives were still more powerful than their diesel counterparts and they were still being used to haul ore over the Rocky Mountains. The fact is steam locomotion is as powerful as you need it to be and the mechanics of it are simpler than today's modernized piston engines. Americans have not only been deprived of superior technologies in our automobiles and trucks, but deprived in the railroad industry as well.

Santa Fe steam locomotive #3768 entered service in 1938. These engines were beautiful, powerful, simple, able to run on coal, oil, gasoline, bean oil, wood chips, etc. and are still used by a few countries. U.S. Railroad Companies began eliminating them during the 1950's, citing higher maintenance costs

In some cases, mechanisms that were locked up and ignored 75 years ago would be revolutionary today in terms of their fuel flexibility.

Let's start with a discussion of steam propulsion and from there progress to the kinds of power systems that were substituted for them. In some cases we have been brought back to square one and in other cases we have been robbed. Note that during the years between 1900 and 1950 there was not a piston diesel engine made that would fit inside a train body which had enough power to pull the heaviest loads. And that should confirm for engineers that steam is actually more powerful and more compact than a piston combustion engine. But this is just a minor point.

Yet this form of propulsion has received nothing but scorn in the United States. This scorn has nothing to do with steam itself, but is directly a result of steam's greater efficiency and the fact that there is no requirement for refined petroleum fuel in order to produce steam. That's the real reason we don't use steam propulsion today; the oil industry demands a vehicle which runs solely on diesel fuel or gasoline.

Steam locomotives are still used in foreign countries such as Russia and China as they can still outperform the modern diesel piston engines that have replaced them in the United States. If only the design was nurtured rather than deliberately phased out, steam powered locomotives could have progressed markedly. Here are a few examples:

## Steam Locomotive Development In The United States

A true summary of how the modern diesel-electric locomotive evolved in the United States is another contradiction in human knowhow brought about by corporate insistence to shun efficiency in the name of monopolization. There are many design configurations that have been developed for steam locomotives over the years beginning in about 1750 when the steam engine was just coming into vogue in America.

As to the actual first steam powered piston locomotive that was ever built in the world my belief is that these were not the first. In the following sections I have separated them into specific power mechanisms and showed the times that these different systems were applied.

### 1750-1944 Steam and Piston

The steam piston powered locomotive has a decisive advantage in that it can start from a dead stop without the need for a gear reduction or a clutch. This is what made steam pistons a natural for locomotive use where a heavy load has to be started from a dead stop. With a steam piston powered design this is easily accomplished.

The engine is also simple to reverse. This is why this design was to enjoy such a long and useful lifespan as the primary locomotive propulsion system employed the world over.

When they needed more powerful locomotives the designers simply had to burn more fuel faster thus to make more steam. As still more power was needed they increased the operating pressure of the boiler. It is possible to get as much power as you want using a steam boiler in conjunction with pistons.

When the Titanic went into service in 1912 she was equipped with two steam piston engines as well as one central steam turbine engine. This was the time just before turbines would start to find their way into a steam locomotive.

The post years of WW1 brought a trend to convert from coal to oil as it was advertised to reduce labor. In the process of "upgrading" to fuel, many ships were also upgraded with turbine engines.

A steam turbine is obviously more efficient than a steam piston engine, but did you know that a steam piston engine is more efficient than a petroleum piston engine? This is for the simple reason that you can design a steam boiler that absorbs much more of the heat of combustion than in a piston engine which dumps its exhaust gasses at 1400 $^{0}$F. This is the major shortfall where petroleum engines lose efficiency.

Steam locomotives can be fitted to run on any kind of fuel that will produce heat in a boiler. This is exactly the reason why there are only a few left operating in the United States today. The result is another entire industry has been lost in the United States.

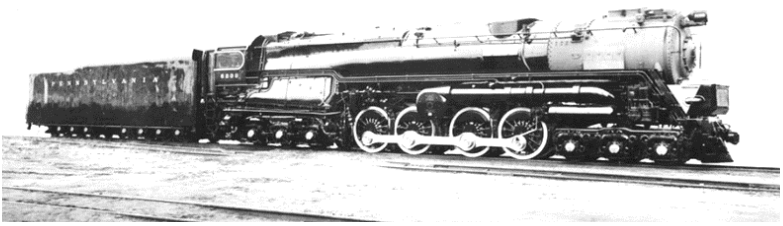
As electric cars, cable cars and electric busses were phased out in the cities, so too were the steam powered locomotives phased out. All were shut down decades ahead of their time, and it was done so all for the sake of Big Oily.

**1944-1949 Steam, Direct Drive Turbine**

Of all the train locomotive designs I have seen this one has to rank as one of the most interesting. The Pennsy S-2 combined the power of steam with the rotary design of the turbine, connected via direct drive gears that kept the design relatively simple. It was able to consistently pull passenger cars at speeds of 100 mph. At slower speeds it got poorer fuel mileage, so they used this as the reason to cancel the design entirely.

What is so unusual about this design is the fact that a steam turbine has the ability to produce torque even at 0 rpm. As a result it could be coupled directly. Understand what this means is when the train comes to a stop the turbine wheel that is connected to the output shaft is at a stop.

A turbine becomes its most efficient at full rpm. But now here is mind-blowing information that reveals a high speed turbine does not need a clutch for starting out. This is reason enough right here to use a turbine design over a petrol design from the beginning.



**Now here's a real locomotive!** The Pennsy S2 direct drive steam turbine built in 1944. The S2's were designed to pull the largest passenger trains at 100mph plus speeds. They were the most powerful direct drive steam turbine trains ever built. The next development was to be the **steam turbine driving electric traction motors.**

Full rpm for a massive power plant turbine is 3600. Full rpm for a smaller turbine is going to be higher. For example the Navy's steam torpedo turbine spun at a reported 50,000 rpm and the Chrysler turbine wound up to 52,000 rpm. That's the inherent beauty of the turbine design itself; the smaller you make it, the higher rpm it can turn, which helps it generate even more power for its size.

The Penny S-2 design did require some large and expensive gear reducers in order to get it geared down low enough to be able to get the train rolling from a dead stop. Steam turbines of this day did not have variable pitched blades and I believe that with time to develop this technology into this design that it could have gone on to become a highly successful locomotive, especially for the higher speeds that companies were seeking to provide their customers after the war.

As it turned out the tide was turned against the direct drive turbine because it supposedly consumed too much fuel when the train was run at slower speeds. In other words, the steam turbine was more efficient than the other designs as long as you ran the thing at full speed, but when they operated at reduced speeds, such as for freight, then it consumed more fuel than the piston engine designs. This could have been solved by reducing the size of the turbine so that it was fully loaded at the slower speeds they needed to operate at.

In addition, the use of variable pitched blades would have allowed a turbine design that performed efficiently in a wider range of load requirements and speeds. This is exactly what Chrysler did just eleven years later in their Turbine Development Program. The Chrysler was a gas turbine as opposed to a steam turbine but the same technology would have been effective. The steam turbine powered direct drive train should have been nurtured, not cancelled and forgotten.

**1948 Steam Turbine/Generator Traction Motors**

Now let's take a look at what were without a doubt the finest locomotives ever designed. They combined the power of steam, the efficiency of a turbine and the transfer ability of electricity via a generator connected to electric drives at the wheels. This is the way a modern power plant that generates electricity operates. It is the most efficient way to convert hydrocarbon fuel or coal into useable energy. This concept was known as the "Chessie" design.


**The Jawn Henry, 1944 to 1958.** This was the first train designed and built in the United States that featured a turbine-electric drive system. The wheels were driven by electric traction motors.

Along with the Chessie design there was another prototype steam turbine electric known as the Jawn Henry. It is written up in the history books as having been too complicated and having nagging mechanical failures. But these should not have been definitive reasons to discontinue the design of a locomotive concept that was both innovative and efficient.

The Jawn Henry may have had a few bugs but its design was truly superior to what we ended up with and are using today; diesel powered reciprocating engines built by EMD connected to a generator.

At least the "modern" American train adapted the electric drive, but they turned around and went back to pistons. This is indeed a step back into the primordial era of petroleum worship.

The revolutionary "Chessie" design continued the use of a boiler to make steam, employed the use of a steam turbine to harness the steam pressure, directly connected to a generator and from there sent the power to a set of electric traction motors at each of the drive wheels.


The "Chessie" 1947, was to be, in the words of then-president Robert J. Bowman, "the finest daylight train in the world." The "Chessie" was to offer all-reserved first-class coach service between the nation's capital city and Cincinnati on a fast 12-hour schedule. Morning departures (8:50 a.m. Washington, 8:30 a.m. Cincinnati) each way would ensure daylight passage through the magnificent Shenandoah Valley, New River Gorge, and Ohio River. In order to make this ambitious timetable a reality, certain concessions were made; only 14 stops were scheduled en route. Moreover, no baggage cars or other head-end equipment would encumber this flyer.

The first nail in the coffin in what was to be the Chelsie was the fact they were publicly committed to protecting the coal market. Thus, the Chesapeake and Ohio Railway chose a technologically-advanced motive power unit for the premier train that would streak through the coal fields. This led to the rollout of the largest passenger locomotive in all history. This was the magnificent M-1 Class steam-turbine-electric. This was a radical design weighing in at more than 428 Tons, without the tender. That was 43 tons heavier than the C&O's own H-8 "Allegheny," arguably the world's most powerful locomotive. The massive M-1 locomotive generated 6,000 horsepower, the equivalent of three diesel powered EMD E7s.

The nose of the locomotive contained the coal bunker. The engineer's cab was placed behind the bunker, followed by the boiler, smokebox and stack. Next came the turbine and generator for the electric motors. The water tender was pulled behind. All this fuel and power culminated in eight traction motors, designating the engine a unique 4-8-0-4-8-4 wheel arrangement (2-C1+2-C1+B).

In its rush to market, the C&O ordered three of the untested locomotives, for a total cost of $1.6 million. By July 1947, No. 500 was on the rails of the Chesapeake and Ohio, emitting not the familiar "chug-chug" of the reciprocating steam engine, but a distinctively constant "whooshing" sound. After a break-in period the "500"was sent on a system-wide publicity tour in December, 1947, visiting the major on-line cities, and an estimated 40,000 persons passed through the cab to inspect the controls. Later in 1948 the locomotive again went on exhibit, this time at the Chicago Railroad Fair.

The postwar period became the most promising era of public transportation for Americans, who at that time were quite used to comfortable travel by railroad. And why shouldn't they have been when they were part of a transportation system that was so much safer and user-friendly? But then the whole program stalled.

"Between its public appearances the "500" did manage to pull a few passenger trains. However, as the reports came back that were published in the press the machines were supposedly hampered by excessive firing rates and poor draft conditions. They supposedly spent as much time out of service as working. And it is no surprise that Big Oily got their wish when in the autumn of 1948 the "Chessie" idea was dropped.

It was later written that the M-1s would never be able to match the diesel's economy or availability. As interest in the turbines waned the locomotives were quietly retired and returned to Baldwin in 1950. This was after nearly two years of service between Charlottesville, Virginia, and Cincinnati.

And so, after all of this splendid engineering and transportation design had been carried out, America somehow managed to end up back at square one. Does that sound like normal progression of industrial knowledge or is it another one of those episodes in the United States that somehow manage to turn innovation into failure? The regression from rotary motion to reciprocating piston is the mark of Big Oily.

**More On The "Chessie"**

There were a number of innovations offered on this train. One of these was the first family coach which contained 32 seats. In this unique concept, you were in the domain of a hostess who offered every conceivable comfort for the traveling family. These included changing rooms and suspended bassinets. There was a glass-enclosed "Junior Club" play area furnished with the latest in children's toys. There was a movie theater with 11 small seats that featured cartoons.

The family coach represented Chesapeake and Ohio Railways's greatest hope in bringing all families to the devine level of train travel. All this and yet the "Chessie" never ran. By 1950, most of "Chessie's" equipment, had disappeared from the railroad's passenger car roster. The most spectacular Domeliner of all time went down in history as "The Train That Never Ran".

**A Summary Of Chelsie Advantages Over Today's Designs**

1. Coal was burned as boiler fuel to make steam.
2. A steam turbine powered the train, the most efficient mechanical design to date.
3. The turbine connected directly to a generator which supplied power to the drive wheels eliminating the need for a clutch, transmission and connecting shafts.

These were all discomforting attributes for Big Oily but the design aspect that posed the greatest danger to the oil industry was the boiler. And as you know, it is those mechanisms equipped with boilers that can run on many different types of fuel. And that could have included bunker fuel, coal, tallow, lard, plastic trash, natural gas and sawdust. That's why we never saw this train.

## 1950-2011 Gas Turbine/Generator Traction Motors

Now we come to another normal evolution of locomotive power. This configuration kept the turbine design but dropped the use of steam. It was like powering a train with a stationary jet engine. It was a better design than a piston engine, but less fuel efficient than a steam powered turbine.

UP 18, preserved at the Illinois Railway Museum.

Of course gas turbines offer advantages over piston engines. There are fewer moving parts, decreasing the need for lubrication and potentially reducing maintenance costs, and the power-to-weight ratio is much higher. A gas turbine of a given power output is one tenth the size of an equally powerful piston engine thus allowing a loco motive to be very powerful without being inordinately large.

But how do you think this story is going to end? Well, there's one big disadvantage with a turbine; its power output and efficiency drop dramatically when the speed of the turbine is reduced. This is what was exploited as a way to make them appear inefficient compared to piston engines. The fact is the GTEL systems were vastly superior for long-distance high-speed runs.

Union Pacific operated the largest fleet of such locomotives of any railroad in the world, and was the only railroad to use them for hauling freight. Most other GTELs have been built for small passenger trains, and only a few have seen any real success in that role.

With a rise in fuel costs, leading to the 1973 oil crisis, gas turbine locomotives became uneconomical to operate. Many were taken out of service.

Additionally, it was reported that Union Pacific's locomotives required more maintenance than originally anticipated, **due to fouling of the turbine blades by the Bunker C oil used as fuel**. Note; if you ran this stuff in a modern diesel EMD engine it would be fouled up and corroded within hours. The gas turbine design never had a chance!

From what I could find, Union Pacific ran a large fleet of turbine-powered freight locomotives starting in the 1950s. Here's an article about them:

> *The GTELs were widely used on long-haul routes, and were cost-effective despite their poor fuel economy due to their use of "leftover" fuels from the petroleum industry. At their height the railroad estimated that they powered about 10% of Union Pacific's freight trains, a much wider use than any other example of this class. As other uses were found for these heavier petroleum byproducts, notably for plastics, the cost of the Bunker C fuel increased until the units became too expensive to operate and they were retired from service by 1969.*

Did you notice the part about the "leftover fuels from the oil industry that were dramatically raised in price"? You would have to be creative in order to come up with a way that pistons could possibly beat a turbine. In this case comparing rot gut cheap bunker fuel to highly refined high priced diesel fuel was their method. Bunker fuel should have only been 1/10$^{th}$ the cost. Big Oily raised the price of bunker fuel which shut down the gas turbine's advantage. No collusion, nothing to worry about here, move along.

In April 1950, Westinghouse completed an experimental 4,000 hp (3,000 kW) turbine locomotive, #4000, known as the Blue Goose, with a B-B-B-B wheel arrangement. The locomotive used two 2,000 hp (1,500 kW) turbine engines, was equipped for passenger train heating with a steam generator that utilized the waste exhaust heat of the right hand turbine, and was geared for 100 miles per hour (160 km/h). *While it was demonstrated successfully in both freight and passenger service on the PRR, MKT, and CNW, no production orders followed, and it was scrapped in 1953.*

Scrapped! The best design ever because it addressed the lost exhaust gasses from the gas turbines. Big oil needed to get this idea forgotten as quickly as possible.

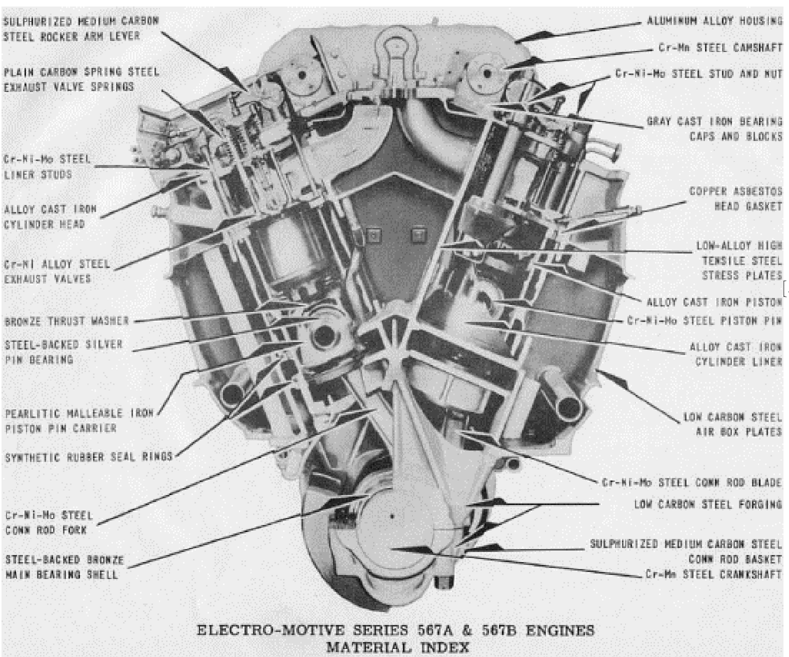
Pictured is a modern Diesel Electric Locomotive. Is it an improvement? Not really. It has more moving parts and uses more expensive fuel.

In 1997 the Federal Railroad Administration (FRA) solicited proposals to develop high speed locomotives for routes outside the Northeast Corridor where electrification was not economical. Bombardier Ltd, at the Plattsburg, N.Y. plant where the Acela was produced, developed a prototype (JetTrain) which combined a Pratt & Whitney Canada PW100 gas turbine and a diesel engine with a single gearbox powering four traction motors identical to those in Acela. The diesel provided head end power and low speed traction, with the turbine not being started until after leaving stations. The prototype was completed in June 2000, and safety testing was done at the FRA's Pueblo, CO test track beginning in the summer of 2001. *A maximum speed of 156 mph was reached. The prototype was then taken on a tour of potential sites for high speed service, but no service has yet begun.* **This is sounding all too familiar!**

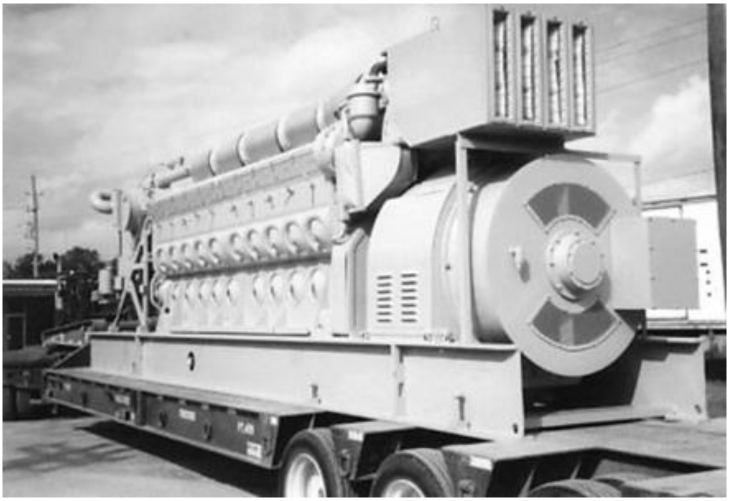
## 1925-2011 Diesel Engine/Generator Traction Motors

Well folks, here in America this is what we're using almost exclusively today. Yes indeed, our shysters in the checkered oil room steered us back to piston engines. Of course, being piston engines they are much larger than a steam or gas turbine, but thanks to a Tight-V design and enough length to get 16 cylinders in total, engineers have managed to get 6400 Horsepower to fit inside the engine compartment. What an accomplishment for the diesel when a steam piston train from 1938 had just as much horsepower.

Moving parts: 16 Pistons, rods, wristpins, bearing caps, 64 rings; All this iron comes to a stop and changes direction 33 times per second!




Cross section and below: State of the art EMD cylinder block configuration that is a necessary design feature in order for the engine to fit within the width of a train car. That seems pretty snazzy, plus over the past 100 years they have figured out the best alloy metal for every single component. They are so detailed that they have lost sight of the obvious: they are shackled to a piston engine design.



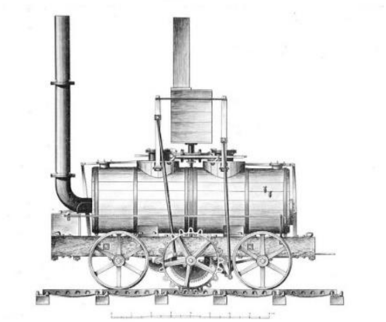
Something seems terribly wrong with this picture when reviewed from an engineering perspective. How could a diesel reciprocating engine ever replace a steam turbine? Considering the additional number of moving parts compared to their steam forerunner, the only way this obvious engineering back-step could have transpired is by inappropriate actions by Big Oily to insure excessive consumption of petroleum type fuels.

It took 50 years of development of the diesel powered electric to develop the same power as the steam powered locomotive. Along the way we witnessed the shunning of better designs such as steam and turbine power and the inevitable "arrival" of the oil-company-approved design; a piston engine.

I'm not saying we don't have a reliable system of travel, but at what cost should it come? The volumes of petroleum material that gets pulled up out of the ground, refined, stored, pipelined, sea-transported, trucked and pumped over and over again from giant tanks and into millions of vehicle tanks is astronomical.

Remember, crust-produced petroleum always brings with it pollutants and toxic materials. These would not be present if we derived fuel and energy from natural sources above ground. The Oil dudes care nothing about our air or our health as they have demonstrated unmitigated preference for piston engines. They only care about consumption and nothing beats a piston engine in this category.

It is doubly shameful to see the pitiful state that our nation's railroads have fallen into. On a per ton per mile basis, these piston driven electro motive trains are barely more efficient than over the road trucks running on the same fuel. So Big Oily added insult to injury when these gluttonous wizards eliminated steam locomotives then switched most of the nation's railroad freight to over-the-road trucking haulers.



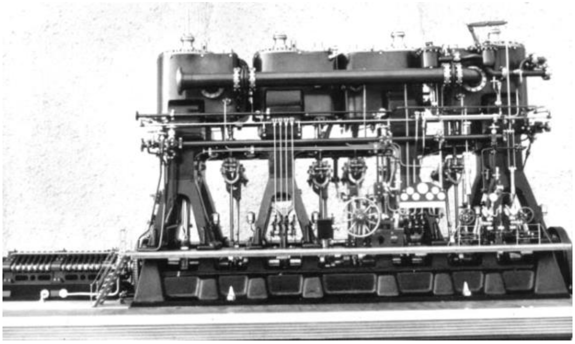
In 1812, Matthew Murray's successful twin-cylinder rack locomotive Salamanca first ran on the edge-railed rack-and-pinion Middleton Railway.


Left, the Doble Steam Car; There were four Doble brothers: Abner, William, John, and Warren. Their father became wealthy, patenting the Doble Pelton wheel. All were at one time associated with the automobile company. Abner Doble built his first steam car between 1906 and 1909 while still in high school with the assistance of his brothers. By 1922, the model E had been developed; this could be said to be the "classic" Doble, of which the most examples have survived. The initial monotube boiler design was perfected into the "American" type. This produced steam at a pressure of 750 psi (52 bar) and a temperature of 750 °F (400 °C). Courtesy: Wikipedia

# Chapter 14

## Steam Turbines And Ship Propulsion

A REVIEW OF PISTON ENGINE development and their continued use in the marine industry is another interesting chapter of the piston story as it gives us a look at some of the most serious propulsion systems. I say most serious because the power needs in the shipping industry dwarf the power needs in the railroad industry. For example, how would you power something as large as a 100,000 ton ship that may find itself alone at sea in 50 knot winds? While at the mercy of the sea and wind reliability and power are at the top of priority. The larger the vessel, the greater the cargo and with this comes the greater potential for loss. Therefore any unplanned shutdown and loss of power is considered a life-threatening emergency.



A model of the starboard engine of the Titanic. Four steam cylinders at the top produce power downward and upward. This would be the equivalent of a modern 16 cyl 4-stroke diesel. The actual engine was 65 ft. tall.

Now it was around 1750 that the Western world began constructing ships that were to be powered by steam engines as well as by wind. The first power plants for ships were a steam boiler in combination with reciprocating pistons. As it turns out this is a remarkably durable design and well suited to the task of driving a large ship at sea. It is again an important point to keep in mind, that a steam powered piston engine is more efficient than a gasoline or diesel powered piston engine. There are two reasons for this:

1. The fuel is used as boiler fuel rather than in a combustion engine. The exhaust temperatures of a boiler are much lower than are the exhaust temperatures of a combustion engine, therefore the boiler is a more efficient means of extracting the heat of combustion from the fuel.

2. The steam piston engine has two power strokes per revolution as opposed to the gasoline/diesel engine which has one power stroke for every two revolutions. That means that a steam engine with two cylinders has the same power as a petroleum powered engine with 8 cylinders.

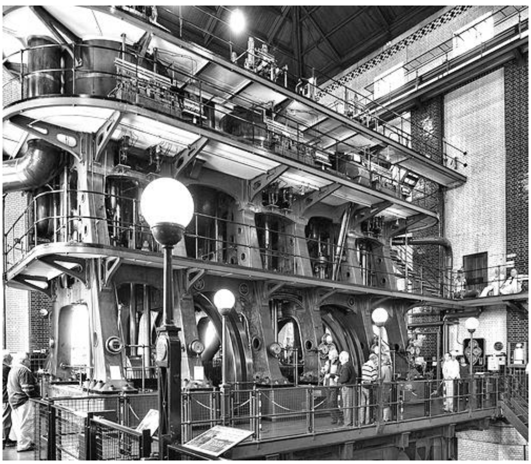
The older way of powering ships was by no means a poor design, quite the contrary. The most important consideration for designing the power plant for a ship is to understand that they require lots of horsepower to move them through a viscous fluid, waves and prevailing headwinds. These steam powered behemoths accomplished this very well in that they were reliable and could run on plain old unprocessed coal.

Steam piston engines had the advantage over combustion engines and steam turbines; they could easily be reversed. The first turbine-equipped ships initially solved this problem by having two separate turbine engines; one was used for forward and the other was engaged only for reversing.

Never forget: gear reducers rob horsepower and are very expensive. The steam piston engine design eliminates the need for a gearbox. In addition it solves the problem of coming to a complete stop. When the pistons and rod come to a stop, heat energy is saved and stored in the boiler.

The steam piston engine did not need to be geared down nor did it need a clutch. Later, the steam turbine would require a gear reducer in order to couple the power to the propeller shaft, but it would not require a clutch. **Only the combustion piston engine required both a gear reducer and a clutch.** Therefore the steam piston engine remained competitive even to this day for the fact that it is simple, powerful and extremely reliable

A steam turbine will save much weight, but as we will see, unless you connect it via generator-to-electric drive, the cost of the installation (because of the requirement of a high speed gear reducer) will cause most shipbuilders to use steam piston. Actually the industry has slipped back into the most primeval days yet of power evolution by dropping steam piston, shunning steam turbine, being shut out of gas turbine and ending up with diesel piston engines with gear reduction. What is being built today as standard propulsion for cargo ships is madness.



The world's largest triple expansion steam pumping engine still in operation, at Kempton Park Steam Museum, London.
62ft high and weighing 800 tons, the 'Sir William Prescott' is the size of the engines on RMS Titanic. It has been restored to working order and can be seen running on steam on certain weekends during the year. Note; this engine is so large and turns so slow it does not need a gear reducer.

Back to steam piston engines; they have about the same efficiency under light load as under heavy load since the extra heat energy is simply stored in the boiler as increased pressure. These same reasons why the steam piston engine was utilized at sea for over two hundred years still exist today. These inherently good qualities of steam and pistons were not easily overcome with a turbine engine because it is designed for high rotational speeds. For us to believe that steam pistons engines have been overcome and outdone by the diesel piston engines of today is to fall for the Big Oily mind game.

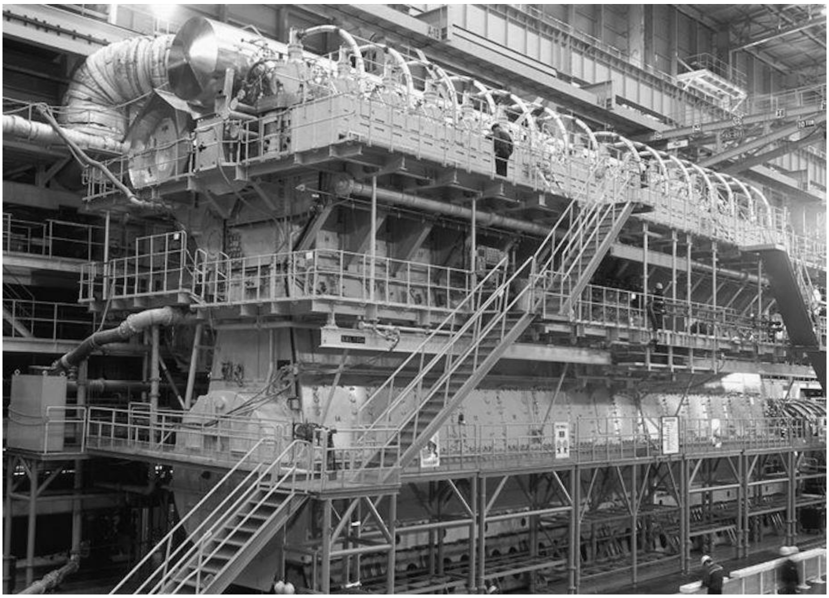
These inherent advantages of the steam piston over the steam turbine were only overcome by mating this kind of high speed shaft horsepower with an electric generator for the means to couple and transfer the incredible horsepower of a steam turbine. This type of arrangement allowed the full utilization of the package in the most simple and compact and lightweight package available. This would be comparable to the technology of the Chessie steam turbine train. Thusly within the shipping industry their developed a far superior system which should now be utilized to a great extent in ships all over the world.

Unfortunately, just as we saw in the Chrysler Turbine Program and the Chessie Steam Turbine Locomotive, what is happening is repeated ignorance and the shunning of superior power mechanisms. I am sorry to report that ship propulsion is going down the same misguided path as the public transportation sector but the continued reliance on petroleum piston engines which burn primarily diesel fuel makes this an obvious plot. To not use steam piston but do use diesel piston is crazy. To not use electro-mechanical coupling devices but do use gear reducers and clutches is pure insanity.

I will briefly mention that there is one more important component to a complete and properly designed turbine-electric propulsion system and that is the addition of storage batteries. The storage batteries are able to take any extra power that is generated by the turbine and store it for future use. That makes it possible to run the turbine now at its full rpm where it is most efficient, just like they do at the electric power plants.

When extra power is needed, such as when the ship is just starting out from a dead stop, the stored energy in the battery is utilized for this short high-load condition. This allows the ship designers to select a much smaller turbine from the get go. The smaller turbine is properly sized to be kept running at full rpm and maximum efficiency all the time the ship is underway. Think of it as a battery charger. When the batteries are fully charged, it is shut off. Actually it is idled, but this takes very little fuel to just spin turbine blades.

Today it is primarily the military which utilizes these superior gas turbines and steam turbines even though they have been available for decades. Meantime, the oil producers have sunk to the level of equipping their giant tanker ships with giant piston engines. This is reminiscent to the era of the Monitor and Merrimac.



The first 14-cylinder Wärtsilä RT-flex96C marine engine has a maximum continuous power output of 80,080 kW (108,920 bhp) at 102 rpm. Measuring 27.3 m long and 13.5 m high, it has an overall weight of 2300 tonnes.

The largest container ships, such as the Maersk, claim to be the most efficient but have in fact gravitated back to the use of monstrous piston engines. Shown is the 800 Ton two stroke piston engine built by Wartsila that produces 110,000 Hp. They run on bunker fuel which is a little cheaper than diesel, but these engines are of just slightly better efficiency than a standard diesel.

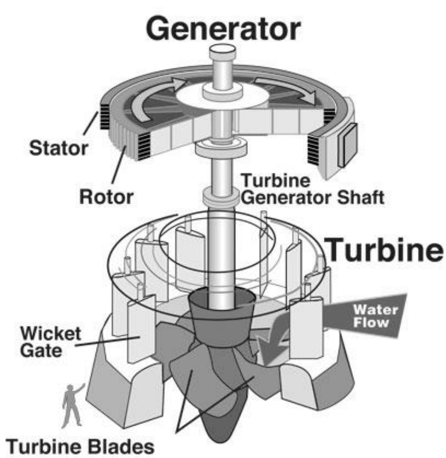
The one shown above has a 6 to 10 foot stroke and turns at only 50 to 75 rpm. This allows it to be direct drive connected to the screw, without the need for a gear reducer. That does make some logical sense. It represents a savings in weight, expense and lost horsepower through reduction gears, but we have to remember that steam engines did the same thing with fewer moving parts.

The manufacturers of these amusing relics of the past will be more than happy to quote you all of their supposed advantages over engines of the past. Just keep in mind this engine is upwards of 70 feet tall and weighs enough to equal 20% of the ship's total cargo capacity. All this weight has to be pushed through the water, which compounds the fuel consumption. The additional fuel the ship has to carry to push this extra weight takes an additional cut out of the cargo. The oil industry doesn't care how much fuel they burn moving the fuel itself; it just helps add to the price.

The public transportation sector did embrace superior technology and the use of turbine powered electric propulsion during the first half of the 20th Century. Unfortunately, since this time, most of the gains have been taken back by the oil industry itself.

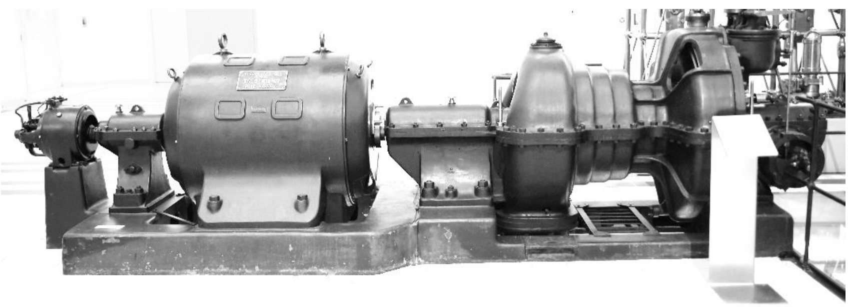
## More On Turbine Technology

The use of the turbine to harness steam, when used in conjunction with the electric generator and storage system is a quantum leap beyond the steam piston engine. So we will want to learn more about the design and the way to understand how a turbine works is to first study water turbines. Below is a diagram of a hydroelectric turbine. This turbine wheel is designed and built to capture the energy of falling water.




In the case of a steam turbine it operates along the same principle, however since it is a flow of gas rather than a flow of water, which is much less dense, more blades are required and the spaces between them much reduced. The important concept to note is the fact that whether it is water or air (steam vapor) that you are harnessing, both have similar flow characteristics, thus both can be harnessed using turbine technology. In the case of using a gas in place of water you just turn up the rpm to the point where the gasses are squeezed tightly as they pass from one set of blades to the next.

Below is a steam powered turbine-generator device from 1910 that represents the quantum leap in engineering that took place at the turn of the century. At first glance it may not look like much but it represents the brilliant union of steam to a steam turbine that is direct coupled to an electric generator. This is the same type of system that is used today in virtually every major power plant in the United States. There is no need for a reduction gearbox, thus saving space, weight and frictional losses.



Steam turbine generator set with multistage steam turbine (right) and cylindrical AC generator (left). A tube condenser for the exhaust steam is set beneath the turbine. Turbine: System Melma-Pfenninger, made 1910 by Maschinenbau A.G., Prague, rating 331 kW, rotational speed 2000 rpm. Generator: made 1910 by Elektro Akt. Ges., Prague, rating 250 kW.

The reason this system has prevailed is for the fact that it is the most efficient way to convert hydrocarbon energy into useable electrical energy. The use of the direct-drive-steam turbine provides about 80% of the world's electrical energy. This is proof that it is the most efficient system. Today, except for third world countries, you almost never see a power plant that is powered by reciprocating engines. There are some of these old plants left over in many countries that today serve as backup units or peak-demand units, but they are horribly inefficient and consume expensive diesel fuel, thus helping to further drain these poor people dry.

## A Design Flaw In Today's Nuclear Powered Plants

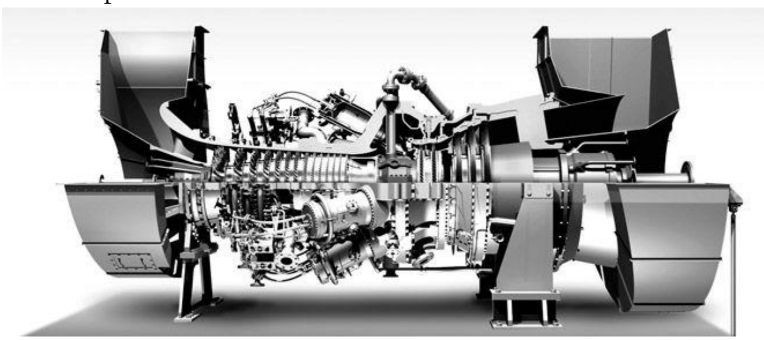
In a normal coal fired power plant the turbines used for electric power generation are directly coupled to their generators. Power plant generators must rotate at constant synchronous speeds according to the frequency of the electric power system. The most common speeds are 3,000 RPM for 50 Hz systems, and 3,600 RPM for 60 Hz systems. Here in the United States our electrical power steam generating turbines operate at 3,600 rpm. To increase efficiency they are designed for high steam pressures of 1200 psi.

Wait for this! "***Since nuclear reactors have lower temperature limits than fossil-fired plants, with lower steam quality, the turbine generator sets may be arranged to operate at half these speeds, but with four-pole generators, to reduce erosion of turbine blades."***

In other words, in the nuclear plants they can't run nearly as high of a steam pressure because this would not allow them to cool the core of the reactor enough. So they use 600 lb. steam instead of the normal 1200 lb. steam that is standard in modern coal and natural gas fired plants. This is just part of the reason why electricity produced using nuclear power is four times as expensive as producing it from petroleum or coal.

## Gas Turbines

Sometimes you will find a mid-sized plant that is powered by a gas turbine. Gas Turbines do not rely on steam but instead combust petroleum fuels inside the turbine. The combustion



Kawasaki three phase 120 Kw gas turbine generator. A steam turbine would not have the front compressor of this rotary design, as the steam is pressurized beforehand in the boiler.

chamber is made by compressing air which enters at the front end of the turbine, then it is fueled and ignited in a small chamber between the compressor stages and the power stages. The exhaust gasses exit the rear and much heat is lost. Gas turbines are still much more efficient than a piston engine, offering up to 100 times the horsepower for the same weight engine. But they are not as efficient as a steam turbine because they lose so much exhaust heat.

Gas Turbines typically run on natural gas, diesel fuel, bunker fuel, kerosene and jet fuel. Note that these hydrocarbon fuels would best utilized as boiler fuel to produce steam.

Looking at various types of methods currently used to burn hydrocarbons for the purpose of generating electricity, we would start at the very bottom of efficiency and that would be a system that burns gasoline in reciprocating engines. Next up the ladder would be a system that burns diesel fuel in a diesel type reciprocating engine. Next up the ladder would come a properly designed gas turbine running on whatever was the cheapest boiler fuel at the time. This package would dramatically outperform a diesel engine, and it does so with approximately 1/10 of the weight of ground based stationary applications. By the way, this advantage drops to 1/100 the weight of a comparable piston engine in the aviation industry.

A gas turbine can be made more efficient by capturing the exhaust heat, and the best way to do this would be to couple it with a Stirling Engine. They can't allow this of course. What would happen is this; First they would be very impressed with the added efficiency that the Stirling engine provided to the overall efficiency of the plant. Later, however, they would realize that if they had built a larger Stirling engine from the get go and cancelled the gas turbine they would have had an even more efficient system yet. Plus, it could run on virtually any kind of fuel. Well, you know Big Oily can't allow this.

Gas turbines are more compact, cheaper, lighter, easier to maintain than piston engines, but unfortunately if you design the engines too large, such that they are running in a slightly throttled-down mode, they will waste fuel. I believe that they have deliberately done this such that they can use these fuel wasting incidents against the design of the turbine itself. And to my amazement it looks like what they have done has worked. After all, we are still falling for the piston engine over and over again. They keep telling us they are making them more and more efficient and we keep getting the same mileage, don't we?

Gas turbines should either be used in stationary applications where they are operated flat out all the time, or they should be minimized in size and connected electromechanically, relying on a storage battery to supply the short high-load demand situations. These are the only engines that are powerful enough to power the Abrams tank, so figure that we have just scratched the potential of this type of engine.

It is indeed a mystery as to why the gas turbine engine is not supplied a water-emulsified gasoline and/or diesel mixture as the efficiency could be greatly improved with the addition of super heat steam expansion like the WWII torpedo. Lloyd's of London, you noticed in the first chapter, has approved the use of emulsions. The only thing holding back their use is the oil industry.

## Steam Turbine Development In Ships

By the late 1800's the steam reciprocating engine had reached its pinnacle and for military ships there seemed to be no further avenues for improvements in efficiency. In the heaviest ships, such as the military dreadnoughts or battleships, the need to get more power caused them to build larger and larger engines. Now the size of these massive moving components was imparting vibration both to the engine, causing it to breakdown, and to the ship, which was particularly unwelcome in lavishly decorated ocean liners.

The problem in engineering the steam turbine in place of a reciprocating piston engine was that while a reciprocating engine utilizes the pressure of steam the turbine principle uses the speed of steam, and that is fast; 2,000 mph is fairly typical of a moderate power boiler. In order to utilize this energy, pressure and kinetic energy, the turbine blades have to rotate at least one half of the speed of the steam jet.

> “Even by the 1880's it was just not possible to construct a device that could rotate at those speeds without melting or flying apart. It is the speed of the steam that powers a turbine. They transform both pressure and linear energy, such as wind, into rotary energy. But in 1884 Charles Parsons patented the first workable turbine.
>
> The method he used still forms the basis of turbines today, including the gas turbines used in jets and modern warships. Parsons took a tube and down its inner length he set rings of angled blades. He then set a cylinder in the tube which also had rings of angled blades. Steam is fed into the tube at one end, passes through the first set of fixed blades and hits the first set of blades of the cylinder at an angle. Rotational velocity is imparted on the cylinder and it begins to spin. The steam passing through the rotating blades hit the next ring of fixed blades and it is this effect that impedes the steam, causing a pressure to build.

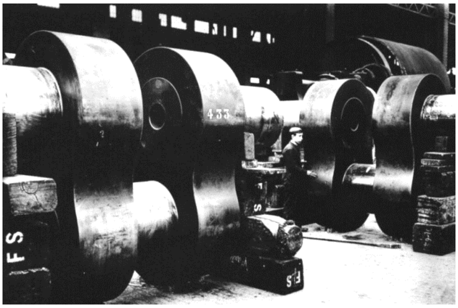
By careful design of the interacting blades the ideal pressure differential is created to spin the cylinder.

The British Navy became interested enough to warrant a commission to Parsons to begin equipping new warships with steam turbines. In 1902, HMS Amethyst was one of four sister cruisers being built while the other three received standard reciprocating engines. The performance comparison deeply shocked even the conservative admiralty such that in 1905 the committee recommended that all future warships be equipped with Turbines. The first to be rushed into production was a big gun battleship equipped with turbines known as HMS Dreadnought in 1906.

The value of the turbine cannot be measured in speed alone. Power for weight the turbine was lighter and more compact than the reciprocating engine and with less vibration. This made for a more stable gun platform which effectively increased the accuracy and range of the guns. At top speed the reciprocating engine was at the limit of its capability and susceptible to mechanical failure, but the turbine reached its peak efficiency at top speed.

This activity was not lost on the great merchant entrepreneurs of the time. In 1901 the King Edward became the first Turbine Passenger vessel, operating on the Clyde, several smaller ships followed but it was in the big liners that the Turbine proved its full worth.

The Virginian and Victorian were the first turbine equipped liners, each of 13,000 tons. They were followed by the 30,000 ton Cunard Carmania, who had a sister ship the Caronia. **Their comparison in speed, fuel consumption and engine space savings spelled the death of the reciprocating engine in high**



Crankshafts for the Titanic's steam powered reciprocating engines. The sheer weight of the moving parts in these high power marine reciprocating engines caused problems with vibration, wear and reliability.

> **performance ships.** Later, Lusitania and Mauretania of 38,000 tons were to follow with Turbine engines providing 70,000 Shaft Horsepower.
>
> Although the turbine was not efficient in slower cargo ships and never fully replaced the reciprocating engine there, it did augment many. Parsons went on to invent a secondary turbine which utilized the waste low pressure steam from the primary reciprocating engines. This turbine was geared into existing shafts and provided improved fuel economy on long journeys such as of the order of hundreds of tons of coal per voyage.
>
> The Titanic's central shaft was turbine driven and the outer two shafts were driven by giant piston reciprocating engines. For its day this was considered the best package for both reliability and fuel economy." Wikipedia

During the next two decades Parsons developed gear reducers of a high enough quality to handle the high speeds and power of the turbine. Later, a superior alternative to mechanical gearing was developed by coupling the turbine to a generator which in turn powered an electric motor. In World War II the Buckley Class Destroyers of the United States Navy used such a system.

## Ship Propulsion Trends

Today the shipping industry's embrace of the steam turbine electric has been scaled down by the use of gas turbines in place of steam turbines. This is for the simple reason that with the gas turbine there is no need for a boiler. But make no mistake, there is much more efficiency in the use of steam rather than using a type which burns petroleum fuel to create pressure.

Today almost all gas turbines are only fitted on military ships. The fact is gas turbines would be a much better propulsion system for passengers and freight, especially if they were electrically connected rather than mechanically. When coupled to a generator, which eliminates the need and expense of a gear reducer, they are far superior in performance and efficiency.

But the shipping industry has only cow-towed to the petroleum industry. When you read their engineering brochures they only blather about newer, larger piston engines that have relatively flat (predictable) fuel consumption at slow and moderate speeds. They fail to mention that this is not a factor when evaluating an electro-motive design where the turbine is simply set up to run at its most efficient power to horsepower setting all of the time except when idling.

You have already seen what happened in the railroad industry when the Chessie program was scrapped, resulting in the end of boiler steam power. And since only a few people had really known what happened, all it took was some time to pass for its wonderful design merits to be forgotten. Such is the fact that water-to-steam produces more expansion than fuel-to-combustion gas which requires an extra compression stroke. It's like it never existed. These piston engine designers are weird folks.

Water to steam produces more expansion than petroleum combustion. This means that ever since the demise of the steam turbine boiler, ship propulsion evolution has been a pathetic crawl back in time toward the dark end of the cave where the piston engine was born.

Remember, when you turn up the boiler pressure, a steam turbine becomes more efficient. That's because you get all of this extra pressure free just by increasing the operating temperature. Today the world's most modern electrical generating plants are steam powered ones with pressures of 2400 psi operating at $1000^0$F and operate to 40% efficiency. Imagine the gains in modern propulsion efficiency if we were utilizing these higher pressures today in our ships and equipping them with steam turbines.

Nuclear powered ships operated by the U.S. Navy cannot utilize this kind of high pressure technology for the reason that a nuclear reactor has to run a lower temperature of steam in order to keep the reactor from overheating. Therefore, they run on 600 psi steam instead.

Regarding the use of gas turbines, the only place where we find these is in military ships and tanks. There was a period of time when some commercial ships were outfitted with a gas turbine, but **now virtually every manufacturer has retreated back to large piston engines.** Yes, you are reading this correctly. The marine industry has become, for all practical purposes, part of the petroleum drainfield.

And let us ever remind ourselves the use of water injection is still rarely practiced and even more rarely discussed. This would provide increased performance even for these piston engines. It would markedly increase the performance of gas turbine engines, if allowed. Their failure to utilize such an effective idea that is free delineates that the industry wants us to forget about the use of water in our combustion engines. Of course they do; it's another manner of producing and harnessing steam.

## Ship Propulsion Today

Let's start with a moderate sized ship less than 10,000 tons. Ships of this size will generally have medium speed engines that operates at around 500 rpm. These come in a two stroke type and a four stroke type of diesel piston engine with a preference for two cycle due to its higher power to weight ratio. These engines start at the size of a railroad engine, roughly 6,000 horsepower, and from there with increasing numbers of cylinders and longer strokes top out at 20,000 horsepower in a 20 cylinder configuration.

Since these engines are turning a shaft that is too fast for most large propellers they will require some form of gear reduction. These will generally be mechanical drive into a gearbox connected to the propeller shaft. They can also be purchased as a gen-set to power drive motors, but for reasons beyond logic, you will rarely find this superior form of power coupling than on cruise ships. Cruise ships do employ a gen-set system that connects with electrical pods connected to propellers which are completely outside the hull. This saves the weight of a long heavy driveshaft and allows the propellers to be directionally rotated for steering.

The electro-mechanical swivel drive provides a significant improvement in former ship handling characteristics allowing these vessels to eliminate the need for rudders and thus saving drag. But the main gain in efficiency is from the power saved by not having to go through a gear reducer connected to a heavy shaft which must ride on large bearings. So even when forced to utilize a lowly piston engine as the main power-plant on the vessel, the generator-to-electric drive motor does improve the efficiency. However, this feature just scratches the surface of the wellspring generated by the electro-mechanical concept.

The combination of the electro-mechanical drive with the efficiency of a gas turbine could provide dramatic efficiency especially if the exhaust gasses of the turbine were utilized for a secondary steam plant or Stirling engine. If a gas turbine is properly sized and direct-connected to a generator it will outperform a piston engine and increase the cargo carrying ability. A steam powered turbine would of course be even more efficient.

## World’s Largest Marine Diesels

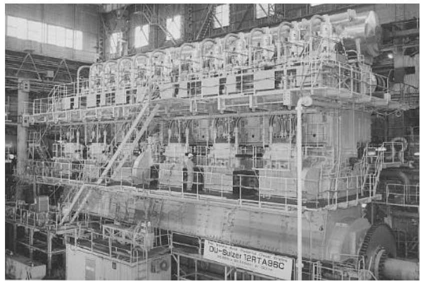
.

As of February 2023 the largest marine diesel engine I could find is the Wartsila RT-flex96C. This is the same engine as on page 270.

Below is the company’s sales brochure:

> “The World’s Largest Marine Diesel Engine. The world’s first 14-cylinder low-speed engine entered service on 1 September 2006 in a large, fast container vessel. Developed by Wärtsilä Corporation, the 14-cylinder Wärtsilä RT-flex96C engine is also the world’s most powerful engine with an output of 80,080 kW (108,920 bhp) at 102 rpm.”

> "The 14-cylinder Wärtsilä RT-flex96C engine is a major breakthrough for ship propulsion. It extends the power available to suit the new generation of large containerships while combining the benefits of proven, reliable engine designs with the complete flexibility of RT-flex common-rail technology."




> "Traditionally low-speed marine engines have been built with a maximum of 12 cylinders. However, when it was recognized some years ago that envisaged container ships would need more than was available from existing RTA96C and RT-flex96C low-speed engines, a solution was found to extend the engine power range to 80,080 kW by offering also 13- and 14-cylinder engines."

So much fanfare over the number of pistons! They could have increased horsepower just by using a more powerful fuel. What is this more powerful fuel? It is the existing fuel mixed with water, methanol or both. Continuing on:

> "The 14-cylinder RT-flex96C is thus based on an already well-established 12-cylinder RT-flex96C design, which itself was developed from the RTA96C engine type widely applied in container ships since 1998. It thus benefits from the wealth of service experience with engines of the same type. To date there are more than 300 RT-flex96C and RTA96C engines in service or on order worldwide."

> "The crankshaft of the RT-flex96C has sufficient torque capacity for 14 cylinders, the material having been upgraded to enable an increased shrink fit for a greater design margin. The thrust bearing structure in RT-flex96C engines with a mid-gear drive has been revised to reduce deformations and stresses even with the increased thrust in the 14-cylinder engine when the vessel is equipped with a shaft motor."

Try to picture in your mind these mammoth-sized parts coming to a stop and changing directions 3.4 times every second? And remember the wasted energy to turn a valve equipped reciprocating engine robs approximately 30% of the total horsepower it produces. That's over 30,000 horsepower in the 14 cylinder version. That's a lot of extra fuel burned just to make the engine rotate. That's why Big Oily loves this design.

Then there's the weight and space to consider. The amount of iron here is going to cost thousands of tons of lost cargo on each trip. The added fuel that it burns has to be carried aboard which compounds the rate of fuel consumption. Every extra pound that a ship carries has to be pushed through the water.

I can't understand why the industry puts up with such a heavy design, other for the reason of maintaining the status quo on what a ship's fuel consumption is supposed to be. Folks they can make all the claims they want as to how brilliant they had to be to design an extra two cylinders into an engine that already had 12 cylinders, but in reality this is a bulky design with an exceptionally long crankshaft and an obscene number of total moving parts. Continuing:

> "An important feature of the first ship installation of the 14RT-flex96C is the high-efficiency waste heat recovery system. It contributes major savings in fuel consumption and reductions in exhaust gas emissions. Exhaust gases of the ship's main engine pass through an **exhaust-gas economiser to generate steam for a turbine-driven generator.** The turbo-generator set **also includes an exhaust-gas power turbine driven by a portion of the exhaust gases** diverted from the main flow through the engine's turbochargers."

Wow! Isn't this mind-blowing information! Here are fuel-enhancing solutions that would make all combustion piston engines more efficient. Note that this one engine is powering two turbine type engines off its exhaust heat. Engineers can't see the forest for the trees! They don't need to harness the wasted heat from the big piston engine; they need to get rid of the big piston engine and start with heat from a gas turbine engine.

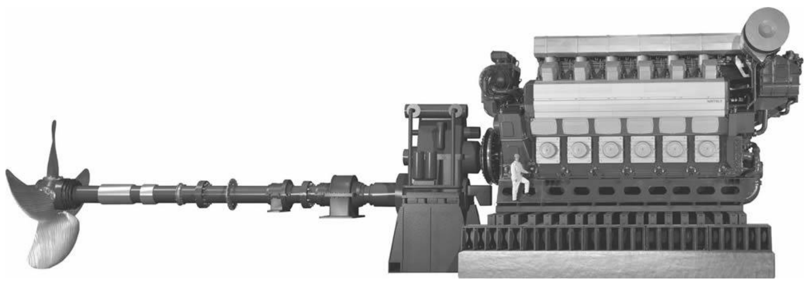
> **"This high-efficiency waste heat recovery plant can provide an electrical output of up to about 12% of the main engine power.** The generated electricity is supplied to the ship's main switchboard and employed in a shaft motor to assist in ship

> propulsion. A portion of the steam from the exhaust economizer is utilized in shipboard heating services."

That sure is interesting to know and I wish Ford or GM knew that. We could improve our current engine efficiency by 12% if we recovered our exhaust gas heat.

Big Oily is exposed in the shipping industry, just as in the auto and railroad industries, but none of them are able to work together and connect the dots.

So here we are today: The largest container ship as of February 2023 is the vessel Ever Ace, 400 meters in length with a



carrying capacity of 240,000 Tons. And like the Maersk, it utilizes a Wartsila 2 stroke piston engine, although it is only 11 cylinders in size.

Now for vessels that are between 10,000-100,000 tons the power plant may be more like this midsize engine. Today, a typical ship that is more than 10,000 tons will have one or several large slow-speed 2 stroke diesel engines. These engines make railroad diesels look like toys. You can see in the picture how large they are compared to a man. Do you see him? The engine is 34 ft. tall.

The pistons in this particular 6 cylinder engine are 38 inches in diameter and the stroke is 6-10 feet depending on configuration. You can power a super tanker with a couple of these! And if you still believe that piston engines are still under consideration in the 21st Century, then this might look like an improvement as it replaces former designs that were even larger.

## Ignoring The Steam And Gas Turbine

One of the much desired benefits of the aero-derived engines or gas turbines is the short amount of time for the engine to reach full operating temperature. This is due to the relative small amount of material used in the construction of the engine itself as opposed to a steam turbine with boiler, and the more common diesel engine. Both a boiler and a large engine made of iron have to reach proper temperature before being fully loaded. This could take up to six hours in large vessels.

With the experience gained since the first gas turbines in the 1940 and recent developments of fast ferries, ship owners realized that a fast vessel could be profitable and that consumers would use it. This has given way to some growth in this field. Still and by far the most common type of marine propulsion has gone the route of the piston engine.

A piston engine that is connected to a gear reducer is the worst power device. Direct drive saves gear reducer loss. Electro-motor powered by a piston engine is better. It remains about our only choice over and above conventional engines with transmissions.

During the early era of gas turbine fuel comparisons verses piston engines, the data came out that the piston engine was somehow better. And during the process the industry seemed to forget that steam performance had been a proven performer as well, especially if modern materials and engineering had been applied. This is the biggest mistake they could have made. Notice how we keep getting derailed from water technology!

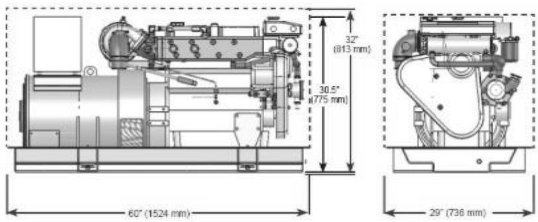
A ship's propulsion systems should be connected via an electric generator or gen-set. This is a far superior way to connect the drive train. But the fact is, it can't really make that much of a difference when diesel powered pistons remain the selected power driver. Still, there is a way to dramatically improve this system, and that is to simply add a battery storage block that can provide full power for a few minutes to an hour.

By having some extra juice that is always available from a battery, it is possible to dramatically boost amperage for short bursts of power. When a ship is starting out is generally when it needs the strongest thrust from the engines. Once a ship is moving at cruising speed the engine is generally throttled back. Now, by sizing the engine horsepower to this throttled back requirement, you can design

| | |
|---|---|
| **AC Output[1]** | |
| **38 kW** | 60 Hz, 1800 RPM, 1 Ph, 1.0 PF, 120-240 V/158A, 120V/316A |
| **32 kW** | 50 Hz, 1500 RPM, 1 Ph, 1.0 PF, 220V/145A |
| Voltage regulation | ±1% |
| **Lugger L944T Engine** | |
| Type | Vertical inline 4 cylinder diesel |
| Displacement | 203 in³ (3.33 ltr) |
| Bore | 3.70 in (94 mm) |
| Stroke | 4.72 in (120 mm) |
| Aspiration | Turbocharged |
| Fuel System | Bosch type inline injection pump |
| HP @ RPM | 60.0/1800 50.0/1500 |
| **Approximate Fuel Usage** | |
| 1800 RPM @ full load[2] | 2.8 gph (9.8 lph) |
| 1800 RPM @ half load[2] | 1.5 gph (5.3 lph) |
| 1500 RPM @ full load[2] | 2.5 gph (9.5 lph) |
| 1800 RPM @ half load[2] | 1.3 gph (4.9 lph) |
| **Installation Data & Weight** | |
| Wet exhaust elbow | 3 in (76 mm) OD |
| Raw water inlet | 3/4 in (19 mm) OD |
| Fuel inlet and return | 1/4 inch NPT |
| Approximate dry weight | 1417 lbs (643 kg) |

1. Based on SAE J1995 and ISO 3046.
2. Actual fuel consumption will vary depending on operating conditions.

**M944T Dimensional Drawing**




**M944T Overall Dimensions L x W x H:** 60 x 29 x 30.5 inch (1524 x 736 x 775 mm)
**Overall Dimensions with sound enclosure L x W x H:** 60 x 29 x 32 inch (1524 x 736 x 813 mm)
Dimensions given in inches (mm). Dimensions subject to change without notice.
Contact dealer or visit www.northern-lights.com for most current installation drawings.

the ship with an engine of ¼ the size of the normal engine. Smaller engines weigh less, take less space, and require less energy to make them run. Finally we can forget about designing the boat around the giant behemoth formally known as "the engine".

Shown above is a typical piston powered generator set. It is a superior system than mechanical drive but still a bit archaic due to its employment of a piston engine. The fact is this and all piston-electric packages sold in the year 2023 are an engineering joke.

Still, it is possible to achieve some fuel savings with this package if a storage battery can be included in the electric circuit that supplies electricity to the propeller motors. For example, let's say you just need 60 kW to push your vessel at hull speed. The package above is rated to handle a continuous load of 60 kW, so you equip your vessel with it. Now during normal cruising operation you will be running a small engine at full load verses a large engine at light load. Of course, this system will not supply you with enough power when you are starting out, so in this case you add batteries to your system. Now you can run with the smaller engine because when you need the power of a big engine you can pull juice from the battery.

Diesel-electric trains use this system with the exception that they do not carry batteries. So when this type of train is starting out the engines are running at full load and once the train is up to speed the engines are throttled back down. The system is more efficient than a direct drive with transmission and clutch because it doesn't lose energy in gear reduction and rotating inertia. However, utilizing a gas turbine would save tens of tons of weight which would enable the train to carry more cargo. This added weight doesn't hurt so much when transporting freight via steel wheels on steel tracks but when you put added weight into a floating ship it dramatically increases the displacement.

Increasing a ship's displacement kills fuel consumption. This is why turbine engine generators coupled electrically to the ship's propellers should be a standard package in every vessel today, not just military ones.

At this point we have seen how the automotive, rail and shipping transportation propulsion systems have undergone what looks like normal evolution, but in fact have gradually morphed back into the predominance of piston engines. And although they are slightly more efficient than the same kinds of engines of a century passed, they still consume almost the identical amounts of petroleum as before.

We will now review a transportation system that has become the least efficient of them all.

The modern steam turbine was invented in 1884 by Sir Charles Parsons, whose first model was connected to a dynamo that generated 7.5 kW (10 hp) of electricity.[10] The invention of Parsons' steam turbine made cheap and plentiful electricity possible and revolutionized marine transport and naval warfare.[11] Parsons' design was a reaction type.

# CHAPTER 15

# The Modern Airline Industry

## Piston-Powered Aircraft From The 1950's
### Were they really as fuel-efficient as the latest passenger jets?

AS I WAS RESEARCHING the trends in engine designs with regard to aviation transportation I was fortunate enough to find a technical paper that had been produced in Germany by the National Aviation Laboratory, NRL in 2005 that had examined exactly what I was looking for. Inside the report it compares airline fuel-efficiency from prewar days to airline fuel-efficiency today. Their research led to the conclusion that the fuel performance of modern day passenger aircraft compared to piston driven aircraft from the 1950's has remained unimproved. In fact it goes on to report that on a per passenger mile basis, the most efficient modern aircraft, the Airbus A380, has just now managed to match the fuel-efficiency of the 1950's piston engine powered Lockheed Constellation shown.

This is one of the most efficient fixed-wing aircraft ever built, the piston-powered Constellation of 1955.

When I first read this article I didn't know what to think as the summary of their research did not make engineering sense. How was it possible that these turbine powered planes could be consuming even more fuel than piston engine powered planes? These new turbine engines put out 100 times as much power per weight of a piston engine, yet they weren't able to improve the efficiency of the plane! I knew I had to find the full story.

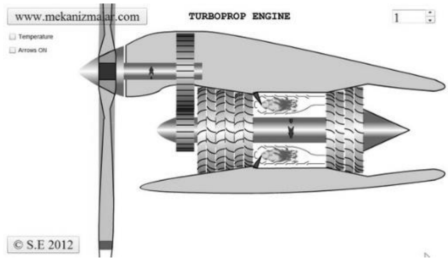
The flow of air into a turbine is open and straight, making them much more efficient at compressing air into the combustion chambers and expelling it out again. This is where a piston engine is at its worst, having to do an extra stroke just to get air into itself. More drawbacks emerge for the piston engine, such as friction losses between rings and pistons, plus self-cancelling momentum dynamics caused by pistons being stopped and started.

For all fixed wing aircraft that rely on fuel-powered engines to keep them aloft, weight means everything. There is no possible way that a piston engine could come close to the performance of a turbine. Could it be they found a way to sabotage the performance "numbers" of the turbine?

Another possibility for such poor fuel performance from such a modern engine is the possibility the engines were installed into a non-streamlined design and flown too fast. I wondered if these airline designs, that feature engine pods hanging below the wings, are simply being flown beyond the point where they still maintain laminar flow.

The jet engine of an airliner and the gas turbine of a ship or train operate the same, or at least we are taught that way. As air goes in the front, it is compressed in a first stage, then it is directed into a combustion flask, charged with fuel and ignited. Ignition causes combustion leading to high pressures. Since the turbine gasses only flow in one direction it leaves no choice but for the expanding gasses to exit the rear, through the second stage (which is what is driving the compressor in the first stage).

A jet engine is set up to release all of its exhaust as thrust whereas a gas turbine engine will be direct coupled to a generator, gear reducer or propeller (turbo-prop). A turbo-prop is more




efficient than a jet but does not have the top speed potential. All piston aircraft should have converted to the turbo-prop design 100 years ago. Airliners today could operate with much less fuel if they would convert to turbo-props and slow down their airspeeds.

Note: the greatest money-making scheme on the planet is the world's monopolization of the fuels we use and the continued preponderance of fuel guzzling engines that consume it. We have to be on the lookout for overcharging and fraud every step of the way. Aggressive sales tactics been applied every bit as much to the aviation industry as they have been applied to the auto, truck, rail and shipping systems. As cars have been garnished with newer high-tech engines only to have fuel gains negated by four wheel drive, our planes have been garnished with more efficient jet engine designs only to have their fuel gains negated by giving us a fuel-hogging design.

## Fraud Within The Airline Industry

In 1955 the public got extra speed at the cost of fuel efficiency, even before the vast majority of people needed increased speed at all. Wouldn't we have been happier with lower cost flights that gave us room to lie down? If we had known they were going to guzzle away our gains by enacting foolish practices that benefitted the oil industry, would we have endorsed the system we got?

The transportation mechanisms in use today demonstrate that our existing vehicle smog laws are total hypocrisy. If the public had known beforehand what kind of system the FAA were planning, they would have seen how utterly useless federal and state smog requirements for automobiles are. If the public had known that the FAA was allowing them to burn upwards of 10 times the weight in fuel as what they carried in cargo, they would have either thrown them out or stopped paying them any heed.

According to airline industry figures it has taken 50 years since the Constellation to get back down to the same "gallon per passenger-mile" using an Airbus 380 with the latest fuel innovations. Just imagine what kind of performance we could get today using the turbine in a modern version of the Constellation! Since we were never allowed to apply this better engine in such a practical manner we will never know.

But we do know it has never been the intent of the oil industry to reduce foreign dependence on oil production, nor reduce carbon dioxide being added to the air, as they nixed a way that could have cut our fuel consumption in half. Unfortunately financial wizardry does not cure greed.

## Jet Planes Do Not Hold As Much Fuel As They Say

Perhaps what the public really needs is for Big Oily to commit to the public good and admit how much fuel it really takes to power modern airliners. My professional analyses confirmed what others have been claiming; an Airbus 380 does not hold 250,000 lb. of fuel in each of its wings as they state in their manuals and sales videos.

In fact it has come to my attention that there is most likely no fuel being stored in the wings of any of our jet powered airliners. And if the airliners are not storing fuel in their wings as they say they are, that would mean there is not enough room on board them to fit the gallonage they claim. And it they're not carrying the gallonage they claim, that would mean they run much more efficiently than claimed.

Are these engines running over-unity by converting water vapor and other gases into elements using harmonics? Could these engines be burning ammonia and methane in the upper atmosphere? Honestly, what is going on. Both ammonia and methane are used to fill weather balloons, meaning they go up to the heights these jets are flying at, but just try to get figures on the density of the air at these altitudes! The governments are obviously hiding something about our upper atmosphere.

Gas fractions are only available at lower altitudes, thanks to the atmospheric data NASA provides which is limited. For a reference point: Air is 1.205 g/L. It's also pertinent to know that ammonia burns like propane. Take note that between the density ranges of .7 g/L (methane) and 1.33 (oxygen) g/L there exists the following gasses: going up in density from methane: ammonia, natural gas, carbon monoxide, nitric oxide (NO) and Oxygen at 1.33. Now, is there enough oxygen at 30,000 feet to feed a turbine engine?

Yes. Then why wouldn't there be methane and ammonia?

And perhaps we should focus on the use of water vapor which comes in at .804 on the density scale! Might these engines be super heating water vapor, or possibly breaking it into hydrogen and oxygen and combusting it? Certain resonant frequencies break water molecules. Perhaps these engines break water molecules using harmonics created by their spinning blades, then combust them back together.

Everything that is organic eventually rots and produces ammonia, and it's the same with methane. Do we really have any idea how much of these gasses are up high in the atmosphere? It's a fact that Big Oily is afraid of methane and ammonia, since both are superior fuels and both can be made from petroleum stocks. And as you know, when you make methanol from petroleum you get 4.5 times the original amount.

And there are some other possible forms of energy up there that they could be tapping into such as electrical charge. Are these jet engines in actuality positive ion generators (like particles repelling)? Ion power=star trek show=reality.

## Global Warming And $CO_2$

The basic premise of the global warming advocates is that carbon dioxide blankets the earth creating a sort of insulation. But for those who still have a rational mind note the simple fact that carbon dioxide is heavier than air. It doesn't blanket the earth, it hugs the ground. Much lighter gasses like water vapor, methane, ammonia, nitrogen, hydrogen and oxygen do blanket the earth, but not $CO_2$.

Never forget that **$CO_2$ is heavier than air and tends to be concentrated near the ground.** Evidence of this can be seen by looking at the tops of mountains that are higher than 13,000 feet. You will notice that there is nothing growing there. Trees don't grow above the "timberline" because there is too little carbon dioxide.

To label excessive $CO_2$ as a "cover" is therefore flawed. When we take into consideration the fact that modern air transportation produces $CO_2$ in amounts that would stifle most accountants and engineers we realize it is even more flawed. According to their own figures, if a 747 is up for six hours it will consume 20,000 to 30,000 gallons, and this produces 20 lb. of $CO_2$ for every gallon of hydrocarbon fuel burned. Today the airline industry supposedly burns 180,000,000,000 gallons per year. This would produce 3,360,000,000,000 (three trillion) pounds of $CO_2$ into the atmosphere every year. Really? Is this really happening?

The folks at the Geneva Convention on Climate Change don't seem the least bit concerned with it. In reality, just the fuel numbers alone incriminate Big Oily's plans to fleece the public through inflated, needless fuel consumption and destroy earth's atmosphere in the process.

These are the results: The consumption of fuel by commercial jet aircraft (pound-mile per gallon), and, (passenger-mile per gallon), has been higher than it was in the 1950's! This is a giant waste of technology and a colossal disservice to the people.

And we may have been doubly had. It now looks as though the airline industry has been over-inflating fuel consumption to over-inflate the profits. Keep in mind that our nation has been importing petroleum from the Middle East dating back to the era of the Constellation Airliner. Therefore, that would have been the worst of times to turn up the air speeds and thus consume more of what we were in short supply of!

Another crazy practice of the industry was fuel dumping before landing to help save on tire wear. It was reported in the LA Times that the forests outside of Los Angeles near Victorville were dying. It was then that the industry actually admitted they had been dumping fuel for 10 years. Such practices certainly give Big Oily's "oil shortages" a different meaning!

The FFA and Big Oily had to be on the same team in order to have gotten away with endorsing an airline industry which dumps fuel onto our earth while at the same time produces billions of tons of carbon dioxide into our atmosphere? All this for the sake of going faster? I don't think so. If they really want to talk about reducing carbon dioxide they should first talk about reducing the combustion of kerosene in our skies.

If they truly wanted to eliminate $CO_2$ in the atmosphere they could simply change our fuel formulation to ammonia. Ammonia is readily available and can be made from petroleum stocks. It does not contain any carbon atoms yet burns with roughly the same energy as kerosene. Burning ammonia does not produce $CO_2$.

But why should we care so much? Note that the amount of carbon dioxide in our atmosphere is incredibly low. Compared to Oxygen, which is at 20.9%, Carbon Dioxide comes in at .038%. Animals need oxygen from plants and plants need Carbon Dioxide from animals, right? Now notice that the amount of Oxygen is currently about 600 times the amount of $CO_2$.

I believe that global warming is a ruse because of the fact that a little extra carbon dioxide going into the atmosphere would in reality help out the plants on this planet. As for the animals, such a small increase in $CO_2$ in the overall content of atmospheric air would not even be noticed.

If environmental engineers are really concerned about climate change, then there should be absolutely no excuse for operating our airline industry with the type of fuel and fuel volumes currently allowed. In the meantime, we travel as sardines within flying kerosene-guzzling torpedoes, as if to save on fuel.

## The Deep Hidden Truth About Big Oily

And now we can't help but see the hypocrisy: being required to purchase expensive smog-equipped vehicles, subject ourselves to mandatory smog permit fees when in the meantime tons of $CO_2$ is being dumped on our heads.

In its basic analysis a smog certificate is just a "burning permit" to turn toxic fuel into toxic gas, forced upon us by an industry bent on polluting us. Consider that if all of this equipment and expense was indeed for the purpose of insuring that our air quality is better, then there would be an even greater effort to address the extreme amounts of $CO_2$ produced by the airline industry. As it is, the climate change advocates require us to accept this industry's indifference to human health.

It is time to expose the oil industry for what it is; a charade of human engineering. Sitting atop it is the fact that petroleum is not in short supply nor ever has been. Crude oil reserves have nothing to do with fossilized animals or organic plant and animal material that was supposedly laid down millions of years ago. Enough time has passed and enough actual production has been achieved that we can fully take the clothes off Big Oily now. The fact is petroleum is an abiotic fluid. If you don't know what that is go to the website: theriseandstallofthepistonengine.weebly.com for a video.

It's time for the world to learn that petroleum is produced deep down between the rock layers of the earth, in massive reservoirs that make the shallow reserves of Kuwait look like tiny ponds. Also check out appendix 2: Stalin and Abiotic Oil, while you're there.

Imagine if everybody knew that in truth the world's supply of petroleum is unlimited? As it is, we all shuffle in step with false high-tech industries like the auto industry, the airline industry, the racing industry, the TV/movie industry, etc. Each is supposed to serve as a backdrop for the scenes we humans act out, but more and more they are looking like training grounds.

# CHAPTER 16

## Superior Car Designs Now Forgotten

THE FIRST GASOLINE powered car came about in 1887, and as time went on other designs came and went, but the piston engine lived on. Our embrace of the gasoline engine looked inevitable because the gasoline engine itself was so near perfect in function. Over the years we figured it was a superior design than the other types of propulsion that were used and experimented with. But it never was.

In this chapter we will take a look back into the actual history of automotive development in the United States from the time it all began.

### The Riker Electric Car

> "When a Riker electric car won the $900 first prize at a track race in Narragansett, R.I., in 1896, and was followed across the finish line by another plug-in entry, Scientific American was amazed. The announced success created surprise, as it had been thought that motors using some form of petroleum were best adapted for horseless carriage use.
>
> But despite being a pioneer of the plug-in car, the Riker Electric Vehicle Company of Brooklyn, N.Y. is

barely remembered today. This is partly because it existed for only a very short time.

Andrew Riker, the company's founder and a pioneer in electric motor design, sold the company to Colonel Albert Pope, the bicycle and electric-car magnate of Hartford, Conn., for a reported $2 million in 1901. I probably would have done the same thing. That's a lot of money. Somebody had lots of money to buy out and bury the electric concept.

The storage batteries were housed in two large compartments that form extensions to the body; one at the front and one at the rear. The front compartment contained a single set of 12 cells, and the rear one held three sets making 48 cells altogether.

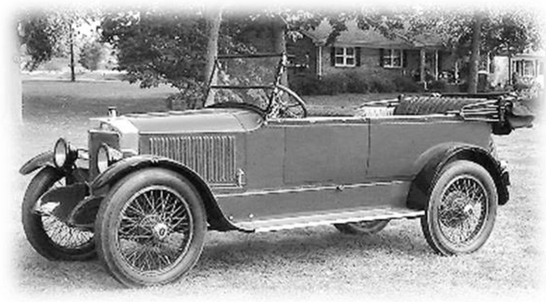
During his brief turn in the spotlight, Riker built and sold more than 1,000 electric cars. He also came close to setting a land-speed record in an electric known as the Riker Torpedo. He built the car's electric motor and 72-volt drivetrain. The only significant missing part in the car today is the battery pack, which likely consisted of Edison glass-cased batteries. In its prime, the 1898 Riker could reportedly reach 40 M.P.H. and travel 50 miles on a charge." Clipped article

A plush model Riker Electric car in 1904. Note: the driver sits way up in the back of the vehicle and serves more like a chauffeur. Rich people rode in and owned these electric vehicles because of reliability and safety.

After more than 100 years we haven't advanced much in electric drive technology. Try to imagine how well this type of vehicle would perform today if it had been allowed to evolve with the high tech materials and electronic components that are now available to similar entrepreneurs of this age. Keep in mind this is 1904 and yet the description of the batteries makes them sound as good as or superior to batteries today. By having 48 cells it is possible that up to 96 volts were available to the motors which would be powerful enough to move a small compact car at 60 mph. And what a time to be royal when they had access to talented engineers and entrepreneurs during the 19th and early 20th centuries! Now, let's take a look at another promising form of transportation.

## The Stanley Steamer

The Stanley Steamer was a remarkable automobile. The twin brothers who designed it, Francis and Freelan Stanley, were truly innovative in their approach to applying steam technology to the automobile. They took a proven propulsion system that existed for large steamships, trains and industrial machinery and scaled it down into a lightweight package. It was an amazing accomplishment for the time and their design proved beyond the shadow of a doubt that steam powered automobiles were more powerful and reliable than their gasoline engine powered counterparts.



Robert E. Wilhelm's 1918 Model 735B 7-passenger Touring Stanley Steam Car September 10, 2005

Let me explain some of the reasons why using steam for piston powered engines is so much more effective than using gasoline plus air combustion: The first most noteworthy difference is the fact that a piston steam engine produces its maximum torque at 0 rpm.

If you have ever looked at an old steam locomotive you may have noticed that the steam cylinders are connected by rod links directly to the drive wheels. This means that there was no need for a transmission or a clutch. However, both of these components are very necessary in a gasoline engine because it does not begin to develop much torque until it is up to approximately 1000 rpm.

How would you start out a long heavy train from a dead stop when you have an engine that is turning at 1000 rpm? You put it in the lowest possible gear and then you start slipping the clutch to get rolling. Since trains carry such heavy loads that are so difficult to get rolling, this system is never used. It would result in fried clutches even in conjunction with enormous gear reduction.

Steam power takes care of all that. With steam as your pressure instead of combustion gas, it is much more uniform and controllable. The operator literally opens a valve to let the steam begin to flow into the cylinders and the cylinders start to gradually move just as the steam pressure going into them gradually builds. And this works 4 times as effectives because a steam piston engine has two power strokes per each revolution, whereas a modern gasoline or diesel engine has only 1 power stroke per 2 revolutions.

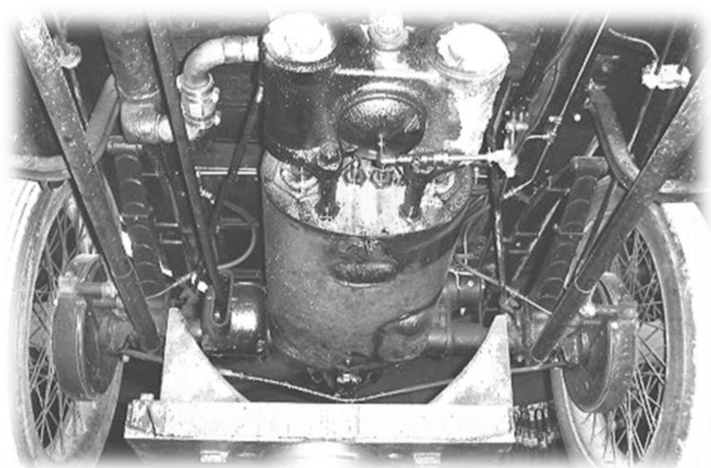
Here's an article on the Stanley Steamer, Courtesy: stanleysteamers.com

> "The **Stanley Motor Carriage Company** was a manufacturer of steam-engine vehicles from 1902 to 1924. They produced their first car in 1897. Production rose to 500 cars in 1917. Steam was generated in a vertical fire-tube boiler, with a vaporizing gasoline (later, kerosene) burner underneath. The boiler was reinforced by several layers of piano wire wound around it, which gave it a strong, yet relatively light-weight, shell.
>
> In early models, the vertical fire-tubes were made of copper, and were expanded into holes in the upper and lower crown sheets. The boilers were safer than one might expect as they were fitted with safety valves. Even if these failed, a dangerous overpressure would rupture one of the many joints long before the boiler shell was in danger of bursting.
>
> There has never been a documented case of a Stanley boiler exploding in use. The engine had two double-acting cylinders side-by-side, equipped with slide-valves, and was of the simple-expansion type. Drive was transmitted directly from the engine crankshaft to a rear-mounted differential by means of a

chain. In order to improve range, condensers were used, beginning in 1915.

A Stanley Steamer set the world record for the fastest mile in an automobile (28.2 seconds) in 1906. This record was not broken by any automobile until 1911. The record for steam-powered automobiles was not broken until 2009.

A Stanley steam engine provides four power impulses per crankshaft rotation similar to an 8-cylinder internal *combustion engine. However, the power is applied uniformly* for a longer length of the stroke than the hammer-like explosions common to gasoline or diesel engines. This provides the steam engine an advantage of more torque in a smaller package over what can be generated with a gasoline engine of equivalent rating.



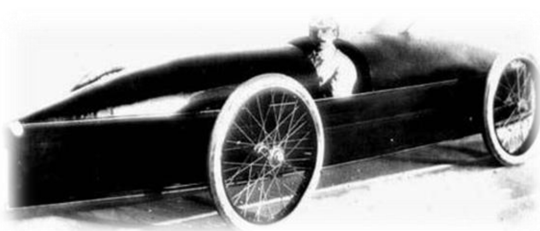
The engine was mounted to the rear drive axle at a nominal 1.5:1 gear ratio between the crankshaft and the differential gear. Transmissions were not required and hence there was no "neutral" or clutch.

Early Stanleys were fueled with gasoline but later models incorporated a two-fuel system of gasoline for the pilot and kerosene for the main burner. Kerosene, provided not only more heat energy per unit than gasoline, it was also safer and less expensive.

To start a Stanley a torch is used to preheat the vaporizing tube and light the pilot making the Stanley Steamer one of the few cars difficult to steal in anything less than 20 minutes. Fuel efficiency was roughly 10-12 miles to the gallon.

Stanley steamers generate steam in drum shaped boilers ranging from 14" to 30" in diameter and from 14" to 18" in height. Unique in their design, no Stanley boiler has ever been documented to explode. The circular boiler walls are strengthened with three layers of exceptionally strong piano wire to provide sidewall strength unequalled in boiler designs for similar ratings. The use of between 500 and 1,000 fire tubes not only efficiently transfers heat to the water, they provide a structural strength to the boiler ends. Operated nominally at 600 PSIG, boilers were factory tested to twice operating pressure before being placed in a car.

Using ball-bearing construction throughout, the Stanley car was capable of speeds in excess of 75 MPH for short periods of time if one could locate a dirt road of the period suitable for the exercise. For later cars a standard automotive radiator served as a condenser returning the steam to liquid and eventual reuse in the boiler. Non-condensing cars required about a gallon of water per mile or two but later condensing cars greatly improved this efficiency to the neighborhood 10 miles per water gallon.



A Stanley car set a land speed record of 127 MPH in 1906 and the following year one was clocked at nearly 150 MPH before it crashed near Daytona Beach. The deck was always stacked against the legitimate and widespread use of steam for powered vehicles. Later through politics and race restrictions, the Stanley twins were no longer allowed race their cars for reason that they ran on steam.

A remarkable and noteworthy characteristic of the Stanley was its ability to store up energy in a boiler. The boiler was fired up at least 30 minutes before the start of any race for this very purpose. During this time extra pressure would build and be stored in the boiler. Once the Stanley got to the start line she was ready to spring like a cougar, thusly from a dead stop there was no way for a hapless piston engine to keep up with the lightweight and super charged Stanley race car.

The racing version looked like a pointed cigar and it was very streamlined. This is no doubt another feature which the major players wanted to stifle. Since the steamer didn't need a radiator it didn't need to have this ridiculous metal box up front to break the air flow like all the gasoline powered competitors.

Being barred from racing was a tremendous blow to the steamer concept and the Stanley Company as interest in improving the product declined after that. In its time the Stanley was truly an impressive and prestigious automobile. Their self-imposed production limits of 1000 cars per year further hindered availability.

A Stanley steam engine with a 20 horsepower rating operating at a steam pressure of 550 PSIG can generate perhaps between 100 and 125 horsepower for a very short period of time. This is why the use of steam is far superior to the use of petroleum combustion piston engines. A petroleum powered piston engine must be sized 4 times larger than what horsepower is required to drive it at highway speed, and this is necessary in order to have enough power when accelerating from a stop." End

It is estimated that during the 24 years the Stanley Motor Carriage Company built steam cars that somewhere around 11,000 to 12,000 were built. Today there are perhaps 600 Stanley cars still in existence.

## The White Steamer

The birth of the White Steamer company began in 1898 when Thomas H. White purchased a Locomobile steam car and found out shortly thereafter that its boiler was unreliable. He enlisted his son Rollin to improve its design and the rest is history. It was an even better steam powered car than the Stanley Steamer because it didn't take nearly as long to warm up.


The reason for this was Rollin White developed a form of water tube steam generator which was way ahead of the Stanley's boiler design. His White steamer operated with superheated steam and took advantage of the properties of steam at higher temperatures. His "boiler" consisted of a series of stacked coils with two novel features. One: the coils were all joined at the top of the unit allowing water to flow only when pumped, which allowed control of the steam generation. Two: Steam was pulled from the lowest coil, closest to the fire. This allowed accurate control of steam temperature.

Rollin White patented his steam generator, US patent 659,837 of 1900. Mysteriously, there was little interest in developing a steam powered car or truck.

## The Doble Steam Car

The Doble was an American steam car founded by Abner Doble and manufactured from 1909–1931. The company's latter models with fast firing boiler and electric start, were considered the pinnacle of steam car development.

Today the term "Doble Steam Car" comprises any of several makes of steam-powered automobiles including Doble Detroit and Doble Automobile. Thus they were generally just called

"Doble". Abner and his brothers John, Warren, and Bill built their first steam car comprised of parts taken from a wrecked *White* steamer.

The Doble brothers went on to build a second and third prototype in the following years, further defining the steam car concept which the main auto industry had abandoned. Their third prototype led Abner to file a handful of patents for the related innovations, including a water-condensing system which allowed the water supply to last about 1,500 miles in contrast to a typical steamer's 100 miles. This was just one of the many innovative features of the Doble.

The Doble Steam boiler of 1925.

In 1925 Howard Hughes' desire to experience real speed led him to choose the 1925 Doble Steam Car which would later out-accelerate the mighty Model J Duesenberg of 1930. The Doble could do 0 to 75 mph in just 5 seconds, with its engine turning over at less than 1,000 rpm, and it could sustain speeds of 95 mph right from the factory. Hughes later reached 133 mph by modifying the boiler to produce 2,000 psi. with a 1:1 final drive ratio in place of the standard 1.5:1. This was a death-defying feat considering the tires, chassis and roads of the time.

A Doble would set you back at least $10,000, at a time when you could buy a Ford for $400. As a result, only 41 were built over 10 years. And even then, Abner Doble lost money on every car. In fact, it is estimated that a typical Doble may have cost in the neighborhood of $50,000 to build!

## The Tucker

"The Tucker was a uniquely designed car with features that should have been embraced by all of the other automakers. Instead, and unfortunately for the public, the superb features of this car were shunned.

It should be pointed out, the superior features of the design were not dropped merely because the Tucker Company went bankrupt (or was forced out of business by corrupt bankers). The ideas were shunned because they saved fuel.

Tucker took a different tack, designing a safety car with innovative features and modern styling. His specifications called for a water-cooled aluminum block, flat-6 rear engine, disc brakes, four-wheel independent suspension, fuel injection, the location of all instruments within reach of the steering wheel and a padded dashboard.

To finish the prototype design and get construction under way, Tucker hired famed stylist Alex Tremulis, previously of Auburn/Cord/Duesenberg, on December 24, 1946 giving him just six days to finalize the design. On December 31, 1946, Tucker approved Tremulis' preliminary design. At this time Tucker changed the name to the "Tucker '48".

Later, Tucker hired the New York design firm J. Gordon Lippincott to create an alternate body. Only the front end and horizontal tail-light bar designs were refined for the final car. These were some of the advantages of the new Tucker design:

1. Engine mounted over rear drive axle.
   This negated the drive shaft of other makes and gave the Tucker the same acceleration using a 6 cylinder engine as the other car makers using V-8s.

2. Flat engine design was more compact and lighter.

This made it an easier fit into the rear of the car. The passengers road more on top of the engine than behind it as in standard automobiles with their large V engines up front. It was found that this dramatically improved the car's handling, especially when breaking; the rear of the car would go down, not the front, as with standard autos of their day.

3. Radiator in rear
   This gave the car designer the ability to design the nose more like an airplane than a freight train, as is now done. It is shameful how modern car companies have failed in every way to make the front end of our cars more streamlined.

4. Streamlined front end
   The fuel mileage of the Tucker was far superior to the equivalent V-8 powered cars of similar weight and passenger space. They could typically get 28 miles per gallon, which was almost double what their counterparts got.

5. Streamlined rear end
   Here's another area that modern car manufacturers have deliberately avoided. Throughout the 100 years or so of development, every car design that featured a sweeping back has been shunned. The reason: it is an effective way to remove drag. Do you see any airplanes flying that have a tail shaped like a cut-off box?

A *perimeter frame* surrounded the vehicle for crash protection. A roll bar was integrated into the roof. The steering box was behind the front axle to protect the driver in a front-end accident. The instrument panel and all controls were within easy reach of the steering wheel and the dash was padded for safety.

In addition the windshield was made of shatterproof glass and designed to pop out in a collision to protect occupants. The car also featured seat belts, a first in its day. The car's parking brake had a separate key so it could be locked in place to prevent theft. The doors extended into the roof, to ease entry and exit.

The engine and transmission were mounted on a separate sub frame which was secured with only six bolts. The entire drivetrain could thus be lowered and removed from the car in minutes. Tucker envisioned loaner engines being quickly swapped in just 15–20 minutes. Here's another article on the Tucker:

> "Tucker envisioned several other innovations which were later abandoned, such as Magnesium wheels, disc brakes, fuel injection, self-sealing tubeless tires, and a direct-drive torque converter transmission. These were all evaluated and/or tested but were dropped on the final prototype due to cost, engineering complexity and lack of time to develop.
>
> Tucker also initially tried to develop an innovative engine. It was a 589 cubic inches (9.65 L) flat-6 cylinder with hemispherical combustion chambers, fuel injection, and overhead valves that were actuated by oil pressure rather than a camshaft. An oil pressure distributor was mounted in-line with the ignition distributor and delivered appropriately timed direct oil pressure to open each valve at the proper interval. This unique engine was designed to idle at 100 rpm and cruise at 250-1200 rpm through the use of direct drive torque converters on each driving wheel instead of a transmission. These features would have been auto industry firsts in 1948, but as engine development proceeded, problems appeared. The 589 engine was installed only in the test chassis and the first prototype."

The final car was only 70 inches tall but was large and comfortable inside. Tremulis' design was called the most aerodynamic in the world and although it still sported pre-war type fenders it was both stylish and modern.

**Tucker 48 Specifications**

A total of 51 were built, of which 47 survive now.

1. Engine: H-6 (horizontally opposed), ohv, 335 ci (4.50 x 3.50 in. bore x stroke), 7.0:1 compression ratio, 166 bhp, 372 lbs/ft torque.
2. Size: 128" wheelbase, 219" overall length, 60" height, 79" width, 4200 pounds.
3. Performance: 0-60 in 10 seconds, est. top speed 120 mph

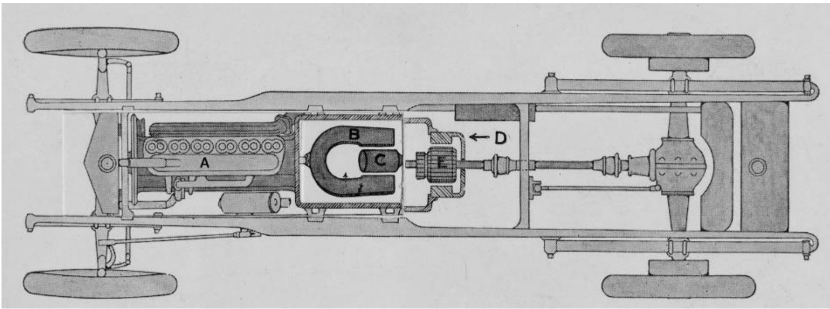
## The Owen's Magnetic


1917 Owen Magnetic Model M-25 7-Passenger Touring Car

I have to admit that before I saw this amazing automobile on the Jay Leno Garage feature I did not know this car ever existed. After looking at the design for a few hours afterwards it became apparent that this was another design that was way ahead of its time. The fact that it has not been referenced in today's hybrid designs and improved upon is most unfortunate.

Designed by Justus B. Entz and first publicly shown at the 1914 New York Auto Show, the electro-magnetic transmission of the Owen Magnetic was a development that came long before its time. While it worked, and worked well, its concept was implemented far before engineering, electronics and materials were adequate to support it.

The concept is disarmingly simple. The engine is connected to a generator built in unit with its flywheel. Electricity from the generator powers an electric motor attached to the driveshaft. With no direct connection between the engine's crankshaft and the car's driveshaft, power transmission is smooth.




The Owen's implementation added several supplemental functions including five separate settings akin to a selective shift transmission's gear ratios for power transfer between the engine/generator and the driveshaft, and, a bank of 24 volt batteries to conserve excess power, and to start the engine through reversed electricity flow.

Ingenious hardly begins to describe it. But it was too expensive for the general public to afford. A 1917 Owen Magnetic was priced at $3,150, a price higher than a Packard Twin Six.

I invite you to research further about this remarkable car. It is so ingenious and then for it to end up in limited production for a few rich folks, and then forgotten. The Owen's Magnetic was more advanced than today modern hybrid designs, and it represented a superior way to connect our engines to the wheels using magnets and induction coils instead of clutches and transmissions. This concept should have been embraced universally.

## Air-Cooled Cars

Air cooled engines are more efficient than liquid cooled engines but the public has been told otherwise. But just consider their simplicity in that they do not require a radiator and cooling system. Instead of having a heavy block which is fed cooling water by a pump, the air-cooled engine sports a smaller block, cylinders with cooling fins and a fan. It is obviously much lighter in weight.

A modern 4 cylinder air-cooled aircraft engine. This engine can fit above the car's rear wheels eliminating the need for a drive shaft. If it was placed up front, the hood could slope downward giving it an aerodynamic shape. Being air-cooled means light in weight free of a radiator and water pump.

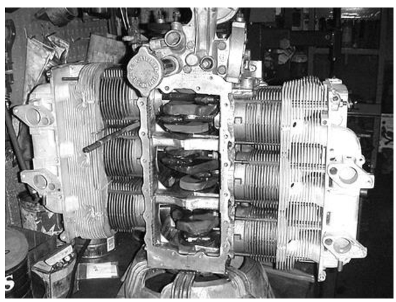
Air-cooled engines in cars have been used extensively overseas in Europe where simplicity and high gasoline prices have dominated the budget priced car market. They have operated successfully in the Volkswagen Bug and Karmann Ghia of the 50's, 60's and 70's.

A six cylinder air cooled engine was introduced on the Corvair by General Motors in 1962 as an entry air-cooled car in the United States. Few people think of the Corvair today as an innovative design, but it could have revolutionized the power trains in modern day autos. The design only lasted five years before the program was scrapped by GM. That was not merely a bonehead decision; it was one ordered up by the oil industry because they were lighter in weight and saved fuel.

This was truly an innovative automobile even though it went down as being one of the most dangerous cars every produced by the major auto industry. The safety issue was actually remedied before the public had turned sour on the concept by fitting the rear suspension of the 1966 Corvair with an anti-sway bar. By then it was too late and General Motors dropped the model.

For a number of years during the 60's there was a separate racing class for Corvairs in stock racing as there were no other models made at that time that could compete at the same level. My guess is that General Motors deliberately released the car in an unsafe design such as to deliberately cause a sales collapse that would be used as a reason to discontinue any further development of the air cooled concept.

Phasing out air cooled cars was a necessary chore that had to be carried out before they sold us on the idea of small compact Japanese-sized cars here in the United States. As a result, today we equate good gasoline mileage with smaller cars. It rarely occurs to us anymore that maybe even a sturdy Pontiac Bonneville-sized car could get 40 or 50 miles per gallon. But it could, with an air-cooled engine in the rear slightly larger than the Corvair. But look how we just assume that if it is a larger or a heavier vehicle, it's going to get lousy mileage. Air-cooled engines would have solved that dilemma.



1964 Corvair. This six cylinder horizontally opposed engine was had the potential to revolutionize the automotive industry. Unfortunately, radiators, upright v engines and long driveshafts were in the plans.

In the next ten pages is a summary of air-cooled cars manufactured after WWII. Take note of some very fuel efficient design ideas that were gradually phased out in favor of larger and heavier drive trains and engines.

Heavy drivetrains combined with stop and go driving, are devastating on fuel mileage.

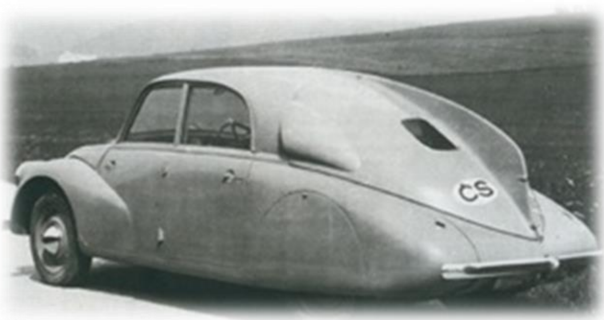
**End of an Era:**

## The Last Air-Cooled Automobile Engines

Article reprinted compliments of: J Kraus

"Air-cooling was quite rare before World War II. In the 1940's only the Czechoslovakian Tatra flat-four and V8 and the VW flat-four were being produced. Following the war, both Tatra and VW restarted manufacturing air-cooled engines, the Tatra V8 staying in production though 1975 and the VW flat-four (redesigned in 1960 along the same lines) lasting through 2003.

After the war Citroën and Panhard joined the air-cooled club with the 2CV and Dyna X. The Porsche 356 débuted with a modified version of the VW engine. Later Fiat introduced the Nuova 500 with an air-cooled




1936 Tatra T97 an air-cooled engine car manufactured in Czechoslovakia up until the 1970's. Note the air intake scoops on the upper sides for cooling. Note also that the entire car has a streamlined shape, there is even a partial tail in the rear. This kind of airstream design does make a significant difference in fuel mileage. Sadly, this concept has escaped the public's scrutiny.

twin. In 1959, Chevrolet introduced the Corvair with a horizontally-opposed air-cooled six-cylinder engine.

Then came the final generation of air-cooled power plants. The decade of the sixties represented the peak of development of air-cooled engine designs, with significant advancements over those created earlier. All these engines featured overhead camshafts, hemispherical combustion chambers and the ability to rev to 7,000 rpm or higher.

The Panhard featured a two cylinder motorcycle engine that resembled a BMW motorcycle engine. It performed well with plenty of speed and acceleration.

The first genuine 1960's design to come to market was the NSU Prinz 1000 launched in 1963. This was the world's first inline four-cylinder to incorporate air-cooling since the ill-fated 1923 Chevrolet, and the first air-cooled automotive engine with an overhead camshaft.

The engine was constructed of an aluminum block with two sets of iron cylinders cast in pairs, and a pair of twin cylinder heads. The cooling fan was built into the flywheel and a single overhead camshaft was driven by a chain from the nose of the crankshaft. One, 1.1 and 1.2 litre versions were built. Uniquely, the engines were mounted transversely, just behind the rear axle.

## NSU 1000 TTS Engine

NSU 1000, 1963-1973

This was a robust engine with a strong and rigid crankshaft supported by five main bearings. Soon after introduction, the sporting TT variant was launched with twin carburetors and later, the fabled TTS. The TT and TTS versions would happily spin up to 7000 rpm in stock form and were a favorite of sedan racers of the period, facing off against Mini-Coopers and Fiat-Abarths. The NSU's won many European Touring Car Challenge

Division One awards including 1st at Spa in 1967 and 1971 and 2nd at Zandvoort in 1968 and 1970. They also achieved class victories in the 1968 Marathon de la Route and the 1974 German Hillclimb Championship.

## Porsche 911, 1964-1998

Probably the most iconic air-cooled engine among enthusiasts was introduced in the Porsche 911 of 1964. Designed by Paul Hensler and Hans Mezger to supercede both the standard 356 engine and the 4-cam Furhmann engine, the horizontally-opposed six cylinder was originally produced as a 2.0 liter with an aluminum crankcase and aluminum cylinder barrels with cast-iron liners. Each cylinder was topped with its own aluminum cylinder head with a fully machined combustion chamber. The single overhead camshafts were chain driven. Cooling was provided by a belt-driven cast magnesium fan surrounding the alternator. The air ducting was molded from fiberglass-reinforced resin.

## Early Porsche 911 2.0

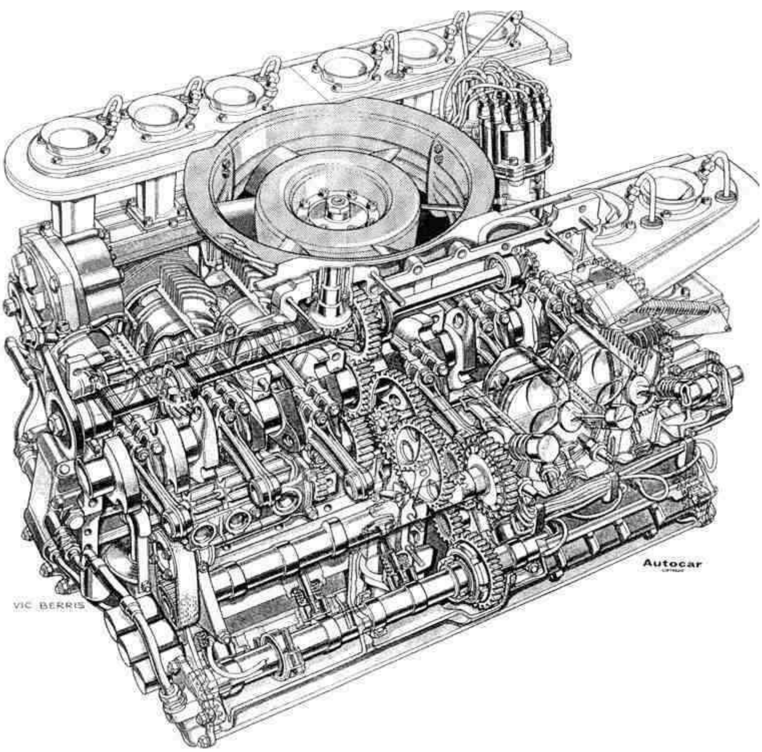
Engine with Dual Triple-Throat Weber Carburetors


The crankcase of this engine had a dry sump, with a single dual-chamber pump that handled both pressure and scavenging functions. An eight-liter oil reservoir and full flow filter were located behind the right-rear wheel. Porsche immediately took this new engine to the track, installing tuned versions in the 904/6 in 1965 and the 906 the following year. In 1967 a near-identical version to the 906-spec powerplant was made available in the 911R that developed 210 DIN hp at 8000 rpm, an output that would not again be available to the public in a 911 until the Carrera 2.7 RS of 1972.

For lesser mortals, the first 11S was introduced at the same time with 160 hp at 6600 rpm, achieved through higher compression, more aggressive cam timing and revised carburetion. In the fall of 1968, E and S versions incorporated mechanical fuel injection and electronic ignition. Over the ensuing years the engine grew in steady increments from the original 2.0 litres to 3.6 litres and was developed in both normally aspirated and turbocharged form. It went on to win almost every major race in the world in which it was entered including the Monte-Carlo Rallye in 1968, 1969, 1970 and 1978, the Tour de France in 1970, the Targa Florio in 1966 and 1973, and Le Mans in 1979.

## Porsche 917 Engine

This was a 4.5 liter, naturally aspirated 12 cylinder engine in 1969 designed to reduce torsional stresses on the long crankshaft. All takeoffs for power and ancillary drives were taken from the center of the crank.



In 911 fashion, each cylinder had its own individual aluminum head. The dual overhead camshafts, four in all, were gear driven.

Low weight was a key priority. The crankcase was aluminum-magnesium alloy and the cam carriers and cam covers were magnesium. Cylinder barrels were aluminum with Nikasil liners. The connecting rods, rod bolts, fan drive shaft, auxiliary and output shafts and other miscellaneous hardware were made of titanium. The fan shrouding, cooling fan and intake stacks were fiberglass. The cooling fan displaced up to 148 cubic meters of air per minute.

Like the 911, the 917 employed a dry sump oiling system. The system held 30 litres of oil. Each cylinder had dual spark plugs, ignited by two seperate distributors. Fuel was supplied by Bosch mechanical injection. The initial batch of 4.5 litre versions produced 520-580 hp at 8500 rpm, the turbocharged versions generated up to 1580 hp on full boost.

The 917 won Le Mans and the World Sportscar Championship title in 1970 and 1971, the Interserie Championship from 1970-1973 and the Can-Am Championship in 1972 and 1973. During the 1973 season, it won every single race. In 1975 a 917 set a closed course speed record of 356 kph/220 mph at Talladega Speedway, hitting over 400 kph/250 mph on the straight sections.

**Citroën GS, 1970-1986**

Here is the last production air-cooled automobile; the Citroën GS. The GS went into production in 1970 and garnered the European Car of the Year award in 1971. In accordance with traditional small-Citroën practice, it made use of an opposed engine driving the front wheels, this time with four cylinders. Initially just 1.0 liter in displacement, it was ultimately enlarged to 1.3 liters. The crankcase and heads were cast of aluminum and the cylinder barrels were cast iron. The cooling fan mounted directly to the nose of the crankshaft in the manner of the earlier Citroën twins. Following another practice dating back to the original 2VC, the connecting rods were one-piece and installed on a built-up crankshaft.

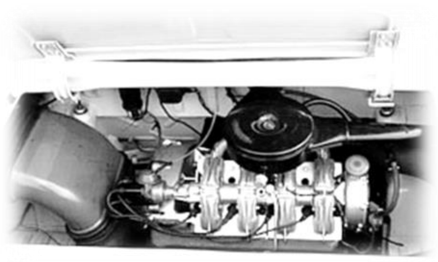
Like the Porsche 911 engine, the GS employed overhead camshafts, but toothed belts rather than chains drove them. Another high revving engine, it produced its maximum power at 6750 rpm. A unique feature of the engine was that the crankcase incorporated a double oil pump; an internal section for the engine oil and an external one to supply fluid pressure for the GS's hydro-pneumatic suspension system. The engine's compact layout allowed for the spare wheel to be stored in the engine bay, a Citroën tradition.

The Citroën GS engine would prove to be the last automotive air-cooled engine. With the increasing emphasis on low emissions, fuel efficiency, larger displacements and heat producing ancillaries; air-cooling was no longer an option. Air-cooled engines traditionally ran slightly rich to reduce combustion temperatures. Unfortunately, this both reduces fuel efficiency and increases hydrocarbon emissions. In addition, the cooling system of most modern cars has to cope not only with engine heat, but the heat generated by the air conditioning condenser and power steering and transmission fluids. These additional loads tip the balance in favor of a liquid cooling system.

While largely renowned as an economical family sedan, the GS also enjoyed a career in rallying, finishing 6th overall at Caledonia in 1973, 4th at the Rally Torre del Oro of Spain in 1975 and 3rd at Cyprus in 1977.

## Other Air-Cooled Engines

The Honda air-cooled twin of the 360/600 (1967-1972) and the air-cooled in-line four of the short-lived but technically intriguing Honda 1300 and 1300/9 Coupe (1969-1973) were developed under the direction of none other than the majordomo himself, Soichiro Honda. The 1300 engine was an inline-four with a flywheel fan in the style of the NSU 1000. What made it unique was that unlike other air-cooled engines that utilized sheet metal or fiberglass ducting to contain and direct the flow of cooling air over the engine, the cooling passages of the 1300 were cast into the block and head in the manner of a liquid-cooled design. This served to considerably reduce engine noise from the level normally associated with air-cooling. Installed in the Honda 1300/9, the quad-carb dry-sump unit produced 110 DIN hp. at 7300 rpm.



Had Big Auto been allowed to utilize hot exhaust gasses to run an evaporative air conditioning system the overheating issues related to air cooled engines would have been negated. And, this is a good time to remind ourselves about the use of water injection as not only a way to increase expansion and BMEP but also to provide the cooling benefits of water. This is another viable way to make air cooled engines run cooler that is mysteriously absent from every design other than air-cooled aviation aircraft in WWII.

As for the statement that air cooled engines have to run a bit rich to keep from overheating, don't forget that water cooled engines ran rich for years because of the fact that gasoline detonates when it is run lean. This problem was solved using timed fuel injection and could be used on an air-cooled engine as well. So look for a return of air-cooled engines in the future, when we finally dump gasoline for a non-toxic fuel like methanol, and find we only need engines of half the weight.