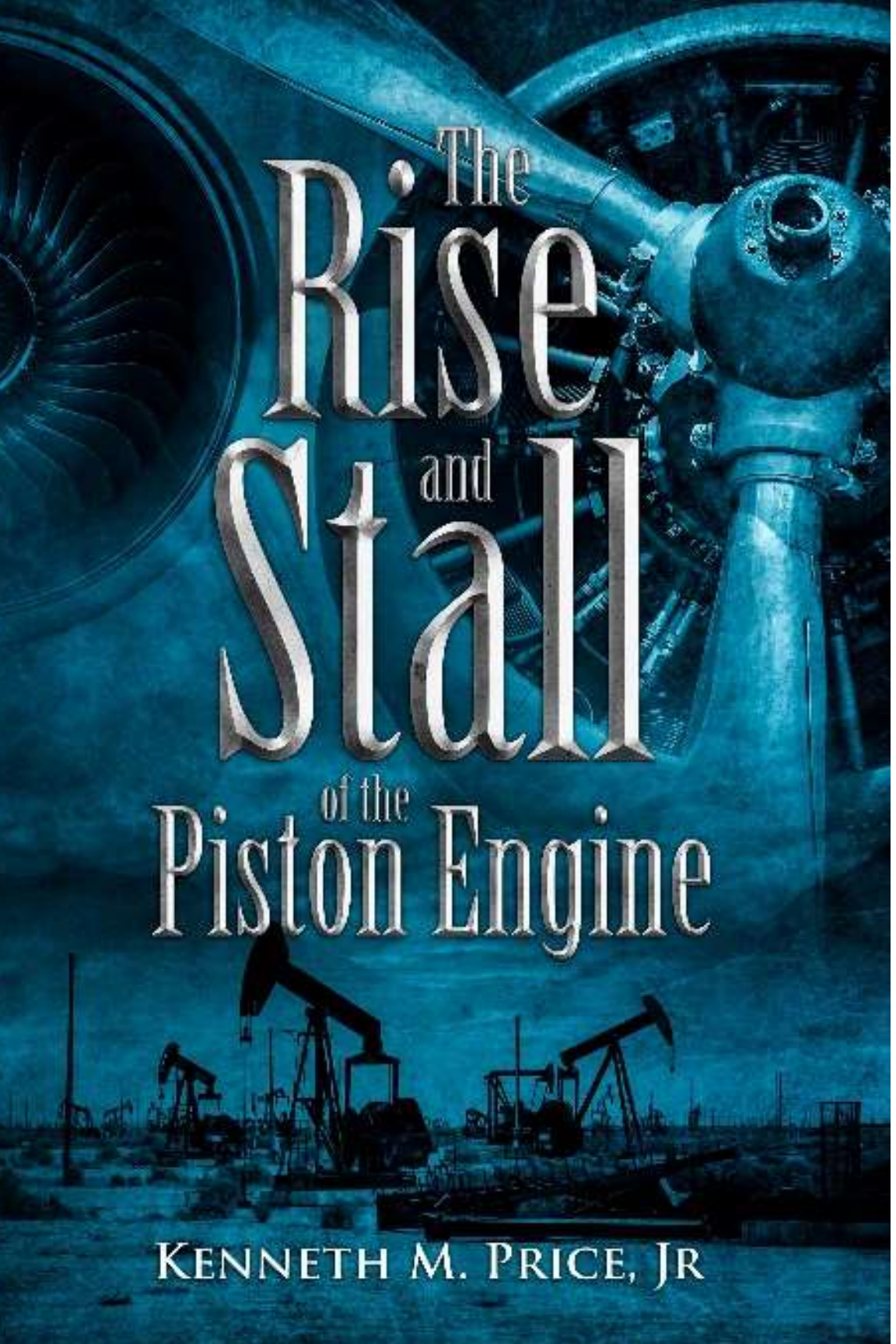
The Rise and Stall of the Piston Engine



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 cars and motorcycles and attempted to fix their engines. To all those who have worked on one of these cotton-pickin contraptions known as a car at least once, this is our universal bond.

Kenneth M. Price, Jr

Book I.

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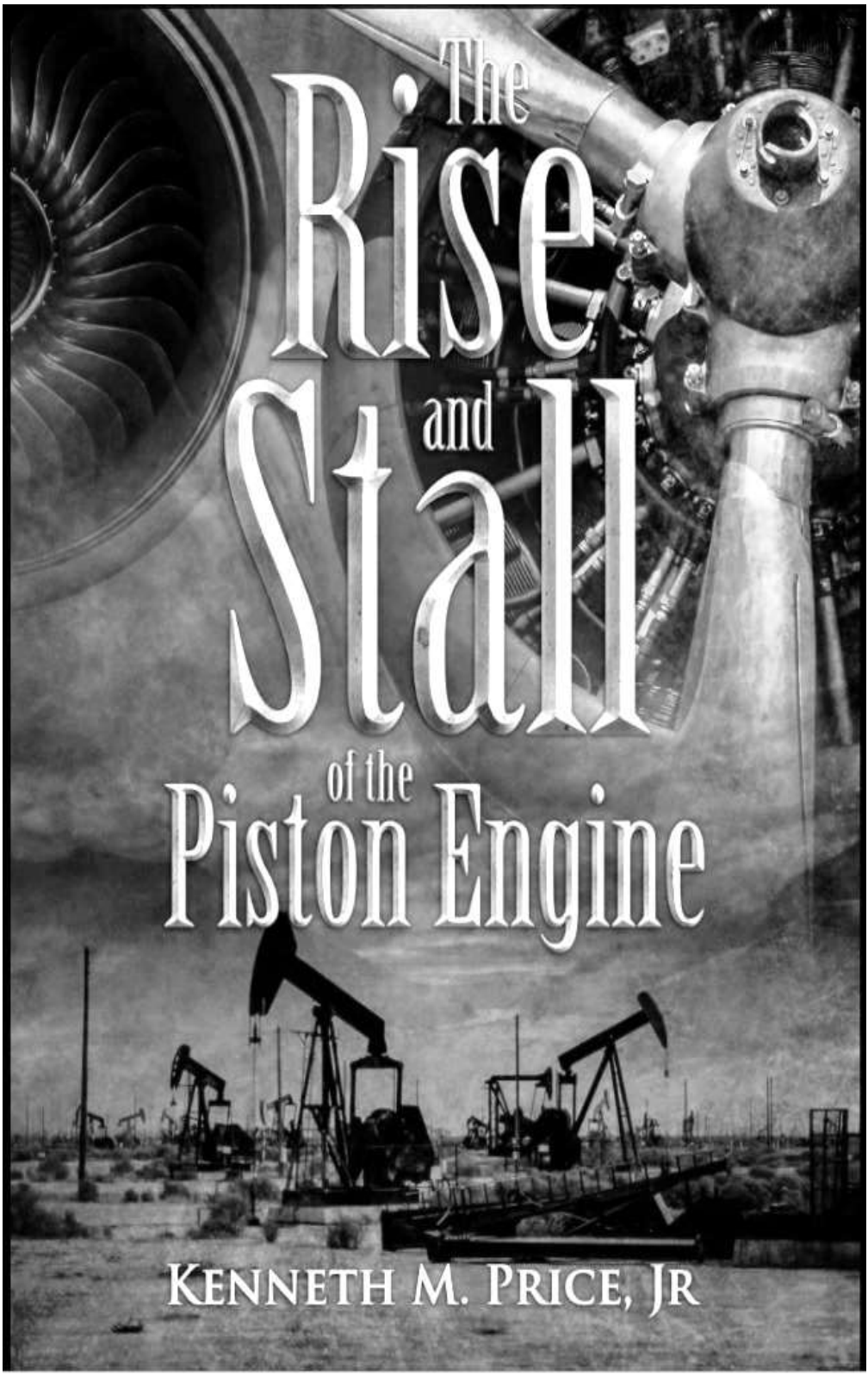
Note to readers:

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 share it with those who you think will do the most good.

Kenneth M. Price, Jr


The Rise and Stall of the Piston Engine
Kenneth M. Price, Jr

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 19th Century, petroleum engineers had already developed across-the-board applications as channels to apply and increase petroleum demand. The mechanical mechanisms that came to the forefront of powered transportation thusly had nothing to do with available technology. The petroleum piston engine's unexplained rise to the top of automobile propulsion mechanisms was a brilliantly-designed plot to create demand for gasoline, and nothing more.

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

Whereas Book 1 is primarily an expose of Big Oil and the Bankster's plans to stick the public with gas hogging piston powered mechanisms, Book 2 explains the degree and extent of the actions they 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.

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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 bibliography ever devised and available on earth at your fingertips. It's called google (for starters) and the process is fact checking. Footnotes are slow and incomplete, thus most of the times a name and link are provided to enable you to quickly confirm the information.

INTRODUCTION

This book is a MUST READ before you re-shackle yourself to a system that is so unsafe and inefficient no person escapes its relentless economic drain. Actually, this book is a MUST READ for anyone planning to enter the 21st Century with an inkling of understanding regarding Earth's present transportation dilemma. For starters the current system is neither safe nor efficient.

So what happened to our safe transportation mechanisms from the past? The world needs an honest and up-to-date evaluation of the world's transportation mechanisms and systems that currently exist, and it needs to be told to us in a language everyone can understand.

Our ecological survival depends upon us becoming aware of the fact that our transportation systems could be better and should be better. To put it bluntly, we have allowed ourselves to build an inefficient system, based on an inefficient contemptuous mechanical device. In the process we were lulled by the purr and false economy of the piston engine into accepting smog and air pollution.

Today, free-thinking scientists, engineers and car enthusiasts are ready to make a change. For others, the synopsis about how we've been duped by Big Oily may be too much to hear. You're going to learn a lot on the next pages. Some of the news will be hard to take. Some people with close ties to their automobiles and industries may get offended. I'm just telling it like I see it from the research.

As you review many of the countless superior transportation mechanisms that have been shelved, thus to never become part of our transportation system today, you may never feel the same about the coveted piston-engine-driven contraptions that we have today. That's the purpose for this book. Much can be brought to light that will help us to see what kind of transportation system we should really have.

Upon this knowledge you'll be able to see Americans and the rest of the "petro-lized" world have been sold on a loser; that being petroleum fuel. You will understand why if we don't wake up fast we are going to turn our lakes, rivers and seas into our very own petrochemical genocide.

In the next decades Americans will be expected to maintain the same antique system we never should have built in the first place. They'll distract us with new technology life Self Steering cars, but they'll leave us with the same piston engines that neither last longer, are cheaper to repair or get better fuel mileage. Government will continue to endorse and Big Oily will continue to supply toxic gasoline. They will NOT make our system into a safe system.

When you know all of these truthful insights, you as a new car buyer are prepared to enter the new car showroom.

FORWARD

WHAT KIND OF transportation system would we have today if our engineers and designers had proceeded ahead with the best ideas and inventions? Remember, the United States and the rest of the industrialized world took a quantum leap in mechanized power systems over 120 years ago with the harnessing of the Niagara Falls in 1896 and the production of reliable electric power. But even as early as 1834 Thomas Davenport had invented a battery-powered electric car. And by 1879 Werner von Siemens of Germany had designed and put into service the first electric powered train in Berlin.

What kind of innovation have we had since 1821 when Michael Faraday first demonstrated electricity, when today Big Oily still promotes the same high-friction piston engine designed in 1886? What kind of innovation have we had since the discovery of medical grade distilled alcohol in 100 AD when our vehicles continue to run exclusively on toxic gasoline, while at the same time consuming as much or more than turn-of-the-century designs?

The Von Siemens' train of 1887 was powered by a 2.2 Kw series-wound motor that drew 500 Volts of direct current. Its electricity was provided from a power plant that utilized a steam turbine which ran off of coal. Take a moment to ponder the significance of this invention. Here was

a system that ran off of cheap coal, burned out of town, away from the crowds. The train itself received all of its energy from the plant by the use of overhead electric wires, and since these wires provided power at any point along their path the train itself did not have to carry its own fuel.

Unfortunately this legitimate human invention, the "ever-fueled engine", was dropped from the showcase and replaced with more glamorous-looking powered mechanisms. Meanwhile the public sat half asleep, placated with high-horsepower vehicles, cheap gasoline and plenty of open roads. With the public hardly noticing, electric powered trains were bought out, and even though they had been built to last, were labelled unprofitable and dismantled.

This was accomplished all for the sake of petroleum-dependent designs. Today these and additional facts reveal the extent to which the public was denied access to superior engineering, metallurgy, chemistry and bio-physic discoveries made during decades of research. If we had, we would have a transportation system today that is safer, friendlier and a lot less costly to use.

Piston engines possess one mechanical idiosyncrasy that is reason enough to have abandoned the design from the start. That idiosyncrasy is the fact a combustion piston engine must be kept running even when at a stop. Correction! Now in 2018 most vehicles are being equipped with a stop start mechanism, so we can all get excited! Or can we? The stop start is at best a paradoxical device as it is electric powered requiring a larger alternator and battery. Perhaps they should just switch to an engine that does not require a stop-start in the first place?

In the meantime it's the same old tune. Even though every vehicle manufactured has been revolutionized by electric-driven digital control mechanisms, every vehicle manufacturer ignores electric powered vehicles. Instead they provide us with larger and larger piston engines that first serenade then later rob us blind. As our powerful engines give way to slow moving traffic, our former high tech car gives way to 5 miles per gallon whilst in the company of thousands of exhausting tailpipes. Few seem to

wonder if we also get dumbed down by toxic car exhaust and carbon monoxide. What do you think?

As overall fuel mileage has remained the same for the past 110 years we now have confirmation that any and all of the "improvements" that have been made to our vehicles for the past eleven decades have just been new versions of styles and trends. Meanwhile the media carries on as though high technology is here, nobody has time to care about the air we breathe anyway.

The problem is we have but one choice for power; toxic petroleum. Whenever you burn gasoline you burn at least 34 additional toxic compounds along with it. This renders it unsuitable as a fuel used in confined areas like cities, but such stupidity only delineates consumer fraud., the situation gets even worse. A typical 25 year contract with Saudi Arabia pays $2.00 per barrel supplied. That's less than .05 per gallon yet it is sold at a higher price than a gallon of milk.

To produce milk requires land, cows, grass, feed, machinery and workers, but somehow by the time .05/gal oil reaches our pumps it is priced at $4.00/gal. This represents a 7900% increase. Such price/value disparages are obviously a result of more than just greedy business as today in the 21st Century the petroleum industry itself has proven to be environmentally heartless. Not only do our cars consume petroleum but our land must consume petroleum as well in the form of asphalt. The amount of asphalt laid down on our land since 1952 now totals 1,320 million tons allowing for 2.7 million miles of paved highways.

This was in actuality a petroleum windfall program set up during the 1940's when our transportation "gurus" got the notion to replace much of our nation's freight from coal powered trains to diesel powered trucks. This may have been a great gain for Big Oily, but it put our heavy freight vehicles in the midst and alongside the public's transportation vehicles. Prior to this most of the heavy freight hauling had been done via rail where it was carried out by professional drivers who operated alongside other professional drivers. The new system required professional cargo truck drivers to use the same system as the general public, which included anyone above the age of 16 who got a driver's license. You can't expect to run a system to

professional standards when you have to incorporate non-professionals into the system!

The system we have today is not the one that either set of drivers would have wanted. Worse yet, today the destiny of our country lies in our choice of what to do with our blacktop highway investment. We can either watch it all decompose into toxic chunks of gravel or watch our nation become bankrupt paying Big Oily for endless blacktop recoats.

How did it come to pass that our evolved transportation system would require all the juice Big Oily could deliver and then some? How did it come to pass that our government would harbor traitors who allowed a corporatized auto/oil conglomerate to operate a monopoly in disguise? How did it come to pass that we ended up with such an accident-prone system? And why are these same companies still allowed to reap enormous profits, even though they always come at the expense of our water, air and lands?

Today is the day to get real and realize we've been sold on petroleum and the petroleum companies themselves, are a looser. To begin, all of our petroleum highways are breaking down under the sun as you read this. This is the system we have built and it has a built-in renewal clause for the oil companies. Now, in order to support this, these same companies are willing to frack our lands and ruin unlimited acres of crop and farmland. If we don't wake up, from now and until the foreseeable future, we will all have to bare the repeated expenditures for the money-gobbling highway system we've unwittingly constructed.

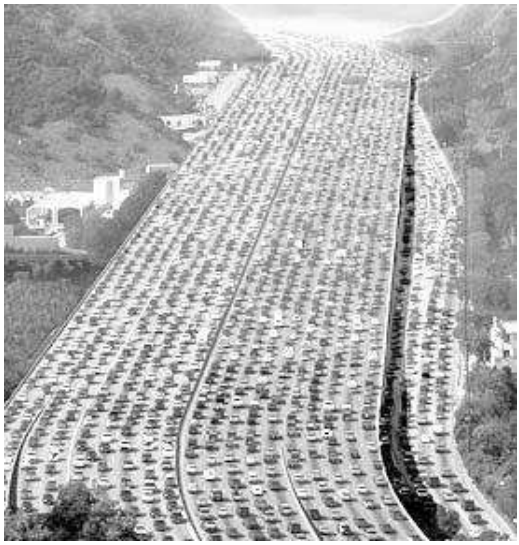
And here we are, a nation that imports petroleum and as a result operates at a deficit! The public has thus become shackled to a transportation system that holds us hostage to the whims of Big Oily. However, just now the shackles are about to come off. Get on board and be part of a "Renaissance" of technology and transportation mechanisms with zero pollution as the standard.

The time has come to question and to persist. We must keep Big Oily from rebuilding our transportation system from the same flawed principles. This time we will build a system that fits the entire planet.

CHAPTER 1

Petroleum Piston Powered Cars

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. Later, 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!)*

Big Oily has dealt the public an inferior hand 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, but it is embezzlement of the public good never the less.

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.

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 fuel/engine package.

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. They just 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 that our vehicles have become significantly more expensive to own and operate. As a standard excuse we're told it's because of the added engine "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, google the top ten polluted cities. Fresno, California sits at No. 1. Reason? It sets in the I-5 Corridor.

If we pay more for our vehicles so that they run cleaner, but the overall system continues to pollute the air regardless, we're not getting more for our money. We're getting screwed. The fact is we've entertained by a theatrical display of amusement-park level mechanisms and have forgotten all of the better ways to move people about safely and efficiently.

Such were Big Oily's goals; made even before the distribution and sales of motor fuels began. Our traffic planners were lured into supporting an industry that was already monopolized. Their corroborations gradually undid what the Standard Oil Antitrust Case of 1911 had been conducted to stop. The consolidation of branches of smaller petroleum companies into a few larger ones was supported by major media and television. This they remained clear of the unsuspecting public.

Or maybe this didn't happen? Maybe the public was alert enough to see the oil industry regrouping and to stop it from ever happening again. Maybe Big Oily was really was under close scrutiny by the government as they claimed? If the public was alert and Big Oily was under close scrutiny 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. The fact is we are dealing with a corporatized industry that has demonstrated over a 100 year period that it has zero regard for our environment and even less regard for our planet. They've even put a pipeline at the bottom of the Great Lakes, the largest volume of fresh water on earth. Now it is over 60 years old now, past its expected service life and managed by a contracter.

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 miss the connection with the petroleum-driven transportation system and our health.

Our current transportation system; considering the crash dangers, fuel inefficiencies and extreme cost of operation, is neither safe, reliable nor efficient. The sad fact is, we've allowed ourselves to accept anything the toxic petro industry dishes out. As a result we have a system only a psychotic-minded person would have designed.

The World's First Automobile

Let's go back to 1886 when the world's first car, the Mercedes "Motorwagen", appeared. Forget the lackluster performance; the main issue was that it ran on gasoline. Gasoline would normally have been the last choice for a viable fuel, but because of its extreme abundance, from this point forward the vast majority of engines were designed to burn this fuel.

In August of 1893 Rudolph Diesel completed the design and construction of an engine that ran on fuel oil at twice the compression ratio and was thus 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. The fuel efficiency was much better than that of gasoline engines. Big Oily obviously knew, if the diesel engine was to become the preferred engine, it would result in 50% lower figures in fuel sales.

But never forget the main reason. These cars came equipped with gasoline engines due to the fact there was a glut of gasoline. It was unusable as boiler fuel because it was so dangerous. So from 1886 onward all of the engines the auto makers installed into our transportation vehicles were designed for the purpose of creating a demand for gasoline. That's a bit of criminal collusion, folks! The result is the colossal giant known today as the petroleum/auto industry and to understand how it operates you have to understand that every piston engine has been built to consume petroleum and build this empire. No gasoline piston engine has ever been built to provide efficient propulsion.

You didn't know this because thanks to collusion with the auto industry, the movie/tv 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.

You are just now beginning to understand the selling job that was done in concert with the building of our current asphalt based nightmare. If you have an expensive flashy car and feel like your dream for prestige has been fulfilled then you need to consider how well they have sold you on the program. 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 for primary propulsion. Ask yourself why virtually every manufacturer continues to rely upon this archaic design from 1886.

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.

Gasoline

The first thing you need to understand about gasoline is that it's composed of a wide mixture of petroleum hydrocarbons. Put in simple/stupid terms: anything that falls within a boiling range of 100^0F to 400^0F can be a component of gasoline.

Gasoline is classified as being of a heavier density than naphtha (aviation fuel) and of a lighter density than kerosene (diesel and jet fuel). In other words; gasoline is unsuitable for aircraft engines and diesel engines.

If gasoline is used in an aircraft engine, because the octane level of gasoline is so low, detonation will follow and the pistons will soon fail. If gasoline is used in a diesel engine, pre-detonation will damage valves while its low viscosity will also damage the fuel pump.

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. Problem: since the gasoline engine has a low compression ratio, it will be less efficient and consume more fuel than a higher compression engine.

The gasoline powered piston engine has the dubious distinction of producing more poisonous carbon-monoxide than any engine considered for automotive use. These two characteristics; excessive fuel consumption and carbon-monoxide exhaust, made the choice of this engine the worst power system ever adapted to an automobile. Today's gasoline engines continue to suffer from excessive fuel consumption and produce poisonous carbon monoxide gas, yet are standard equipment for 90% of our vehicles.

This is a sad evolution considering our original transportation concept was powered by electricity produced outside of the city in a large power plant burning coal or fuel oil. There was no pollution generated in the central part of the city.

Today China is powering trains at 300 mph using this system. Here? The oil/auto industry got the petroleum-gobbling system they wanted. Unfortunately for us commuters, little attention has been paid to the safety of the system itself. As you will soon learn, there never has been more than the slightest motivation to provide this.

Today's Modern Automobile "Choices"

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

So your car is wearing out, or at least you think it is. Therefore it's time to purchase another. So you go looking at vehicles of the size you need. Is there any reason to check out the different types of propulsion systems that are offered? Not really. Will it be 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 have a turbo-charger, super-charger or dual exhaust pipes?

I have to give them credit for giving us lots of piston choices and whether or not to go turbo or non-turbo but fortunately for me I can see it for what it is; just another one of a million piston engine designs that share the same concept as the original 1886 model. Still most are mesmerized by the way they make piston engines look so modern. They 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. Next time you buy a car ask the salesman to tell you 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 fed you.

Over and over again we fall for "new" car and truck models because they invoke a new era of what is to come. That's why we come away from the dealer believing we are buying an improved version of what we already had. A new car is always quieter, smoother, more economical, sportier, faster and attention getting than the last car we bought. Problem is, we got sold on the idea that our existing cars always had to be improved. They kept adding features; and this kept adding to the price.

Notice that they have never added longevity to the vehicle itself. One reason is because they keep installing piston engines in our vehicles. New engines may contain 100's of electronic circuits and accessories but they have not replaced the 100's of moving parts that were in our engines before. A second reason is the continued use of iron in most of the car bodies and frames.

The reality of the situation is that auto manufacturers keep giving us the same Big-Oily-engineered designs, and this is what they 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 manufacturers tools (and costs).

3). Complex engine components that are so crowded, shielded and difficult to get to that a $100.00 part like a starter or alternator will cost between $500 to $1,000 to get replaced.

Know what you are investing in. You just may be getting on board with a vehicle design that is much more expensive to maintain than you thought. And it's getting worse, due to a plethora of engine designs which number in the 100's of thousands, to find parts for and keep repaired.

Expensive cars have expensive maintenance, and now on top of this, today we who buy them cannot work on them. In fact, repairing them is a challenge for every mechanic no matter how skilled. 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?

We have come to the point where we have so many models the only way to repair them, no matter how small the problem, is with expensive diagnostic meters to find it and a computer that shows how to fix it. That

leaves everyone else who formerly took part in keeping their vehicles running themselves deemed as a worthless labor force.

Engineers are supposed to make things as simple as possible, as easy to work on as possible and as safe as possible. Unfortunately the failure of just one major component like an engine or transmission forces us to dispose of the whole car, or face repairs that could reach upwards of $10,000. 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.

In today's world to get onboard with the system we must accept what the car producers have come up with. What they have come up with is the five to ten year "disposable" car. In actuality, 10 year life from an automobile, being that it is such a comprehensively manufactured item, is outrageously short-sided.

The fact that after 125 years of road testing and manufacturing road vehicles are lasting less and less longer indicates we will never have anything of lasting quality unless we upend the current monopoly. Meantime, we are teaching the next generation to live "cool", meaning how to accept cheap materials like plastic chrome grills, plastic seats and plastic dashboards. 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.

When was the last time we got a vehicle offered for sale to the public that would offer those basic things rather than higher cost and complexity? 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.

When you buy a new automobile you will not only be buying into a toxic system but one that allows dealers and manufacturers to rip off the public by charging them more for pollution and smog equipment. This has rendered our vehicles as being nearly impossible to fix. Thusly any

mechanical and electrical skill you possess is going to do nothing for you when the vehicle shuts down these vehicles have been made with so many overlapping computer circuits. Yet even new vehicles can unexpectedly malfunction in a thousand and one ways. And each are slightly different.

With the enormous purchase make sure to keep your car out of the tropics or extreme weather like Las Vegas or Arizona direct sunshine. Keep your car in a garage and keep your garage heated so that it doesn't suffer the daily condensation of its plastic coated electronic gadgets. These have been shown to fail the simple test of time against material hardening, rat-dropping corrosion, heat and cold cycles, insect deterioration, mold and sunlight.

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

The car you buy today can never be restored as a classic car like the ones of the past. 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.

Today the only thing about buying a new car you can count on is that you will become shackled to car payments, insurance renewals, license fees, tires, batteries, oil, anti-freeze, dealer service fees, smog fees and gasoline which when all added up will dwarf the operating costs of cars produced 75 years ago. In the final analysis, there is only one thing the modern automobile does better than all of the previous automobile designs; it takes more of our money to operate it. From now on you will see such things as cylinders, turbochargers, intercoolers, dual overhead camshafts, super chargers, port fuel injectors, etc. for what they are; props in a marketing game show.

Car Crash Standards and Continued 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. Considering that we are in the 21st Century such statistics are deplorable. This is for the simple reason that car crash standards have nothing to do with car top crush-in from large trucks.

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. The tops of our cars and trucks crush down like a cheap cardboard box when something heavy comes down on them. This renders crush-in fronts and airbags 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 more innovative designs and inventions. This is because modern crash test requirements cost 10's of millions of dollars to be performed leaving the big auto to ride atop crash standards 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 which cannot afford all of the tests necessary to get their product approved by the FDA.

The poor hapless automakers tell us that because of all the tests and standards required by the government that today the average new car costs the developing auto manufacturer between one and six billion dollars from beginning to end to bring the car to market. Yes, you read this correctly. Does the above wrecked SUV look like a one to 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.

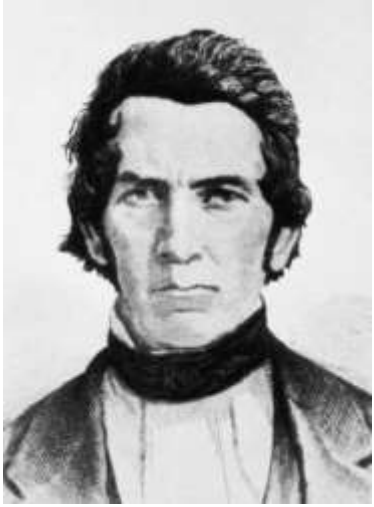
The hard fact is that no quantum improvement has come about in car safety during the past 50 years other than airbags and they don't prevent smashed bodies. And it should be noted for the record that even this improvement was fought tooth and nail by the American auto industry for two decades failing to adopt them until Congress finally mandated it.

Another fact never mentioned is that auto manufacturers who do meet the requirements of standards and testing procedures are in no way encouraged to produce the safest designs to the public and they would not be rewarded by Big Oily if they did. We the human race were never so stupid and callous so as to design a system that puts a 3,000 lb. family car

packed with kids on a busy highway in front of a an 80,000 pound double trailer big 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.

Look around. Important people no longer travel in cars. They travel in RV's the size of busses or cars equipped with body armor and bullet-proof glass. The fact is we've been forced into accepting a transportation system that soaks us to the bone financially even though it endangers our lives every time we use it.

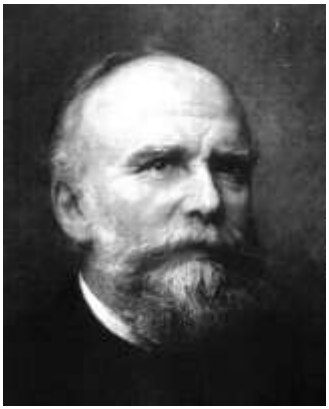
Do the auto/oil executives really believe this is an ok scene for motorists to face every day as they commute to work? Do they relax here too, at home with a beer? What do you think?



Above With his wife Emily and a colleague Orange Smalley, 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

Above: 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 2

The 100 Mile per Gallon Carburetor

Or was it a 200 mile per gallon carburetor?

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 without boring the majority of readers with the medieval details of the piston engine I need to first expose the stage upon which our current piston-powered world operates. I refer to it as a stage because a false notion of prosperity has been acted out in front of the people via a media composed of actors and actresses. In the meantime the oil-sponsored media have conditioned the public to believe that our prosperity is

proportionately linked to the supposed high-tech petroleum powered vehicles that our country's free-enterprise auto industries have redesigned year after year after year. In reality, nothing could be further from the truth. Today we are not prospering. We are shackled to a transportation system that costs us more than it serves us.

Before I present the picture and diagram of the Pogue 100 mile-per-gallon carburetor let me work our way up to it in a manner that will better allow you to believe the story. So I will 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 the water.

That's right. Gasoline formulas blended with water outperformed gasoline without water. This was for the fact that the engine's high combustion temperatures turned the water into steam which lowered combustion temperatures overall. This in turn prevented detonation even though it promoted higher compression and produced more power from the engine. But the biggest benefit of all was the dramatic reduction of exhaust emissions.

You should all be 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, and just wait until you see the cost of it!

Here's a quote from 1895:

> *"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? Don't say for profit, because this restriction represents more than just a bit of corporate zealousness. This is a bit more serious, 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!

This is why that 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 they're still not playing a fair game.

The simple use of water mixed with fuel has to rank as one of the best fuel enhancement ideas ever for the simple reason that water is both abundant and free. Its use would have saved fuel and eliminated smog. It represented a giant leap in fuel enhancement and yet it has been deliberately shunned and kept from the public. Let's review what has transpired:

1895: The use of water (to increase combustion expansion and reduce engine heat), being an obvious method to reduce combustion temperature and produce steam pressure is researched by the inventor of the engine where it is found to dramatically reduce exhaust emissions.

2018: They have now denied the entire population a cheaper fuel and cleaner burning fuel for over 120 years. The situation reaches beyond greed as countless humans have suffered and continue to suffer from the toxic chemicals emitted as exhaust pollution which has led to an all-time high in cancer rates.

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. What are the added costs to the public as a result of this free technology denial? What would a savings of 20% in fuel consumption every year since 1887 have added up to in terms of cost, never mind the health issues? 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.

Don't worry, this is just the beginning. In the next chapters we're going to completely take apart the petroleum piston engine and expose it for what it truly represents. In the meantime, try to replace the mental pictures of the oil industry, the car industry and the oversight committees of Congress currently in your minds with the truer picture of profiteers who care nothing about your health or economic servitude. You need to know what lurks in these corporate chambers that are rampant with public deceit.

I worked for a major oil company for 14 years and 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 the unsuspecting souls who live or work downtown where endless smog-producing automobiles crisscross between the tall buildings through hallways of toxic pollution 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 one single bit about our health, because they know the use of water-emulsion fuel would virtually eliminate smog for free.

Methane and Methanol

We could extend our existing petroleum reserves as a result of water multiplication. We could even negate the need to drill for oil offshore and stop polluting our oceans. 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.

You might be surprised to learn that Methanol can be produced from Methane gas, which is the largest component of Natural Gas. 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!

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. It 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.

Because of the presence of Ethene in the overall mix of Natural Gas it will not liquefy when compressed unless it is cooled to -260^{0}F while at 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 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.

This is a Giant Dilemma for Big Oily

Methane, 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 that's just for starters. Now when any motorist compares gasoline and methanol side by side they will quickly find that there's really no comparison between them; one is toxic and one is not. This is why Henry Ford equipped his Model T's in 1908 with alcohol as the standard fuel leaving gasoline as the optional fuel.

The fact is gasoline is at best a cheap boiler fuel that is dangerous to use and so toxic that it should only be burned in electrical power plants that are far away from cities and people. It stinks and pollutes because it has so many other volatile compounds in it. It vaporizes poorly because it contains all the petroleum liquids that boil between a range of 130^0 F to 430^0 F. Don't even get me started yet on how stupid these wide boiling parameters are! It's like machining a camshaft follower to $1/100^{th}$ of an inch instead of $1/1000^{th}$ of an inch. Who would manufacture such garbage when they could have manufactured such a much better one?

Methanol 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! But 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. For example the process for producing ammonia from natural gas, the Haber Process, was patented in 1905.

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 $2CH_4 + 2H_2O \rightleftharpoons 2CO + 6H_2$
ΔH_{298K}= 49.1 kcal/mol (4)
Water gas shift $CO + H_2O \rightleftharpoons CO_2 + H_2$
ΔH_{298K}= -9.8 kcal/mol (5)

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.

I highlighted "one step steam reforming having been the dominating process" and suspect a deliberate shelving of it over the fact it isn't the dominating process today. I have absolutely no doubt they refuse to use steam because it does not only crack the hydrocarbons but cracks the water molecules as well. You should know that the industry very specifically chooses to avoid technologies that crack water. This is the only reason they don't use Steam Reforming in large plants and why they haven't updated their processes since the 1920's.

We have been told as scientists 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 930^0F. 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?

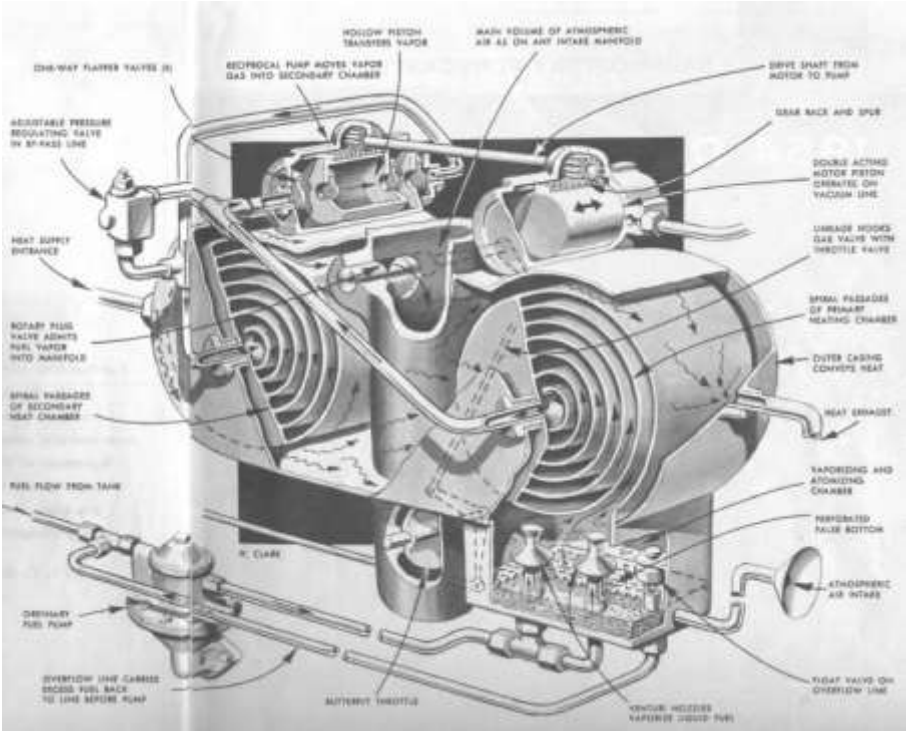
<u>Below, according to Open Source Ecology July 2016</u>

> 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 photocatalysis 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.
>
> With the use of tungsten oxide or a similar semiconductor, photons of lower energy than ultraviolet (down to blue) can be used. This process has been demonstrated by several groups using ultraviolet flash bulbs and also with lasers.

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. Why not use the reformer and steam to crack hydrocarbon liquids directly into methanol?

Now here's where the "methanol factor" takes a quantum leap because it means that the oil industry can convert gasoline into methanol anytime they want to. I know this thanks to the pioneering work of one brilliant engineer by the name of 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 that had been saved and printed into a book he acquired out of curiosity. And in the course of his research he found that the 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.



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

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 as 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. I'm sure there were many other things said such as "you can still have a good future, Mr. Pogue", "think what is best for you and your family", well you get the idea because he took

their advice. Pogue ended up working the remainder of his life designing and selling oil filters in a lucrative business. Later his 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 130^0 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 130^0 F fraction of the fuel was burned in the cylinder first and that the rest of the fuel above 250^0F 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 it unless you somehow converted all of the molecules in the batch to smaller ones that were more uniform. 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, CH4 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, that their boiling points were greatly lowered. And he found that when their boiling points are within the same

temperature range it results in a virtually spontaneous ignition. So the piston gets 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 shows that 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 his tests conducted at 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 every oil refinery and heated it to 500 ^{0}C (932^{0}F). At this temperature the super-heated steam becomes critical, the gasoline molecules begin to break apart, then begin combining with hydrogen and oxygen molecules from the water.

It's a perfect combination; on one of the carbon a hydrogen atom attaches and on the other end an OH molecule attaches. This is the basis of methanol and the amount McBurney 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.

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

This is the big dilemma for big oily. Imagine what is going to happen to their volumes of gasoline sold once word gets out that they should have been converting their toxic gasoline stocks into Methanol all along. The people are going to know that they could have produced nearly five times as much fuel as they did, and they would never have needed to drill for 80% of it in the first place. In other words, what's going to happen to big oily when the people of the world find out they've been seriously ripped off?

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

And 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. For example, methanol was used at Indy for many years for this very reason. When you use Methanol 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 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.

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. So here is **conclusive proof that there is absolutely no such thing as an oil shortage.** We could be swimming in the stuff. This has been one

of Big Oily's biggest secrets, and they certainly don't want the public to figure out that we've been sold on the worst of all possible fuels for the past 80 years.

The Miracle of Methane Gas

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

Now is a good time to further discuss methane gas as there is as much confusion about it. Much untrue propaganda has been said about this naturally produced gas and as a result people tend to fear it. For example during the BP disaster in the gulf when millions of tons of methane were released directly into the atmosphere, industry executives warned via CNN that methane gas was extremely toxic and would kill humans if they breathed it. They used this as a reason to burn it. Was this better than just releasing it? Hint; you may want to read further before you answer.

Methane: CH_4, is a lifting gas from the fact that it is often used in weather balloons for that very purpose. What does that tell us? It tells us that methane will go 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?

The bad truth about methane then must be for the fact that it does rise up into the atmosphere and accumulate there, and that therefore it must be responsible for a blanketing effect leading to an increase 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: $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$.

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 one other thing you should know about Methane is that humans can breathe in and out all of the methane they want. It can only kill you if you allow a methane tank to continue leaking such that it drives the oxygen out of the space to a level below 8%. And further, it is not toxic as is carbon monoxide, made lethal by the fact lung tissue prefers it.

So why would greenhouse climate-change advocates make such negative statements about Methane? What could possibly be so bad about the methane gas that comes out of decomposing organic materials and over-zealous cattle? Why would they make such a fuss about this splendid natural earth cycle? To totally mislead us, that's why. Because in the meantime, in

the Bakken Range of western North Dakota hundreds of stacks dotting Nebraska's fields of wheat and sunflowers sit flaring off methane and natural gas. And out here, every day, more than 100 million cubic feet of useable gas is flared up into the sky. This is enough energy to heat half a million

homes!

Can you see we need to wake up? Any time you see this practice going on you are witnessing right here within our own country energy being deliberately wasted and allowed to be wasted! Aside from blatant disregard for a viable source of energy, the end result of this practice is our nation having less available energy to burn overall which means existing production will have to remain where it is to meet the demand. This allows them to inflate the price.

Today, in lieu of what is going on here, this brings up an important question: why is the public forced to smog-equip their automobiles when the industry itself is not-forced to smog-equip their larger and obvious sources of air pollution?

The failure to conserve energy plus the deliberate contamination of the air is double hypocrisy from the industry because in this case valuable energy wasted and allowed to be released unfiltered and un-scrubbed of trace elements and volatile compounds directly into the atmosphere. 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 are being flared and vented annually."*

It gets worse. These flared gas wells spew two million tons of carbon dioxide into the atmosphere every year. It makes it hard to swallow our current vehicle-imposed smog laws when at the same time the industry itself 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.

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 as a result of loopholes within U.S. environmental laws that enable these insane practices. Here is an account from a landfill in the United States:

"Methane that is currently flared can 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 local 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 thereby prevent the methane from entering the atmosphere and displacing fossil-fueled production of electricity. 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."

The fact is 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 cannot be burned.* What exists now is just another racket for the oil industry that benefits the oil industry.

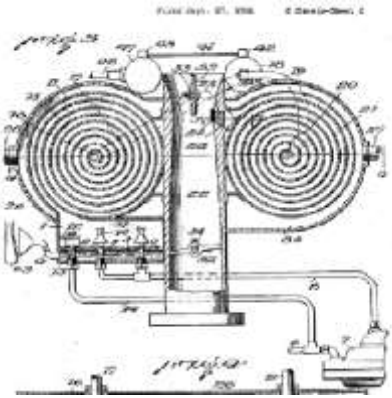
Now also note from this experience how big oily demonstrates complete disregard for global air quality. Thus, when publicly scrutinized the industry itself lays way to the fact that it does not possess the necessary leadership skills to serve as stewards of such potentially toxic substances as petroleum and motor fuels in the first place. If you forget everything else, remember methane is a miracle gas and methanol is its favorite cousin.

The Mystery of the 200-Miles Per-Gallon Pogue Carburetor

For the first time in 14 years, the inventor of one of the most controversial automotive advances of the past two decades reveals the story behind its strange disappearance

By I. T. Galanoy

One of the few photographs ever taken of inventor Charles Nelson Pogue was snapped in 1936 before he and his machine disappeared from the public eye.



CHAPTER 3

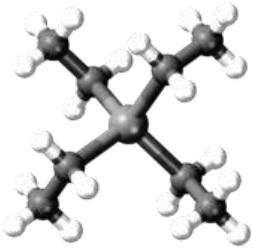
Tetra-Ethyl Lead and Friends

THERE'S NO BETTER way to begin than with this blatant discussion of the use of lead by the world's trustworthy source of data:

"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." From Wikipedia,

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



The underlined information has to make anyone seriously question why the industry ever used this stuff in the first place, and just 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 at the ease of which we are being provided all the necessary admissions to hang big oily and the crudelums for crimes against the people and planet.

For starters, big oily has become so confident of their power and control over our modes of transportation they now are now openly admitting that they could have used Methanol as an octane booster all along. Whoa! That's an arrogant statement considering the millions of children whose IQ's have been dramatically reduced as a result of lead poisoning! On top of this they are willing to openly admit 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 that occurred in the lead mines which supplied the Roman Empire was found to be lead itself. The reason the men were all dying at such a young age was because they were handling and breathing lead particles. This has all been documented. Google "Vitruvius lead pipes" if you want the full story. And while you're at it, google "Washington DC lead crisis" and include "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 seems 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. For big oily this is more than incriminating, as they have already admitted that they could have avoided the use of lead and just used nontoxic alcohol. The oil industry thinks that people are as stupid as sticks!

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, and that we did use it 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 enhanced 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 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. These would have reduced fuel consumption and air pollution. Later they denied us the use of nontoxic alcohol. This would have provided higher octane engines and not polluted all of our highways and downtowns with toxic lead.

Or you could put the performance of big oily this way: First they fouled our air with carbon monoxide and harmful car exhaust, then they added lead to every gallon that was burned. This exponentially increased the level of toxins and lead along highways and near industries which contaminated the soil and buildings of urbanized areas where people worked and grew up.

The industry admits they did this for profit folks. Now we can clearly see this profit-motivated corporate auto and oil conglomerate has proven beyond a shadow of doubt that it cares nothing about humans or property. Big Oily has proven they are not rightful stewards of the world's energy reserves and in fact should be brought before a public trial on a world court and tried for illegal racketeering against the People of the Earth and for Second Degree Murder; killing caused by dangerous conduct.

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. I hope you understand now that the use of lead was never about anti-knock, engine wear and valve beat-in as the auto/oil conglomerates stated, and 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 Giant Crude Oil Drain Field

In order to grasp the full scope of the current transportation abyss we are in the piston engine itself must be exposed for what it is. These high-friction, inefficient devices, manufactured in the hundreds of millions in the United States alone, have today almost completely displaced all of the older, better and less costly systems such as steam trains, electrified rail, underground vacuum-powered trains, trams, etc. As a result 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 oil companies dream, being that they are petroleum consuming devices with a gigantic appetite. The oil industry needs every one of them. Without 100 million of these vehicles operating daily in the United States alone, getting 15 miles per gallon or so, they would have a surplus of oil on their hands within days.

Now let's make a comparison with continuous waste water system. Picture a piping system full of waste water that is flowing into a septic system and from here all of the over-flow goes into a drain field. Now 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 a septic system and drain field as well. In this case the septic system represents the refineries and tank farms and the asphalt highway system represents the drain pipes. Exhaust pipes, tires and brake pads represent the drain holes. The effluent is represented as toxic vehicle exhaust, toxic tire wear pollution and toxic brake pad wear.

In the giant petroleum drain field all of the toxic ingredients contained within crude oil are dispersed upon every far corner of the land and the oil industry brags about the fact they pull 800 million barrels of toxic crude from the 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 ruling of the EPA, crude oil cannot be deposited in a landfill. Makes you wonder why would anyone want to go drilling for it?

Now that we know crude oil is classified as a hazardous waste, we also know that it can only be disposed of in a hazardous waste landfill. Now here's something to think about. How is it that out of the 800 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 the way it is currently classified it is stipulated this is the only place it can go? Well it's because although big oily may not be able to throw it away in a landfill, it's OK to burn it up out in the environment.

I'm sorry this may be so hard to stomach 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 systems is unlimited miles of paved roads that are constantly deteriorating. In addition we have smog in our air and petrochemicals in our water. This is our reward plus the honor of exorbitant car maintenance, 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. Many of us have several petroleum-piston-powered cars sitting in our garages which bring us a myriad of unnecessary expenses in just getting to work and school. In the process we are forced to endorse a toxic fuel for a corrupt system that is directly at odds with our common good and future.

Some Good News!

If we take a small amount of action we can greatly lessen the weight of the petroleum yoke. Just refuse to continue purchasing the gadgets the car industry currently tantalizes us with. 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. Just a change in our attitudes about big oily is all that is needed to bring them down. This is why we have to know what has happened to us.

Otherwise, if we let them, 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. But there is still more to tell so we will now take a look at another part of the petroleum drain field; the asphalt highway industry.

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!

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 tar. Now you're not only getting rid of a hazardous waste for free, you are realizing an increased yield on asphalt sales and have just gotten yourself a promotion, guaranteed!

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. Like the asphalt industry, don't mess with 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 the main ingredient. Such by-products of crude oil refining are considered toxic by the EPA thus they cannot be taken to a normal landfill but must go to a toxic landfill. Yet it's ok for the tire industry to use it in their tires which wear away everywhere as we drive on them. That's clout man!

No oil company can afford to send any of their toxic wastes to a landfill, but thanks to gaping loopholes in the toxic waste laws and oversights by controlling committees, 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 built out of toxic by-products meaning they are without a doubt one of the biggest rip-offs of hard earned money on the planet.

We have become partners in the dispersal of their toxic wastes into the environment and we also pay the disposal fees. This practice can be and needs to be stopped. 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:

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.

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."

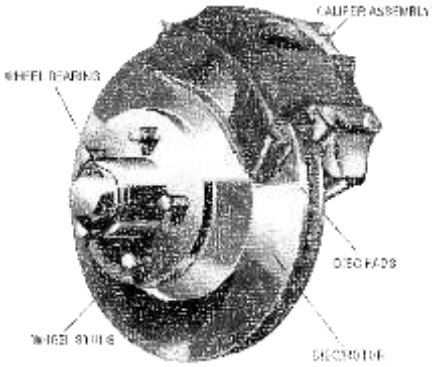
Brake Pads and Brake Wear

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 there's been no improvement in brakes during the past 100 years!

After over a century since the invention of the electric generator, thus having the ability to harness electricity from a rotating magnet within a coil of wire, we still haven't been able to adapt the principle to a wheel drum. Oh really! So, the modern disc brake is the brake-of-choice for autos and trucks even though it is hardly more than a 20th Century engineering Band-Aid 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 have nothing to do with speed. Friction brakes represent massive energy loss within the system. In the realm of developing true higher speeds for traffic flow, the emphasis is 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 to hurry up and make an appointment 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. This is a disgrace! As a result, all of the kinetic energy, the energy required to get the whole thing moving up to speed, is systematically tossed out the window. Worse yet, the energy is converted into the production of brake pad dust which we need less of, not more of. We shouldn't waste energy on the production of toxic dust; but we have for a century!

Like tires, brake pads are made of toxic materials. In this case the materials are asbestos and copper. Now what a shock it's going to be when you learn that these toxic material are now in our water, rivers, lakes, bays and oceans. It is estimated that over 1 million mechanics worked on brake shoes, brake pads and clutches materials on a regular 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 are kept the same.

The fact is we should all be stopping 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. The current brake and wheel is literally an electric generator just sitting on the axle bearing wanting to be energized at the flip of a switch. But car manufacturers will not tap into this obvious method to eliminate a friction-wear design because they themselves are working under the yoke of a larger force; big oily.

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 used for start-up.

We should consider alternatives as the battery industry has become another oil-related mega-sized business that has a similar disregard for people and the environment. As a result virtually every car-manufactured battery, no matter how modern the car, is as short-lived as plastic is cheap. We need to forget the notion that five year battery life for a simple electrical storage device is anything good or acceptable. The fact of the matter is it is

a poor system and it is one that was born of poor decision making. Take note of the world-wide pollution problem we face today from the unmitigated disposal and exposure to toxic lead and acid. 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. These 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.

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 lead 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.

First the oil refinery strips out the toxic chemicals from the oils and fuels. Then a separate petro-chemical company purchases these toxins 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, 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. The poorest individuals are the ones who get exposed the most.

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. Then they add it into the price of the car as if it was something worth purchasing. To keep turnover high, they manufacture the batteries as cheaply as possible. This is likely how some management promotions were secured.

More Plastic Petroleum Uses

(More on; What You're Buying Into)

Another offshoot of the oil/auto industry is the plastics parts for cars industry. As you can see, the amount of plastic components in our cars 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. I looks to me like 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.

Spin-on oil filters

Perhaps the worst 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?

These spin-on style filters remain full of oil soaked paper and it is surrounded by a metal shell which the user cannot get to. 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 these things have created and have resulted in more toxic oil going into landfills.

Can the auto industry possibly be this stupid, considering that the industry already had filter designs that were much better? Earlier designs featured filter elements that were bolted inside a filter housing which merely had to be unbolted such to lift out the old filter membrane and replace it with another. The old saturated membranes could be thoroughly 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.

Well guess what? The spin-on design forces us to over-consume filter components. I cut a bunch of them apart after 5,000 miles and even 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.

Note; there are differences in the oil chemistry of **diesel engines**, especially those that burn poorly and put soot into the crankcase oil. The 1980's GM diesels, cheaply made with low-compression engines were notorious soot producers. If you didn't change the oil every 3,000 miles the engine would crater itself at about 40,000 miles. Most diesel engines don't have this problem and thus their filters can be extended beyond the manufacturer's recommendations just as they can in a gasoline engine. I once cut one apart from a Detroit Diesel with 20,000 miles and didn't find any appreciable buildup of metals, dirt or gunk.

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

I have include the manufacturers of these parts in 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.

You should be especially concerned about the transmission that lurks within any piston powered vehicle, except those few which still have a

manual transmission, because it is nearly impossible to get repaired. It will thus need replacing when it acts up and this will cost $1,800 to $3,600. But this is not the main thing to be concerned about. The main thing you should be concerned about is the fact that this transmission has been built to wear out at a planned rate such that your vehicle will suffer excessive repair costs ahead of its time. It's also been designed to gobble up fuel mileage.

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 coupling connected to petroleum-consuming engines which are kept running even when at a standstill. This requires the engine output shaft to be disengaged from the wheels when stopped. Electrical motors solve this as they can come to a complete stop and restart with ease under maximum torque. The piston engine has to be disengaged and then re-engaged because it cannot drop below 700 rpm without stalling. If you have an automatic, in traffic it remains in drag mode and this consumes more fuel than at full stop in "park" mode. It's a system that won't let you win.

This complicated clutch and transmission is required solely because the lowly piston engine has a limited range of useable rpm. This means that as you increase the speed the engine will increase in rpm. If you continue to increase speed you have one of two choices; 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. The sad part is this component is nearly as expensive to manufacture as the engine. This is because they contain compact gearing, a limited slip transmission and a final drive, all in one housing.

Stop Buying Into Bad Ecology

Here in the United States we are forced to operate larger vehicles with lower fuel economy. In light of the fact that auto manufacturers can produce simple cars such as the $800.00 India-produced Tata, our basic automobile has become way more expensive than the value of what they provide. Instead of simple transportation were pretty much stuck with what television tells us looks cool and what the dealer trots out in his showroom. So we don't even have such buying options in this country.

Thusly, here in the United States we do not have simplicity nor do we get 60 miles per gallon either. Instead they placate us with toy-like gadgets such as the Smart Car for $20,000.00. The Smart Car may be built pretty rugged and it might be safer than a Tata, but don't try to tell me you are safe in either one of them when you are on the same road as 80,000 lb. trucks. What the dumb Smart Car does do is falsely broadcast the motto: "if a car is to be really efficient, then it has to be really tiny". And that's just what they want us to think when we see this car. Of course they want us to reject this car! I hope you know by now that big oily does not want everyone driving around in cheap cars that get great gasoline mileage. So the Smart Car sends a Dumb subliminal message, "It is impossible to construct a vehicle that is both economical and roomy".

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. Next time, before you get carried away, reflect back on the expansion of asphalt everywhere, the air pollution, tires, brakes, lead batteries and the fact you'll still be using the same old toxic gasoline. Pass the dealer by, keep the old car, and pat yourself on the back as you have just saved yourself hundreds of thousands of dollars. And you did this just by having a small change in attitude about Big Oily.

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

Smog Gadgets for Health and Safety

"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 the right picture. This is because for starters, instead of looking at the car's engine you are looking at a few hundred feet of dirty rubber hose, all of which must be connected properly with no cracks for your engine to run correctly. Where should you begin your troubleshooting on a sick 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 by keeping our cars "smog" compliant. Only after forking out $100 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 think to realize that a smog certificate is just a permit to burn the industry's toxic fuel into the air! And we have to pay for it!

Now that you've had a good laugh; how about a good cry? Just eight years ago in 2010 the world's oceans and atmosphere suffered from the BP deep water blow-out disaster in the Gulf of Mexico. As you can see from the picture on the page, the amounts of toxic aerosols that burned up in the inferno above the floating drill platform were astronomical. In addition, BP officials were allowed to further exacerbate the disaster by lighting on fire the remaining huge crude oil slicks so that their toxic brew went into the atmosphere as well!

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!

Now here's where it gets interesting. The story goes something like this: Supposedly within 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". She ship was modified such that after oily water flows through one of 12 intake vents cut into the ship's bow it could be pumped into a series of tanks. Here, oil would rise to the top and then be siphoned off while water is pumped back into the sea. The "A Whale" was said to be ableTop of Form
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. Seventy days after the blowout they began a test on June 30. It's sounding pretty good so far; as if the industry really has someone who cares or has a heart. The public falls for it every time. Now check out what transpired from this whole theatrical investment during wrap-up statements given to the press after the short testing of the modified ship:

> *"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 see why I say the industry is getting so arrogant and brash 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"? People should be rolling out of their chairs over this one. First they converted a ship worth

$160 million to an oil skimmer. Then they sprayed the oil so that it couldn't be skimmed. Bottom of Form

> Thad Allen, the national incident commander for the spill, summed it up like this: saying:
>
> *"he had expressed skepticism, and that A Whale would be more effective with thicker concentrations of oil than the widely dispersed slick emanating from BP's Macondo well".*

Su emphasized that his company absorbed all costs to convert and test the tanker. He vowed to continue refining the mega-skimmer for use in future spills. Chock it off to a learning experience! Well no, I don't think so. First off, if you had any prior thoughts that there really is an oil shortage or ever was an oil shortage then just stop to consider that you just witnessed a petroleum-producing company throwing away 185 million gallons of petroleum. So it's obvious they don't care about trying to save it and it's obvious that it's not in short supply but extreme abundance.

Now here is another gigantic ecological paradox in that within just a few days of spilling a few million gallons of toxic crude into the ocean and burning it up into the atmosphere these horrific debasements of our air and ocean undid all of the good that was achieved by the cleaner air standards imposed upon American automobiles since the anti-smog program began. 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 certified" their cars and pay the exorbitant fees. Now we need to wake up and start a rebellion of some sort; like not buying their lousy cars anymore!

But 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. Instead the industry continues to pit our polluted system against us even harder with larger automobiles, larger engines and all-wheel drive.

It is pitifully obvious that the corporate dictators who promote petro-energy as being viable for electric power and transportation in actuality care nothing for our health. The legislation which has been passed to require smog certification has become a means to placate the public with regard to serious health issues which were in the meantime never addressed. These added controls dictate the tuning of our cars and serve to discourage the public from being able to maximize their fuel mileage. The end result of smog laws that endorse toxic fuels stifles new designs that would be cheaper to build and get better mileage.

Our elected representatives have not represented the people's needs having instead become co-conspirators of supporting flimsy laws and an imbecilic transportation system.

How current smog laws work

You are not going to believe this but currently 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 <u>how many micro-grams per gallon of fuel burned</u> are produced. That means the more gallons of fuel the engine consumes the more micrograms of pollution the engine is allowed to produce. As a result, 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 thus this specification produces no incentive to reduce the amount of fuel burned, and in fact actually encourages 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 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 cancer 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.

The 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 turning over. 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, however and unfortunately, they do provide alibies for the oil executives who have to answer for all the haze, smog, ill-health and euphoria that permeates every metropolis. Whenever they do address smog they stress the importance of driving clean new cars. 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. Instead, smog laws have helped Big Oily to put the blame back on us, never mind the fact that they are still supplying us the same lousy toxic fuel.

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. What once was a cheaper way for a person to keep his car running, by doing much of the work himself, has been taken away. The real air quality issues should focus on gasoline and the engines that burn it, as both were garbage to start with.

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! Our car's fuel settings are not set for maximum mileage!

Fuel mileage is now fully in the control of the factory that set up your car's fuel program. Factory 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. I have read several times where a home mechanic has used a computer tune-up program to tweak their car's fuel system and increase mileage by as much as 30%. Later, when the car was taken to the dealer for its scheduled tune-up, they reset the fuel settings back to factory specifications and this always causes the gas mileage to drop back down to where it was before. It pays to find ways to keep the crudelums honest.

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 fuel-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. They continue to use the same practices callously, arrogantly and devoid of remorse. The public has been bilked of billions of dollars having been paid over decades for extra pollution-reducing components, fees, fines and higher fuel costs. Do you think Big Oily cares a dime?

Oxygenated Fuel: In Hiding For 100 years

Now we're going to really get down on big oily. There are hundreds of chemical formulas for gasoline: the average 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. All of the alcohols contain oxygen.

I should add that the formula for diesel fuel looks quite similar to

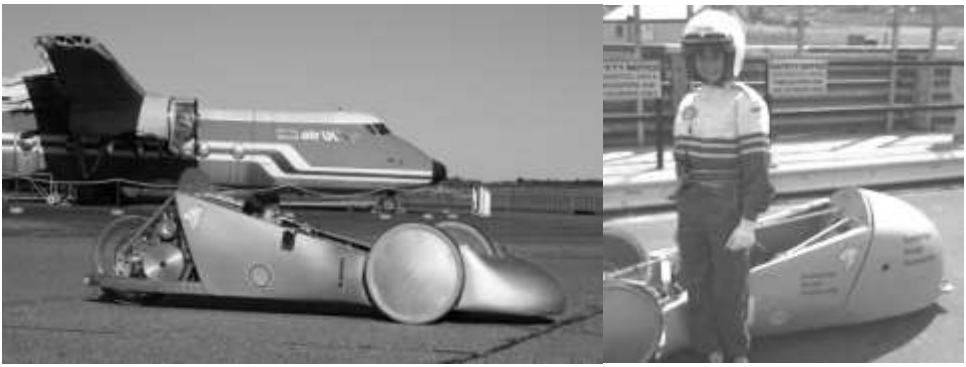
the formula for gasoline; you just have to imagine it having larger molecules because it is more viscous. So diesel fuel would be written something like $C_{20}H_{42}$, meaning it would have much longer and thus larger molecules, and therefore, it is less volatile. But it does not contain any oxygen in its formula either.

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 and 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 air have to be ingested and compressed by the engine during its attempts to 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 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 up to 50 knots.

Today we use similar liquid fuels that are very powerful in our rocket and missile programs but they are not allowed for public use. This is because under the United States Secrecy Act of 1951 the public sector is denied the use of borohydrides, hydrogen peroxide and other high-potency propellants and fuels.

Concentrating Oxygen Superchargers and oxygen concentrators should be standard equipment on all piston engines in order to help them breathe more efficiently for the combustion volume they have. In short, to get any power out of them requires gobs of oxygen in order to combust the fuel. Since nitrogen is 79% of the air that is pulled into the engine while



oxygen is 20.9%, stripping out the nitrogen leaves mostly oxygen. Since nitrogen only gets in the way of the desired oxygen it forces the engine to do more work pumping air into and out of the combustion chamber. Getting rid of the nitrogen fraction results in an engine that can breathe five times easier, or five times as much. Either way it's a win-win situation because with the nitrogen stripped away the pistons only have to compress 1/5th as much gas for the same amount of combustion power as before. This is a brilliant device that should be on every car.

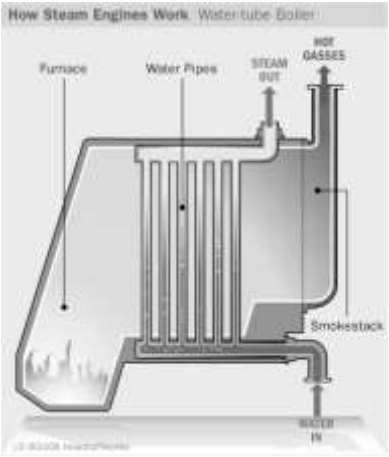
Now is the time to show you just what the value of all of our smog laws have been. In this example, a group of students in the United Kingdom didn't know the limitations of a small diesel engine the way they had been taught by mainstream. These young students were pulled from regional schools and universities 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. 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. Cambridge Design Partnership used elements from its own lightweight oxygen concentrator to create the unique car. The oxygen generator system was originally developed to treat injured soldiers, but in the car it is powered by an innovative micro-diesel-engine. The car also

features low-friction tires to increase mileage. Folks, here is more proof of deliberately discarded fuel-saving technology. 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 unless Congress mandates it.

A better use for gasoline
The only use for gasoline



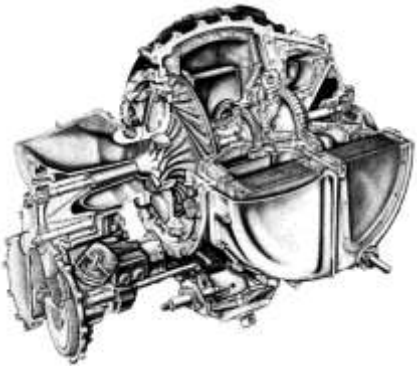
If we were driving around in steam powered cars that burned gasoline or diesel we would consume less fuel for the simple reason that a boiler is more efficient than a piston engine. This is because the fuel and air that is used to feed a boiler does not require compression. When petroleum is used in 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 a more efficient job.

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.

It is important to note that Gasoline does not produce carbon monoxide when it is properly burned as boiler fuel. When gasoline is used in a turbine type of engine it is much easier to get excess air into the system and thus no carbon monoxide is produced. Since the mass of air goes in the same direction it doesn't have to be sucked in out through bended manifolds and valve ports. This would obviously be a more logical application for a gasoline-burning engine.



But for piston engines, gasoline is the worst choice of a motor fuel. It can and should be utilized as boiler fuel out in the countryside where it could be burned in a steam plant to produce electricity to power homes, factories and the transportation system via wire in roads. But so much for practical, pollution-free engineering as you will see.

Wasted Energy

Steam heat and water injection

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 1,800^{0}F! 2. The cherry red color of the turbo exhaust pipe which indicates a temperature of 1,300^{0}F. 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

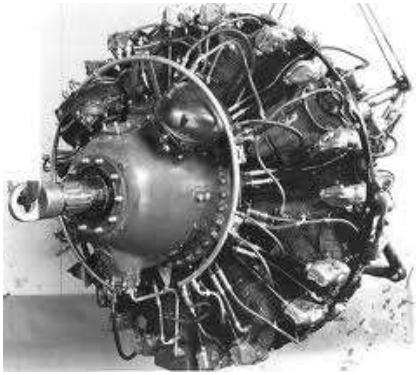
is expecting you to buy into. Can you see what pawns they have made us into since by going along with their program we create a trade deficit here in our own country? The fact is we can no longer afford the excessive thermodynamic waste from a piston engine fed fuel at international prices.

Clearly, there is enough heat here to boil water and it's being wasted. Yet they're still telling us we use too much petroleum. Every combustion engine will benefit with a certain amount of steam injected into the cylinders. Car companies could be boiling water with a simple jacket of tubes around the manifold to make steam which could 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 page one, 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? Water in the fuel increases the average combustion pressure, BMEP. This allows the engine timing to be advanced, reduces emissions and improves gas mileage (that is, if the engine's computer will let you advance the timing). And it helps the engine run cooler. 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 super-heated steam. This obviously results in less heat going into the engine's block. This is obviously the simplest way to improve a piston engine's performance. Yet no auto maker will do it.

Examples of Water Injection Technology



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 as shown at right. 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 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 they are operated under extreme loading. It should obviously be used routinely whenever we are burning fuels in expansion/combustion engines.

If car manufacturers were really doing anything to help fuel economy that they would build a steam heat recovery system into the exhaust systems of our engines as standard equipment, and this is in addition to specifying a fuel that has water at a 10 to 20 percent ratio.

CHAPTER 5

Engineering for 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

IT IS SADLY OBVIOUS that American traditions have given way to endless monetary demands placed upon individuals as they mature into adults. Today stock prices and corporate prices are much more important than being part of a company with long range goals to help mankind. Honesty and morals have given way to wealth and cleverness. Along the way five year car replacement became routine for most car owners.

1925 Ford "New Model" T Tudor Sedan

The manufacturers and dealers encourage us to be prepared for it.

Those who can afford a new car every five years have become used to it. In the process, most overlook the fact that five year car replacement is incredibly short. Five year car recycling is ridiculously premature. 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. Five year replacement time for something that costs so much and is so difficult to manufacture is insanity.

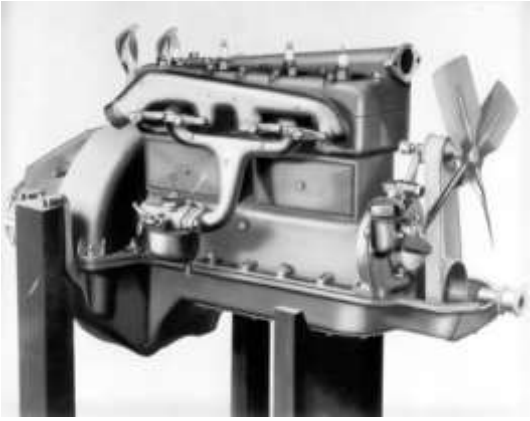
> More from Wikipedia,
> *"The Model T employed some advanced technology, for example, its use of vanadium steel alloy. Its durability was phenomenal, and many Model Ts and their parts remain in running order a century later. Although Henry Ford resisted some kinds of change, he always championed the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

This makes you wonder why the industry doesn't champion materials technology in our vehicles today. O.K. In the 21st Century in the U.S. the average car life expectancy is 10.8 years not just five years. What does that tell us if we have been trading in your 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 you save by just holding on to your own car? We will take a closer look at that later.

Perhaps you formerly believed that a 1908 Ford Model T was junk by today's standards. That's what modern big oily would like, that's for sure. But before we decide, let's review what this amazing vehicle offered, such as the ability to run on three different types of fuel:

> *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.*

Three types of fuel! This makes the Ford Model T more than remarkable considering that this engine design was an engineering masterpiece for its day, and it has remained that way since. 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 then. 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.



The Ford Model T engine that was designed in 1908 was a long lasting and durable design. No wonder we got hooked on gasoline-powered cars.

> *During this era, thousands of Model T's were hacked apart by their industrious owners and reconfigured into custom machinery permanently dedicated to a purpose, such as homemade tractors, ice saws, or many others. Dozens of aftermarket companies sold prefab kits to facilitate the T's conversion from a car to a tractor."* Wikipedia:

The Ford Model T engine has provided innumerable testimonials that describe a solid, durable and well-designed engine. 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 it by the sturdiness of the engine block shown, combined with the simplicity of the overall engine as shown above, I would vote hands down for the Model T as the best gasoline engine ever designed. This happened in 1908. No wonder there are so many of these still running today.

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 1996, 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. Do take note of the fact that every major automaker is still making car bodies out of mild iron steel before you buy your next car. You can see that after over 100 years of car development that their products are so behind the times they are fraudulent.

The Myths Surrounding Auto Recycling

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, re-coated, re-assembled, 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 interior of 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?

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 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 clunkers; 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.

There is one positive thing about the car-recycling program. For those modern day idiots who try to restore a 1970's vintage or newer car into one that can sit alongside the more classic cars of the past, the futile attempts will come to an end. That is because they will all have been scrapped and recycled, as for them there is no other alternative. Today's pursuit of high tech re-cycled cars is a pursuit of false luxury, played out with hard working people on a highway made of ugliness.

Blatant Examples of Engineered Obsolescence

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 everything in perfect synchronicity. That's why the belt is toothed along with the camshaft and crankshaft pulleys. Once 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 thousands of dollars, 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 is guaranteed this is the Achilles heel of 4 cylinder piston engines which have overhead camshafts as most of their timing belts are made 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.

If this belt snaps it will likely necessitate buying a new engine or having the existing one completely rebuilt and chances are the cost of repair will approximate the value of the vehicle. What a lousy deal we get just from broken rubber.

Don't be fooled when automakers boast about how the use of a belt

helps to dampen the engine's vibrations and that now "it runs so smooth". This is total theatrics. I have never in my life ever 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 there to put your car through a brick wall, across the street and through 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 a battery powered 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.

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

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

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. Since the drivetrain is massive it is also heavy. 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.

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.

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

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. It got 28 miles per gallon when similar V-8 powered cars of the day were getting 14 miles per gallon. 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.

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

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. Manufacturers mysteriously chose 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. Notice how large the front end of a typical Ford or Chevrolet Pickup truck is today. Does anyone not know that a square blunt front end robs fuel mileage!

More Auto Maker Illusions

Automakers of today are anything like Henry Ford's 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 2013 car. How exciting!

People fall for it today more than ever before. Just give 'em a plastic reminder of the glory days of the open highway and they are carried away on the gurney of ignorance once again.

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 have been living underneath it and eating your plastic fuel injection hoses. These covers are not only deceiving, but help increase repairs brought on by fuel and electric failures. That's what they call innovation!

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. For example, 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 this 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 cause the engine to wear out prematurely. This is the kind of adolescent engineering trick the engine manufactures torpedo us with routinely. As you can see, it is one being used even on expensive BMW's. Before you buy one, consider what could be a reason to pay extra money for the process of being screwed either way?

The engines are complicated enough, but even if it 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 petroleum epoxy paints that look flashy when 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, and these will soon give way to rust. If you don't take care of these spots your car's exterior will be rust and junk plastic in 10 years. What a perfect double-whammy to taunt every car owner with and force them into a new purchase!

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. But also understand that the dreaded 100,000 mile barrier has been created, planned and engineered.

The fact that cars are made of soft 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. There has been no improvement since.

But they have managed to add unknowns. Now that auto electronic systems have become so critical, car designers have inadvertently added a second Achilles heel to the engine/drive-train heel. Can you see that carmakers have found an effective way to insure that none of their vehicles will be maintainable at all beyond 20 years? Even if we have a car that runs good the first 100,000 miles, and, even if the car is running perfectly good today, thanks to the electronic control circuits that are fitted into them, every time we start them up it is a crap shoot. We are in an awful mess.

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.

For example, Volvo proved in the 60's that piston engines can be made to last 300,000 miles without an overhaul. The first Ford Model T, nicknamed "Tin Lizzy' featured the use of non-corrosive tin in the car's body. This has resulted in a lifespan of over 100 years, proving that if car bodies were built just a little better they could be used over and over again for decades. We should not in the 21st century have to face the dreaded 100,000 mile barrier.

Fighting Back
How to drive cheaply and beat the system

Let us not get too serious with this current dilemma as the bigger problem is the use of friction piston engines and rusting iron car bodies, still going on after 100 years. These practices represent an engineering failure and those who continue to endorse these designs are a disgrace. But we can fight back still. 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.

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.

A lower priced and thus simpler car is going to be easier to keep running. Do some research before you buy your next used car and try to buy one with an engine that has a steel timing chain. Six cylinder engines and larger are equipped with steel chain timing belts, as well as are truck engines. For example, I have a 1994 Ford Explorer with 212,000 miles and the timing chain has never been replaced.

I know that there are possible risks out there on the road when and if your engine decides to sputter to an inglorious stop. So my suggestion is a used Mercedes 240D, 300D, 300 SD up to 1985. These are diesel powered and not hard to find because so many of them were sold and are still on the road today. The four and five cylinder engine, turbocharged or not, is one of the most bullet-proof engines ever fitted into a car. The diesel also gives you the option of running bio diesel. These cars will continue running even

if they suffer complete electrical failure.

A drawback to owning a Mercedes diesel is that there will be times when you will need a good repair shop that works on them especially if you use it as your daily driver. Pre 1985 models in good mechanical with 300,000 miles are a bargain at $1,000-$3,000 dollars. Take it to the garage first and let them look at it before you buy it. Trust me, if you've got access to an honest Mercedes mechanic this model automobile will save you thousands of dollars per year and will virtually never shut down and leave you high and dry.

Remember, you can live without air conditioning, stereo music, cruise control, 4 wheel drive, fuel gauge, odometer, etc. The cheapest way to get yourself back and forth to work that I currently know is with a used diesel Mercedes AND make your own biodiesel or go electric. Insure your cheap used vehicles as "liability only" and drive defensively.

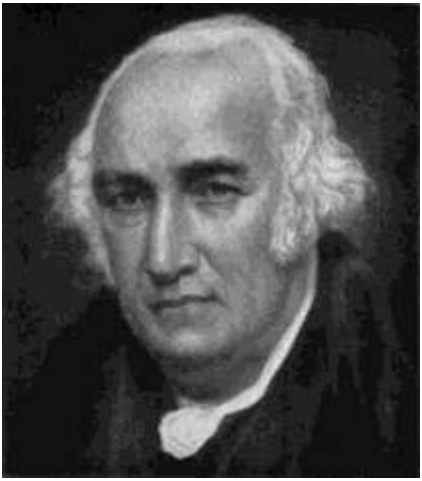
It's easy to do better

The illogical development of piston engines, with a zillion plastic parts and a zillion parts in friction, in the face of superior technology, exposes the auto industry for what it is. All of the supposed performance gains have merely revealed that piston engines prevailed as a result of having been sponsored from the beginning by an industry that was bent on getting them.

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.

The sporty Karmann Ghia was as easy to work on as a Volkswagen Beetle and used many of the same engine and chassis components. Simple, sporty and cheap. Now, 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. You can buy them in a foreign country, but not here. 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.

Today's technology is so blind it offers fuel economy only at one cost: our safety. For if you must have good fuel economy then you are going to be forced to travel in a very small, light car. The hybrid car almost makes an exception and receives more discussion shortly, but the overall fact is, the public has few high-mileage options other than small and tiny models that are built like a cheap gas station and provide about the same amount of safety as a para-glider.



At left: 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] At right: 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

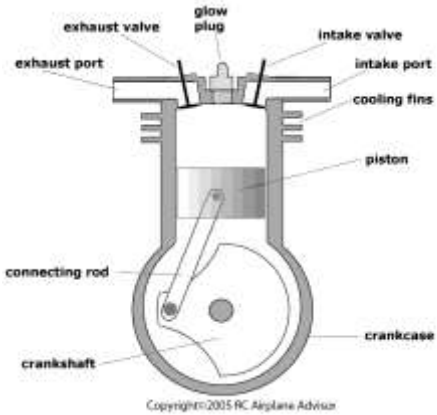
A PETROLEUM POWERED PISTON ENGINE harnesses the pressure created when fuel is mixed with air, compressed and ignited with a spark plug. When it burns, it expands rapidly, and since it is contained within a cylinder, the pressure goes up dramatically, pushing against the top of the piston moving it downward.

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 since 1887 that burn gasoline today 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 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 1/10th the original volume, the cannonball does not have to compress the

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.

powder at all. For the sake of 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. (Actually, it is every two strokes since the piston is only charged every other stroke).

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's a lot more energy in a cup of black powder than there is in a cup of compressed vaporized gasoline in air, and, 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 are really quite wimpy for the simple fact that they need air and lots of it. 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.

The Intake Dilemma of a Piston Engine

Getting air into and out of a multi-cylinder piston engine is an entirely different matter for any designer of a supposedly modern engine. For example the air intake manifold below took thousands of hours to design and hone into the proper and compact shape. What a waste of time. It's just an air restrictor, and it will have a second one on the other side of

the engine that the exhaust gasses will have to go through as well.

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.

Before the air goes into this manifold, it must first go through a throttle plate (see picture on pg. 92). The throttle plate serves as an **intake restrictor.** From the intake manifold the air goes through a narrow passage around the valve, which is now open, and into the combustion chamber. Then the gasses and air go out around the exhaust valve, down another narrow passage then out into the exhaust manifold.

You can see that the poor piston engine has to do a lot of work to get all this air and exhaust into and out of the combustion chambers through these curvy air bottlenecks known as manifolds. This is why I say that the combustion volume of a petroleum piston engine comes at an exorbitant cost. The piston engine must first pull air into itself where it stops, compresses it and then expels it. This reversing motion of the air mass and piston mass limits the upper rpm of any piston engine. On the other hand, for a turbine engine, this is easy to do; just increase the rpm to whatever you need to attain the required combustion volume.

Unlike a turbine, every piston engine has a brick wall limitation regarding maximum rpm. This is the point just before a piston rod breaks under tension or a piston pin shatters leaving the rod free to completely destruct the engine block. This rpm limitation forces us to make do with a limited combustion volume throughput.

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. And there are even more problems with the piston engine, especially when it uses gasoline as the primary fuel.

Fuel/Air Ratio

What makes the Gasoline Engine so problematic?

There is another idiosyncrasy regarding gasoline and how it is oxygenated from the incoming air the engine must breathe in order to operate. 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, otherwise we will again have premature ignition and detonation! This makes gasoline the mule of all fuels. On one hand, we have to provide oxygen to have combustion and clean burning; on the other hand, if we give it just a little too much oxygen it will turn around and bite our foot.

An engine that has to run with a rich fuel mixture must therefore pollute in order to keep itself from self-destructing from detonation. This sounds like the very worst imaginable design by anyone the least bit concerned about people's health. Such a paradox as to the use of gasoline in piston engines should have caused car manufacturers to shun either gasoline as a fuel or the piston engine as a motor in the first place.

Up until the late 60's we had mostly naturally aspirated 6 cylinder gasoline engines that were getting 20 mpg in cars like the Nova, Valiant and

Falcon. Similarly equipped with a V-8, the performance was much enhanced and the mileage only 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. With a few tools and some time I could easily keep one of these cars running for 300,000 miles and they were a pleasure to work on because you could get to all the parts. Then along came the smog mandate laws, which required that we reduce exhaust pollution, 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 ole engine equipped with an extra compressor which was powered by the engine via a belt. This arrangement pumped raw air (extra oxygen) into the exhaust ports and did help dramatically 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 engines produced in America during the 70's and 80's got even worse fuel economy and 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; which could have been as simple as mixing water with the fuel and/or reformulating it into alcohol. So here again the "smog laws" became a worthless hand-slap that made the public pay for it with lousy vehicle performance and mileage. In the meantime the "program" allowed the auto industry to keep selling us the same lousy junk 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.

To the rescue came during the 90's when a cheap low-pressure fuel injection system was designed, which is basically the same design that all car manufacturers use today. This allows the fuel to be squirted into the induction manifold (low pressure) just before it goes into the combustion chamber to be compressed (high pressure). 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 as there is no need for a high-pressure injection pump and injectors since it does not have to supply fuel to within the combustion chamber.

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 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!

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

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. It states than anytime your car is not under maximum acceleration that the engine is being starved of air. Do you understand that under partial-load conditions the pistons will have to pull

down against a vacuum? It takes extra horsepower to pull them down against a vacuum, but this is the only way to keep the engine from spinning at a high rpm.

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

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.

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. Here is another reason why gasoline should never have been chosen as a fuel for piston driven vehicles.

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. Looks like Big Oily has pulled another.

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 25 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 highways 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:

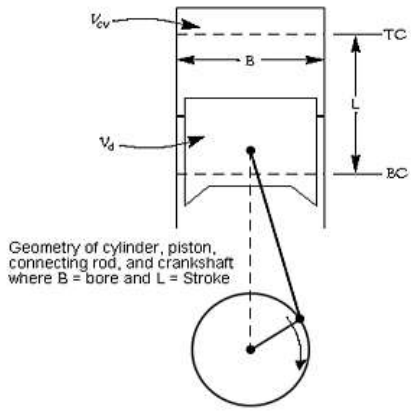
1. The engine itself works its fanny off just to make itself turn.
2. Because it is so hard to turn, the engine's starter has to be very powerful to start the engine.

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 exactly the case. Let's take a modern gasoline engine; it will have a

compression ratio of approximately 10:1. That means that if the engine pulls in air at standard atmospheric pressure of 14.7 psi that it will be compressed to fit into a chamber that is 1/10th of the original gas volume. This 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).



Now something else happens when we compress a gaseous-state fuel/air mixture; its temperature will increase. 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 rises. This is called **adiabatic compression**. It is this temperature and pressure increase that is going to auto-detonate gasoline vapors prematurely if you try to 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 1/8th 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 BMEP *(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. This 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. Gasoline's predisposition to detonate is another expose of the fact its use as a fuel in piston combustion engines is illegitimate.

As you know, gasoline could tolerate a higher BMEP by the injection of water vapor into the cylinders; unfortunately we must all live in ignorance of many discovered facts. 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. These would be smaller and lighter. Their fuel economy would be better and their maintenance cheaper and we would be smog free.

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 current piston power plant of ever car design, from a heat-loss perspective, 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 into one worthless hunk of iron junk. So this is clearly not an efficient design. Anyone with a moderate understanding about thermodynamics can see that any 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 joke. Big Oily wins again.

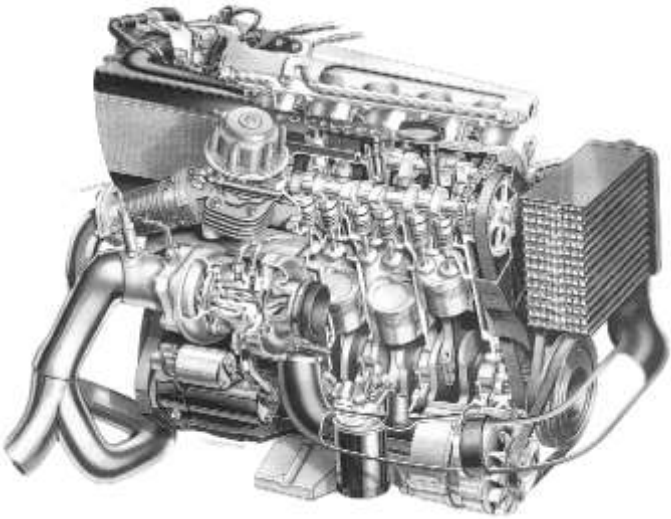
Turbo-charged Piston Engines

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

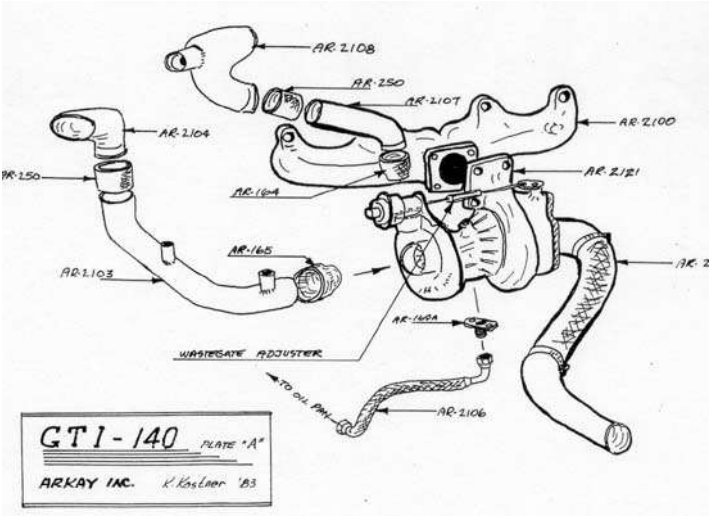
Turbochargers were used extensively on piston aircraft engines during World War 2 but most people associate their invention with Caterpillar and Cummins who began manufacturing turbo-charged diesel engines in the 70's. In 1965 Chevrolet introduced a turbo powered Corvair called the Corso Turbo. Later in 1979 the Mustang II was offered with a

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

Turbochargers for diesel engines are one thing, for gasoline engines they are another. Diesel engines will benefit from the heat and extra pressure; gasoline engines will want to detonate from the heat and extra pressure. Never-the-less, turbochargers are still to this day being sold to the gasoline-buying public under the guise of improving your engine's performance.



Automakers manage to tout the turbocharger as a rotary device similar to a jet engine. In the process of comparison they suggest that a spinning impeller called a turbocharger is similar to a jet engine. And this suggests to people that a spinning turbocharger somehow turns an antiquated reciprocating engine into a rotary device like a jet engine. It does nothing of the sort. Yes, a turbo charger will help cram more air into the engine adding some horsepower, but it is still a reciprocating piston engine. It just has a rotary component added on which adds even more parts to the engine package.



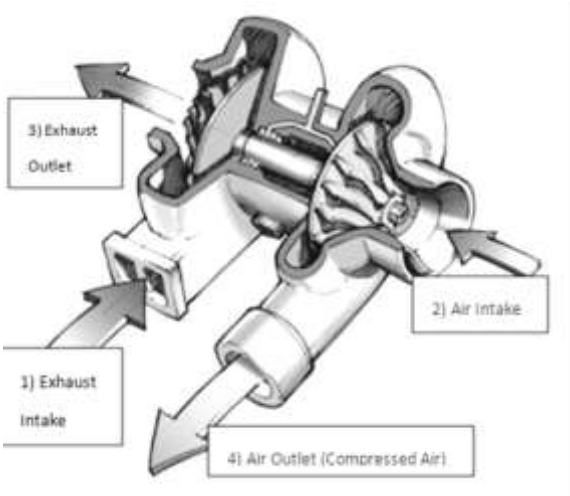
As you can see in the picture, this is no easy gadget to install. On first glance the unit looks compact and simple. But because of all of the plumbing involved, into and out of both the intake and exhaust systems, the full installation of a turbocharger is a very expensive upgrade that requires many components to be carefully crammed into an already crowded space. This makes it impossible to get to the alternator and starter of most cars.

There are many feet of tubing required to hook up a turbocharger, the only way to see all of the necessary components is with the engine on a test stand. Before you settle for the promise of a more powerful and efficient engine, be sure that you are ready for all of these extra parts to be in your way when you try to find out what went wrong.

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.

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 be hooked to 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 develops <u>because the turbocharger, being a near-frictionless device, is a more efficient form of power than any piston engine</u> that it is coupled with. And what the above statement really proves is this: We should be using rotary engines, period. Automotive manufacturers 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. The 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.

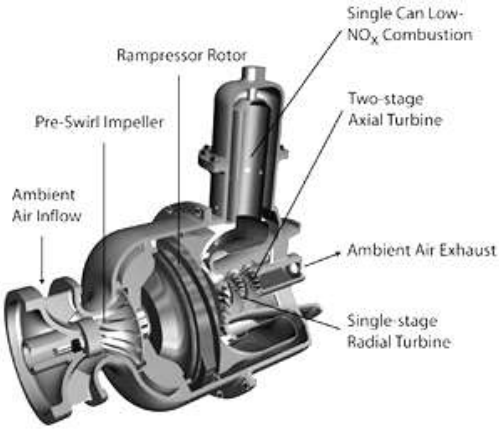
Keep in mind, the piston is now going to have to push harder to expel this exhaust gas at a higher pressure, which is what the turbo-charger itself needs, and remember, a turbocharger has absolutely no effect on the temperature of the exhaust gas leaving the tailpipe of the car. Therefore, it is not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

In other 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. These two points will help to increase fuel mileage, but they are a lot of parts and cost for a relatively small gain since the exhaust gasses are 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: If it is true that a turbocharger will help to 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.

There are many better alternatives than an engine-turbo combination. Consider the recently designed Rampressor Turbine engine below which is a just a further development of a piston and turbine 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 can be engineered and re-engineered until every part is designed for maximum life. In sections following, Top Fuel Dragsters and Turbonique, you will see a turbo engine the size of a car's differential that puts out 1300 horsepower.



These outdated practices regarding petroleum piston engines need to be discussed again and again such that we can never forget, no matter how many times they try to tell us that the design has really been improved. When the design has really been improved, we will be able to hold our hand out in front of the flow 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 the 20th and 21st Centuries.

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

Because piston engines are so hard to start, coupled with expensive replacement starter components, carmakers have designed and instructed the general public to keep engines running when we are stopped, rather than shut them off and restart them. Come on!

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 is such a stupid propulsion design!

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. You should be rolling over in hysteria at this point because it is so hilariously funny. What a joke this is considering it is now 2016 and still these behemoths are all turning over at 700 rpm while stopped in traffic. We are paying for our own asphyxiation.

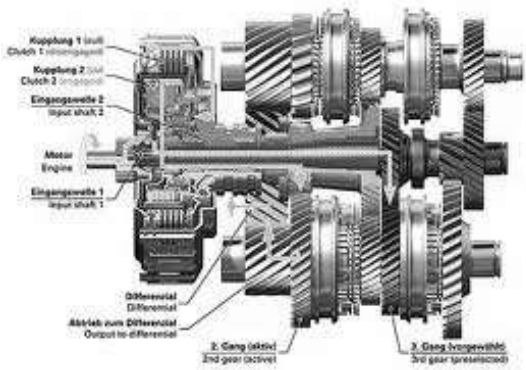
The car's air conditioning system is set to require this minimum rpm. The air conditioner is a fuel robbing mechanically driven gas compressor under the hood that makes your engine run even hotter and we use it to make ourselves colder. What a thermodynamic apocalypse! Even recreational vehicles use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

propane gas which is burned to produce heat. Why don't the car manufacturers equip our cars with evaporative air conditioners which use the vehicle's hot exhaust to first heat the gas, then cool it in a radiator, then release the pressure in the condenser where it produces cool air?

The 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

The petroleum powered piston engine not only has the dubious distinction of being the only design that wastes fuel while at a dead stop, but also suffers from having no power at low and high rpms. The engine produces little torque from 0 rpm to 1,000 rpm, necessitating 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. Ouch!

This is elementary automotive engineering: Gears reduce available horsepower and add resistant inertia into the power train. This robs acceleration, fuel mileage and brake linings from the vehicle concept. 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 added this needless extra weight, maintenance and increased fuel consumption to every vehicle made.

Petroleum Piston Engine Summary

Basic Transportation has become a heavy yoke

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.

It has come to the point where we should review the total petroleum piston engine dilemma so far. While it is a dilemma for us, remember it is a charade for the auto industry. As the public becomes more aware of the poor attributes of piston engines, auto/oily will finally be forced to give us a new design. Here is a summary of piston engine deficiencies so far:

Petroleum Piston Engine Shortcomings

1. The engine is hard to start; requires a sturdy electric start mechanism
2. Hundreds of parts in friction; generates heat and wears out quickly
3. Limited rpm range; requires clutch and transmission
4. Heavy; takes a large heavy 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 gas temperatures and heat loss, poor thermodynamics.
9. Complicated (many machined parts) and difficult to repair
10. Costly and difficult to manufacture
11. Cumbersome; large engine radiator contributes to a blunt front end.

Gasoline Piston Engine Shortcomings (the ones above plus these)

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

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

Turning Better Systems into Memories

THE AVERAGE CITIZEN of virtually every industrialized nation endures the petroleum yoke. In the process people are transported to work in the urban centers where they can find jobs. Unfortunately, Big Oily begins fleecing them as soon as they leave the house. The hard fact is we don't have the kind of mass transportation we need.

We had it in the past but the electric systems have mostly been shut down. And it happened even though our average commute distances became greater due to the housing boom we were encouraged to take part in. It happened just when we needed it the most.

Today the average commuter spends $20 in gasoline and manages to make it to work only to be hammered by car exhaust along their whole route. Not to mention that we travel in flimsy cars that don't protect us in the event of a mishap of human or mechanical origin. We suffer the indignity of having to pump gas ourselves to ring up $100 dollar sales for the oil industry, often times in cold, rainy and windy weather and they don't even have to have a person there to tell us hello or thank you. We buy

exorbitantly priced cars that will hardly be worth a down payment five years later when we turn them in. The system bleeds us dry at every juncture. It is time for the piston engine to go.

It all supposedly began with the "break-through internal combustion engine", the engine of the future; the gasoline engine epitomized by the Ford Model T. Men the world over became mentally 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 engaged with stately and outrageous auto body designs along with luxurious seats and interiors.

This is the "remarkable piston engine story", and it's been fed to us for the past 100 years virtually unchanged. Today we can look back through the old illustrations and see that they depict a story as a much a fairytale as the story of Cinderella. Their faded pages depict scenes chronicling a love-affair era between the American dreamer and their wonderful automobiles. A love affair normally encompasses both sides, but 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. 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 the published illusion of a beneficial partnership between car makers and car buyers reveals itself in the establishment of a world that

seems to squander valuable truths. 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 piston type engines. What do our automobiles really say about ourselves today? Mostly that we have let ourselves be deceived and used.

There simply is nothing extraordinary about the piston engine today such that we should be messing around with them beyond circus rides and exhibition events. Such an invention goes way too far back in our past. We now know that the Ancient Egyptian and South America civilizations possessed advanced machining capabilities. One such example comes from a half-cut stone from Peru that contained a perfect 1/8" slot that penetrated two feet deep through solid rock? Such advanced machining capabilities would have required a rotary form of power. There are innumerable examples all over the world that rotary power has been around much longer than we realize.

Pistons came along after the water-wheel. That's because the water-wheel is so much simpler to construct and demonstrates a type of rotary power device that is superior to reciprocating piston motion. It is more than interesting to note that 20th Century propulsion devices for powered vehicles totally ignore this concept.

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 to manufacture efficient engines.

2. The fuels these engines consume do not mesh with environmental health laws and constitutional welfare, when in fact the use of these fuels pollutes when pollution is not necessary.

In the first chapters you learned the truth as to what has happened to our transportation system overall. In this chapter I will attempt to explain how it happened. For this we have to go back a little further than the turn of the 20th century to when the use of the piston engine came into vogue.

By 1750 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. That is what steam power gave us. It is still true today that potential power comes from anything that will burn/oxidize or chemically/react or atomically/split to produce heat.

There are many abundant materials that can be burned to produce heat and the vast majority of them are better than gasoline. The oil producers have placed the false notion inside our heads that modern power comes from burning gasoline and or diesel fuel, but there really is nothing modern about these hydrocarbons that come from within the earth.

Many people today believe that their car or truck is very nicely appointed and well worth the mechanical complications that require a complex gasoline formula to make it perform properly. But the fact is our vehicles do not require some complex fuel formula to move us about and play the stereo, etc.; the engines that the automaker/oil manufacturers equip our vehicles with do. They designed them specifically for that purpose.

So what could have happened? This is a provocative question considering that the dawn of the modern world began with the advent of steam engines that could produce electrical power from anything that would burn. Steam was controllable, powerful, extremely reliable, while the numbers of moving parts were only a fraction of today's modern diesel locomotive engines. Steam power unleashed the concept of the modern power plant, thus providing electricity for manufacturing, thus providing engines for locomotives, ships and farm equipment.

Steam showed its abilities by the fact that steam locomotives 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. When you convert coal to a processed liquid that has to be burned in a liquid-only engine have you really increased the efficiency? The answer is flat out no! 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.

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.

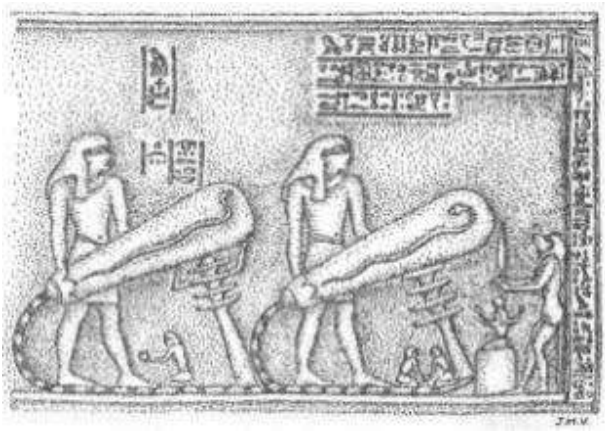
With bronze and steam knowledge our ancestors were building steam powered machines thousands of years ago as evidenced by the Hero engine designed by Heron Alexandria in 10AD. This engine, by the way has very little rpm restriction and makes our everyday piston engine mechanisms look ancient. The ancient 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.

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. Your car has been specifically engineered to be dependent on a type of fuel that only an oil company can produce. Bravo for them. Big oily wins again, but only for a short while longer. From a collective view, our species has not advanced by having our species agree to be held in bondage to a system that is out of touch with the planet's ecology. That is why we as humans will never find fulfillment in buying into this toxic system. The day we truly seek fulfillment as an advanced species on this planet, the petro system is done.

Schools Are Stuck In a Technical Stupor

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 one of the crypts of the Hathor Temple. 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 so 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.

Back to 1750

The official historical version of the piston engine goes back to around 1750 when the first steam engines were going into service. But of course it happened even earlier. In 1606 a Spanish inventor patented the first steam piston engine (in Spain). It was in 1781 that James Watt invented the first rotary-motion steam engine that went into a wide variety of industrial uses.

I hope that you don't accept these dates as anything more than when these inventions showed up in a particular place and time. But whether we use an ancient "original" or accept these dates, regardless of them not being exactly correct, these things 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.

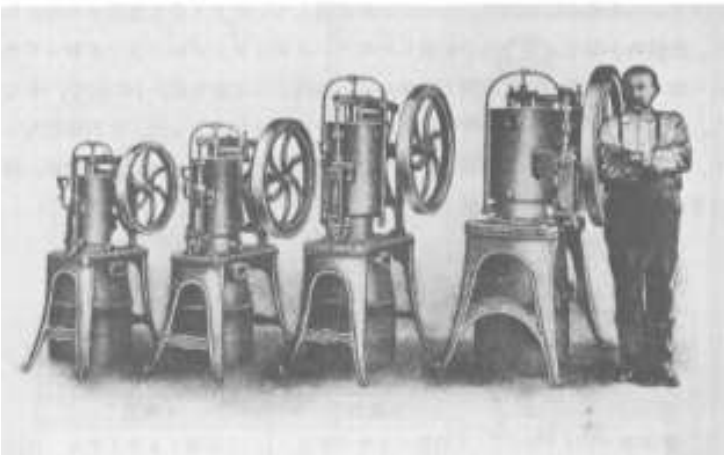
1807: Quantum Leap No. 2

Quantum leap No. 1 was the invention of the steam boiler itself because it produced a method to convert anything that could be burned into steam, and steam could be used to power a steam engine that produced rotational energy that could turn electric generators.

Quantum leap No. 2 was the invention of the Stirling Engine, but few saw it as such. But it was clearly the next breakthrough after the discovery of steam, because now came a much cheaper way to make rotational power and that was because the Stirling Engine does not need a steam boiler.

Rotational power is desired out on a farm or anywhere as you can become self-sufficient, utilizing whatever you have as a waste product to burn and thus rotate an electric generating device for power tools, machines

and pumps. The first to build a working model of Wood's original "Stirling" design was Sir George Cayley in 1807. This improved design by Cayley 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.



For some unexplained reason the further technological advancements by the Rev. Robert Stirling in 1816 earned him a spot in history as the "inventor" of the hot air or "Stirling" engine. 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 war or an 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. It was a front-wheel-drive car 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 ploy. And as time went on big oily would face continued challenges from innumerable fuel saving designs. And big oily would have the foresight to spot them and head them off.

Turning non-Toxic Sources of Energy Against the Public

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 hundred years before petroleum was first or ever used as a fuel. These piston engines were powered by steam, which could be generated by burning anything at hand such as trees, bark, leaves and coal.

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. 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. Here is a bio method to produce hydrocarbons from the land or seas using carbon dioxide from the air or from utility exhaust stacks, combined with 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 nearly a hundred additional toxic chemicals in its makeup, it is expelled into our air legally. The propulsion power we get from this energy source comes at the expense of our health. This means there has been no progress for the past 100 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 a nation's 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 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. Something as basic as a bicycle now requires a computer to diagnose what is wrong when a circuit malfunctions, often leaving the driver stranded. No computer; no fixie is an illogical way to build an engine that is made up of mechanical parts.

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

This has now been going on for 120 years and counting.

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 rotary engines verses piston engines, which reciprocate back and forth. The false controversy gets more interesting considering that during the last couple thousand years mankind developed the water turbine for harnessing the pressure of flowing water, and this is a rotary motion device. During its operation the rotation of the power blades is always in the same direction and always rotational and always in perfect balance.

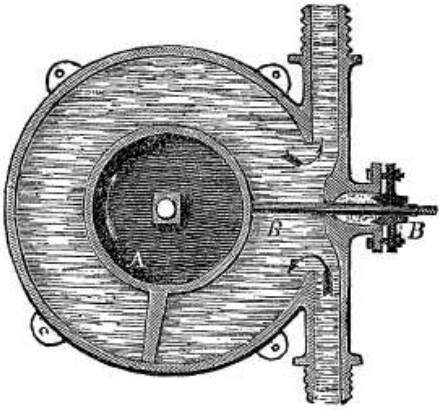
Conversely, in every piston engine regardless of what type, there is a back-and-forth motion of the pistons (which requires energy to stop, start, stop, start, etc.), plus metal-to-metal contact between the piston and cylinders. Thus there are both reciprocating energy losses and frictional ones as well. These are the reasons why a rotary design, which spins about a shaft, easily outperforms its reciprocating counterpart.

In a steam or petroleum powered turbine engine design, the turbine blades, which harness the power of the pressurized water, are never in a state

of actual contact with any other piece of the machinery. Except for the bearing in the center there is no mechanical friction. 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.

After 1781 and the Watt steam-powered piston engine, came many designs for 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.

The concept of the rotary, frictionless engine was not only known but built and used in a multitude of applications. In appendix 9 there are approximately 20 rotary engine designs from this era. Admittedly, most of them were not as efficient as steam piston, but part of that owed to the fact that the steam piston received steam on both sides of the piston and on every revolution. That is why steam piston engines work quite efficiently. Never-the-less these steam-vane designs would have been more efficient than combustion piston engines with four strokes per cycle. Yet for inexplicable reasons reciprocating piston engines continued to receive endorsement in much greater abundance than rotary or turbine designs, especially in the area of transportation vehicles where an efficient and compact



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.

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? A petroleum constituent of crude oil, gasoline, does fit this description.

Note; The industry could have used gasoline as a boiler fuel to power large turbines to generate electricity, but it would have been too efficient to fit their marketing ambitions. 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. The Stirling engine was even simpler, just needing a more compact design. The diesel engine from 1877 was simpler and more efficient since it did not need an electrical system and could run higher compression. The only thing noteworthy about the gasoline powered car when it finally came along in 1887 was that it consumed gasoline.

As a matter of history we now know that at the turn of the century oil production had dramatically outpaced consumer demand. Gasoline in particular was in such abundance that at times the excess had to be flared off in large open pits. Gasoline is too dangerous for stoves and lamps; thus the oil industry was in dire straits to find a home for it.

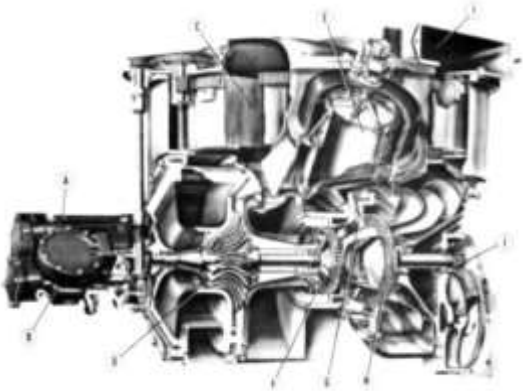
Here are some glaring contradictions regarding engines and rotary power evolution:

Piston Steam Engines first built and used: James Watt 1781
Turbine Steam Engines placed in service: C. Parsons in 1884
Piston Automobile Engines first used: Daimler Bense 1887
Turbine or rotary Automobile Engines placed in service: Never
Wankel automobile engine first used: NSU beginning in 1964.

Note that today the manufacture of Wankel engines for automobiles

has completely stopped as of 2011 when the last Mazda RX-8 was made. The turbine and rotary engines that were designed and built were much simpler than the petroleum powered piston engines that have become so prevalent. This observation underwrites both industrial sabotage and hypocrisy as we can see for ourselves that it would have been far cheaper for Big Oily to equip our automobiles with a tiny Wankel design rather than keeping with these lunky piston engines.

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. 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 trans-mission 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!



Early Chrysler turbine engine, about 1954

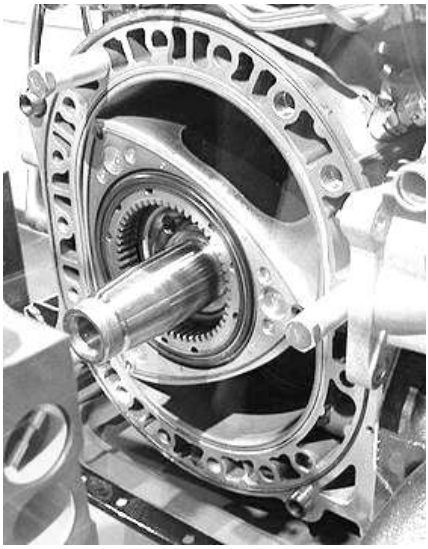
Unfortunately, most of us never knew such better designs existed. The automakers continued supplying the public with their ill-conceived piston engines as if they were in the same category as this rotational high-speed masterpiece. Why didn't they make them available to the public when they would have been cheaper to manufacture and maintain? Big Oily won again.

Enter: the Wankel Engine

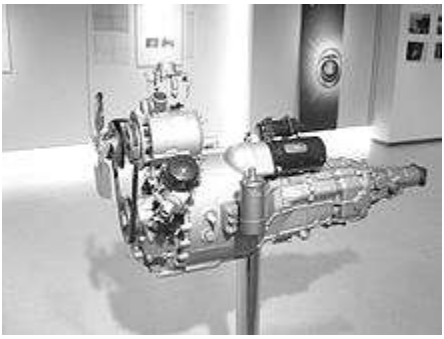
Here in the United States we will not get a 1000 cc economy gasoline engine nor will we get a 1.4 liter diesel like they currently offer in Europe. The fact is, if they wanted us to have better fuel mileage, they would have given us the Wankel engine. The major automakers could have begun building much 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.

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 their limited rpm before pistons went flying, could be left behind. Actually, the design had been around since 1927, but that's part of another book.



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 red starter motor bolts to the engine.

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 has always been to use piston engines. So instead of the auto industry showing us what the rotary engine can do, like turning up the rpms by a factor of 5 or so, they put out a version that would not even equal the gas mileage of a standard four cylinder engine. 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-gussler version of a superior engine. The industry used this bad example against us again as justification to cancel the use of Wankel engines in the future. Here's some interesting back round from Wikipedia.

> "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 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 constructed 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 quality diesel engine, 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, the Wankel demonstrated its ability to run leaner fuel mixtures than a piston engine,

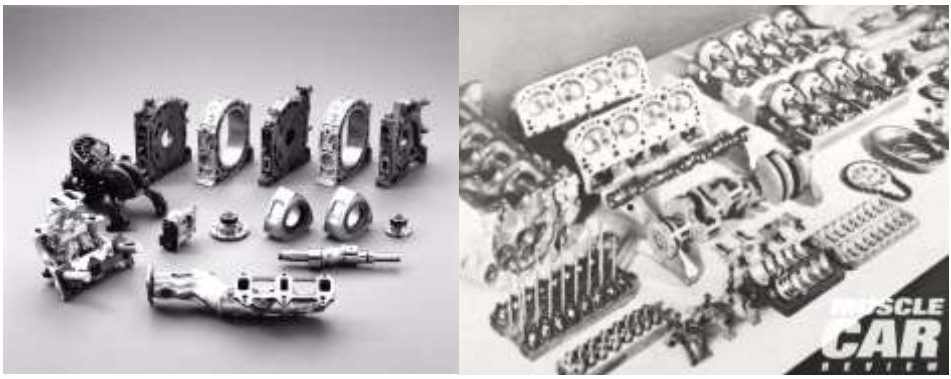
without detonation. This allowed gas mileage to reach 30-35 mpg. When you compare it to any other kind of sports vehicle with similar performance, the Wankel engine does in fact double the fuel mileage. That's pretty impressive for a gasoline engine.

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 use of smaller Wankel engines, drone and para-glider manufacturers all over the world now are no 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.

On the next page are shown 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? You don't have to imagine the parts on the left replacing all of the parts on the right. This was 1970 reality in steel.



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.

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.

Liquid piston diesel rotary engine; courtesy Darpa.

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?

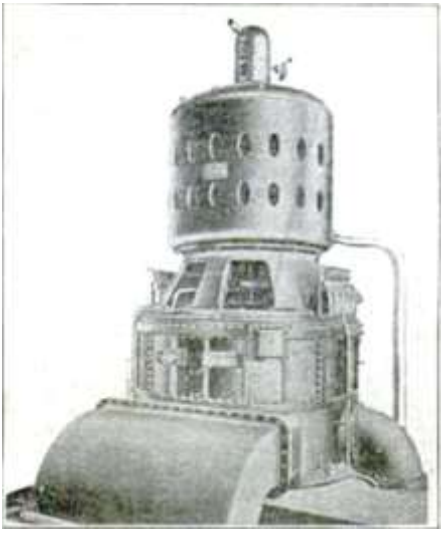
So here we are as of late 2018 and not one car manufacturer is building a car with a Wankel engine. This comes after the Mazda Wankel which had a run of 47 successful years! It was also an era during which the engine design had become better than ever. Does that make sense?

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.

Liquid cooled Wankel drone engine; courtesy rotronuav.com

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 the oil/auto industry that the Wankel engine has not been fully optimized and adopted universally.

Mechanical Combustion vs. Electric Drive



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

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. 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.

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.

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

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 major cities 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.

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 demise of the electric car began 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 and was priced well below that of a Kroeger or Ryker, etc. But it was the assembly line that allowed the manufacturing costs to be lower, not the design itself. And it was the bankers who set up the 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 electric cars 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 them with a match, not that people did frequently. But if you could just find water and any rot-gut fuel such as gasoline, kerosene, turpentine, paint thinner, linseed oil, etc. etc. you could drive on and on, and besides, nothing climbed a grade like a Stanley Steamer.

Big auto excuses for not using a superior engine

Here's an obvious better engine that we should see more of; the diesel engine. Did any of us forget that a gasoline powered piston engine will always consume more fuel than a diesel piston engine? What does this mean if you are an oil producer? 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. They can't live with this reduction in volume sales.

That is why the car companies lay out the ratio of diesel engines to gasoline engines each year and 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 14 mpg pig. And so the majority of us end up commuting on gasoline, all for the purpose of increased sales of petroleum through lowly low compression gasoline engines.

The public has learned many bad lessons regarding diesels because of poor design. Still, there are many drivers and engineers out there who know they are such a better power package than a gasoline piston engine, or at least they should be. But 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. But that's just the beginning of added expenses, accomplished by making it heavier with enormous-sized engines, then burdening it with the same electronic fuel controls of a gasoline engine. It's all calculated to leave the diesel owner with a few pennies in savings when all is said and done.

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. So when we add these extra costs up along with the horrible price premium they are now adding on for diesel fueled engines, most of us continue to end up shackled to gasoline engines.

You should also take note of the fact that there are virtually no small diesel engines placed in cars that are sold in the United States. There is currently one exception: The Chevy Cruz. It's a very small car with a price well over $30,000 dollars. But there are many models of diesel passenger cars sold overseas. BMW has a small turbo diesel that gets 68 miles per gallon, which is significantly better mileage than a Prius Hybrid. Citroen and

Peugot also make small diesel powered cars. These would be a marketing sensation here if we could just buy them, but unfortunately it's a controlled market where only so many diesel engines are permitted to be sold within the U.S. each year.

100 Years of Fluff

The world's fastest street car for 2018 is the Hennessey Venom The Venom GT is powered by a twin turbocharged 427 cu in (7.0 L) GM LSX engine. The LSX incorporates reinforced internal components and additional head bolts with aluminum heads including twin Precision dual ball bearing turbochargers. The engine produces 1,244 hp at 6,600 rpm and 1,155 lb·ft of torque at 4,400 rpm. It has a redline of 7,200 rpm.

Folks I need to make perfectly clear here that this car is built for one reason: to make the public think that the piston engines are still the fastest engines or the best engines. The facts have shown that this is flat out not true, but I will attempt to prove it again.

Pictured: the Bugatti W-16 which held the speed record of 268 mph until recently.

On the next page is the real "fastest car in the world". Check out what kind of engine it has; Hint: not piston engines. What a waste of time that would be. For this 10 Ton "torpedo" to reach a speed of 763 miles per hour requires over 100,000 horsepower! And this is true, each one of its two engines has over 50,000 horsepower.

How many of these complicated reciprocating engines would it take to produce the kind of horsepower needed if you really want speed as your main issue? It would take 665 of the W-16 engines shown on the previous page 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. But it is imperative that we remain awake to the fact that 20th century automotive "engineering" has rewarded us with over-engineered piston engines and nothing more. Even expensive cars fleece the buyer with plastic parts and 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? Creativity and unbridled attachment to gasoline! All this proves is that a piston engine can be made with so many special parts and alloys that they can make it cost in the millions!! All this to supposedly go really fast or to make people think you can go really fast. Why exactly that matters to anyone might indicate mankind's association with pistons has become a primordial urge.

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 these things are safe for human beings to travel in at the speeds expected on the highway next to large trucks.

Pictured below 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 as they don't look any different than cheap compact cars that spew plastic parts all over the highway when they collide. Notice how the passenger door of the center vehicle is crumpled in.

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 if it were not for the wishes of Big Oil.

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. In 1921 a $500 dollar standard Ford Model T got 29 miles per gallon. In short my brothers and sisters, we have been had again.

Auto historians will balk and say, "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; proof that the automobile was designed for a 45 mile per hour system.

CHAPTER 8

Hybrids, Super Hybrids and Electric Cars

Revised June 2018

WITH THE ADVENT of Start-Stop devices now being installed on almost all 2018 vehicles as standard equipment, the case of whether or not to buy a hybrid verses a normal piston powered vehicle deserves a second look. What once was a simple decision; based on moderately reduced fuel consumption verses the initial costs plus repairs, is now complicated. And I have to say that with the addition of Start-stop mechanisms, the argument for the Hybrid vs. the standard power choice has swung in favor of the Hybrid.

There are two major types of Hybrid, the "Plug-in" Hybrid and the "non-Plug in" Hybrid. Of course, they all should be "Plug-in" for the simple reason that energy taken from the grid is only 12 cents per kilowatt hour. When you generate electricity on your own using a gasoline powered generator, it requires approximately $1.20 per kilowatt hour. So the difference is roughly 10 times the cost of charging from the grid to charge your battery using your car's engine.

Above: the interior of the 2018 BMW X5 40e Plug-in Hybrid. This model has virtually the same performance as BMW's other Model X5 gasoline and diesel powered versions.

It should be noted that since the introduction of the Toyota Prius in 1997 the performance of the start-stop mechanism built into this electric drive motor device has been thoroughly tested. It turns out that Toyota has hit a home run with the transmission/motor/engine setup as it has been very reliable.

Reports from YouTube reveal that a used Prius is still a good deal as the engines will run in excess of 250,000 miles. In addition, the batteries can be rebuilt for under $1,000 if you're willing to purchase a kit from a secondary battery company.

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. Compare this to the Stop-Start system in traffic which is going to be repeatedly restarting your engine.

It is obvious that much of this technology has been shared amongst all of the major world auto manufacturers. This means that most of the Hybrids being manufactured appear to be very well engineered. It also makes it nearly impossible to predict quality based upon price or name brand.

Summary of the advantages of using a Hybrid vs Standard setup:

1. Plug-in Hybrids are now standard in most cases.
2. Since the Hybrid has a built in start-stop system it is expected to be much more reliable and long-lasting than add-on SS systems.
3. The cost of the Hybrid models are comparatively close to the cost of standard equipped units.
4. The choices are widespread and almost "exciting", including 500 plus horse-powered Mercedes, Jaguar, BMW, etc.
5. The performances in acceleration are now equal to or better than the standard engine.
6. All of the major manufacturers have reached an astonishingly high level of sophistication.

Now please don't let me give you the wrong impression! Remember, it's impossible to support hybrids and super-hybrids as serious contenders for the long-term as long as the industry continues to keep 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. In my humble opinion, they will likely go down in history as being the most complicated car designs of modern times. I sure hope they do, at least!

Now back to reality.

As of today, compared to the other choices, the Hybrid concept will in fact offer superior fuel mileage and in several cases, increased performance. But we must consider that any savings are at the whims of the overall reliability of the vehicle itself. Thusly, it is comforting to see manufacturers like Mercedes, BMW, Lexus, Honda, Audi, Volvo, etc. as well as the Toyota Prius of 3 decades as part of the competition. And it appears the competition in this area is fierce!

If you've gotten this far in the book you already know that propulsion mechanisms don't need to be this complicated, nor should they be. Therefore, unless you have unlimited money, remain steadfastly calm! And don't forget the fact that all of these crazy designs could be replaced with a small turbo-charged two cylinder diesel engine.

This was proven by Volkswagen in 2014 when they got over 300 miles per gallon in a streamlined sedan. This article is coming up. Actually, the whole gasoline-engine-Hybrid-concept could be replaced by direct fuel-celled electric vehicles or ones powered by induction coils in roadways, etc. We currently have the capability using high density energies like deuterium to power our transportation vehicles with 500 Hp. electric motors, and they would not require charging. I'm referring to the Rory Johnson electric motor he designed that got him an early demise for building a few prototypes.

The sad fact is, the future of our transportation system needs a full

discussion, especially before we commit to another decade of asphalt, etc. At a minimum, future roads needs to be made of granite geo-polymer material that resists wear and stands up to sunlight, and we have to establish standards in designs so parts can be interchanged. But if and when we do decide to replace asphalt, it will be the perfect time to install wires, induction coils, magnets, etc. and to then redesign our vehicles according to the new systems chosen for the future.

Perhaps we will even be allowed hover technology, rendering paved roads as obsolete. Many questions need to be answered before we commit to Hybrid type vehicles.

Picking out a Hybrid Car

Should we buy a Hybrid car? Should we buy a piston powered car? That answer to both is a definite No. But the way things currently stand, unless you buy a fully electric car then you will be forced to buy a piston powered car.

Put in simple/stupid terms: If you have to buy a new car, then buy a Hybrid. Just understand that the best you can do is minimize the size of the Hybrid's engine and then limit the use of the Hybrid's engine. Therefore, you want a maximum of a 2.0 Liter engine plus electric assist motor **with plug in capability.** And you also want it to have a battery that is large enough to go 30 or 40 miles on straight electrical juice.

Be prepared for a long sales ride that will excite you with the prospect of increased gas mileage and indoctrinate you with the features of the power system, modes of operation, personal interface, safety devices and a zillion other features built in. When it's over you will possibly just have purchased your most expensive car ever, and it will all have been for the sake of saving about 1,500 gallons or approximately $4,000 dollars in gasoline over a 5 year period. That's the bottom line folks. A lotta fluff for not much improvement.

Still, I have to admit, that even I knowing what I know about car manufacturers and their collusion, it's easy to get excited looking at all the hot-performing models. You can buy a BMW 730 series that will run 0-60 in 6 seconds and get 40 mpg! You can get 50 mpg with the Porsche Cayenne EX Hybrid. You can get over 100 mpg with a Prius Prime, Hyundai Ionig, Chevrolet Volt, Kia Sole EV and others as long as you plug them in every night and don't exceed 50-100 miles between charges.

The 2018 Chevrolet Bolt boasts an exceptional range of 240 to 270 miles on battery only. MSRP$36,620 - $40,905

The "sleeper" in the group is the new **Chevrolet Bolt**, and yes I spelled that correctly. This is an all-electric car, but I must point out that it has a range of 240 to 280 miles which is as good as the Tesla! It also has acceleration in the 6.6 second range (0-60mph) making it a blast to drive. It holds four people and only costs around $30,000. I believe there is a sizeable government rebate available of around $8,000.

Another potential "sleeper" is the new Honda Clarity which provides an all-electric range of 47 miles. It sport a 1.5 L vs the 2.0 L standard in the Honda Accord Hybrid. Most noteworthy is the fact that it

Drivetrain of the Honda Clarity. Does it have a driveshaft or not? It does not. The only power to the rear wheels is via copper wire. This is a major design gain but they don't seem to want to advertise it.

comes equipped with an electric-motor-transmission. Thusly the gas engine is mainly programmed to drive a generator, applying current to the electric motor and recharging the battery. It can also drive the wheels directly, depending on circumstances, like a floored throttle. In this mode it produces a max of 212 combined horsepower (158 kW). That's decent horsepower!

The Clarity PHEV uses an adjustable regenerative braking system with four Regen settings, selected by the paddle on the left side of the steering wheel, while the right-side paddle releases each stage of Regen braking and allows a coasting mode. Combined, there are 13 different driving and Regen modes available to the driver. Of course, you can completely ignore all the modes and simply drive it like a bicycle. The combination of the complex and new powertrains that may or may not require special consideration or knowledge on the part of the driver can be a bit perplexing.

However, even with the potential break-through features with the electric transmission, the total range of the Clarity with a full charge and full tank of gas is only 340 miles. That is because it comes equipped with only a 7 gallon gas tank! What is going on here is an obvious design error that limits the range significantly beyond 300 miles. And you will find that this kind of illogical engineering is rampant throughout the hybrid program.

Also, there is a Clarity model that is fuel cell powered. It makes for a good demonstration of the hydrogen fuel cell, the only problem is that the source of hydrogen is compressed hydrogen gas which must be transferred into a tank inside the car at over 5,000 psi pressure. It supposedly only takes 6 minutes to refill the tank instead of several hours to recharge a battery, making it look like a better choice.

In actuality this "fuel cell" concept is just another offshoot of Big Oily as the hydrogen gas for the hydrogen fuel cell will be produced from petroleum. As you will read in upcoming chapters, there are easy "liquid" forms of hydrogen that are readily available and easy to store. Methanol or Ammonia are two of them as they are easy to transfer and carry. We don't need to use compressed hydrogen gas as a source of hydrogen!

Some Red Flag Warnings:

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 compact Wankel or similar (Rampressor, Vane, etc.) being applied to any of the offered models. The third is the fact that nobody seems to be allowed to make any quantum leaps in fuel mileage or range.

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. And isn't it about time that we had a "1,000 miles-between-fill-up" car. Of course manufacturers could do this today. So it's obvious; all major car manufacturers are adhering to strict design parameters! Big Oily is in control, and they continue to insist that we stop and fill up every 300 or 400 miles, a statistic unchanged since the 1920's. I think it's all for the sake of soda pop sales.

6 Most Fuel-Efficient Cars

If gasoline mileage is what you are most interested in, a good place to start is this list which I copied from **hybridcars.com**. This is a good place to find the makes of just about all of the hybrids currently made.

You will notice gas mileage figures going above 100 mpg. This is due to a larger battery, and charging the thing off the grid overnight. Remember, electric power off that is taken off the grid is approximately 1/10th the cost of electric power generated by a piston engine.

Cars that charge off the grid can easily top 100 mpg on short trips where no gasoline needs to be burned. Numbers below are an average, and thus they fail to make scientific sense.

133	Toyota Prius Prime	
119	Hyundai Ioniq	
106	Chevrolet Volt	
136	Hyundai Ioniq Electric	
119	Chevrolet Bolt	
109	BMW i3 (94Ah)	

15 Featured Models:

I broke the ratings down into three categories as there are so many models of Hybrids available today that it is impossible to rate more than a fraction of them. Here is the second category from which to scout for a vehicle.

Now remember, with so little history behind each of the new models, what is the actual value of my analyses? The fact is, before you buy one of these, other than the Prius, it would be a good idea to perform google and YouTube searches with questions about the make and model. Let's say you like the look of the new Toyota Avalon Hybrid. Then you are going to search "Toyota Avalon Hybrid problems". You will get a number of sites. You will soon find that the 2014 models had lots of complaints whereas the 2017 models seem to have generated few. Don't take any of my recommendations without checking more facts on your own.

I would also like to mention that the extreme cost of these vehicles may not seem so high in the next coming months. For example, if the U.S. gets their new gold backed dollar as promised by the Leo Wanta Fund, then a $70,000 BMW 540e may not seem so high. If this is the case, be ready to buy the best of what it is you need. Put in simple/stupid terms: If money is no object, these are some nice vehicles for the interim.

#1 2018 Toyota Camry Hybrid

The Toyota Camry Hybrid was redesigned for 2018. It has impressive fuel efficiency and got a...
SCORE 9.0

MSRP$27,800 - $32,250

MPG51 City / 53 Hwy

#2 2019 Toyota Avalon Hybrid

The Toyota Avalon Hybrid fared well and got a
SCORE 8.8

MSRP$36,500 - $42,800

MPG43 (Est) City / 43 (Est) Hwy

#3 2018 Honda Accord Hybrid

The newly redesigned 2018 Honda Accord Hybrid finished with a SCORE 8.5

MSRP$25,100 - $34,710

MPG47 City / 47 Hwy

#4 2018 Toyota Prius

Not only is the 2018 Toyota Prius reliable it is reasonably fuel efficient even without the plug-in feature: It gets a SCORE 8.5

MSRP$23,475 - $30,565

MPG54 City / 50 Hwy

#5 2018 Chevrolet Volt

The 2018 Chevrolet Volt is a plug-in hybrid that has great fuel economy and gets a SCORE8.4

MSRP$33,220 - $37,570

MPG43 (2016) City / 42 (2016) Hwy

#6 2018 Hyundai Ioniq

Combined with the gas engine, the total peak system output is rated as 139 horsepower comparing favorably to the Prius' 121 system power. Acceleration is thus quicker in the Hyundai by close to a couple seconds in a 0-60 mph sprint. SCORE 8.4

MSRP$22,200 - $28,300

MPG57 City / 59 Hwy

#7 2017 Hyundai Sonata Hybrid

The 2018 Hyundai Sonata Hybrid features a 2 L engine with 140 Hp. Combined with a 51 HP electric motor for a total of 190 Hp. And 42 mpg combined fuel economy for a SCORE of 8.3

MSRP$26,000 - $38,600

MPG39 City / 45 Hwy

#8 2018 Chevrolet Malibu Hybrid

The 2018 Malibu Hybrid offers a 122-horsepower 1.8-liter hybrid 4-cylinder, mated to front-wheel drive and a CV transmission. Gas mileage is rated at 49 miles per gallon in the city and 43 mpg on the highway for a SCORE 8.3

MSRP $27,920

MPG 49 City / 43 Hwy

#9 2018 Ford Fusion Hybrid

The 2018 Ford Fusion Hybrid boasts agile handling and the good fuel economy. SCORE 8.2

MSRP$25,390 - $37,370

MPG43 City / 41 Hwy

#10 2018 Honda Clarity

The 2018 Honda Clarity has an upscale interior and highly efficient powertrains, but it can't keep up with the performance of class rivals. SCORE8.2

MSRP$33,400 - $36,600

MPG44 (Est) City / 40 (Est) Hwy

#11 2018 Kia Optima Hybrid

The 2018 Kia Optima Hybrid sits in the middle of our midsize sedan rankings. There's a lot to like about this Kia.
SCORE8.1
MSRP$25,995 - $35,210
MPG39 (Est) City / 46 (Est) Hwy

#12 2018 Toyota Prius Prime

The 2018 Toyota Prius Prime's outstanding fuel economy, fantastic safety scores, and smooth transitions between gas and electric power make it an appealing green
SCORE8.1
MSRP$27,100 - $33,100
MPGN/A

#13 2018 Ford C-Max Hybrid

The 2018 Ford C-Max Hybrid ranks low among wagons when compared to roomier, more refined rivals.
SCORE8.0
MSRP$24,120 - $27,275
MPG42 City / 38 Hwy

#14 2018 Nissan Leaf

The fully-redesigned all-electric 2018 Nissan Leaf adds horsepower, new technology, and an extended range that make it more attractive than the previous generation.
SCORE7.7
MSRP$29,990 - $36,200 MPGN/A

#15 2018 Toyota Prius c

This car has had an amazing run! It has turned out to be a winner for almost all of the buyers for the fact it is so reliable.

The 2018 Toyota Prius c hybrid boasts outstanding fuel efficiency and deft maneuverability in tight city environments. However, the Prius c is held back by the fact it is not a plug-in.

SCORE7.5

MSRP$20,630 - $24,965

MPG48 City / 43 Hwy

8 European Hybrid and Electric Cars

In this next section we will consider Hybrid designed cars as if money is not a significant limitation. As I mentioned, it is very easy to get carried away, especially if you want both performance and good gas mileage.

1. Audi A3 Sportback E-tron

The 2018 Audi Etron has a 507 combined horsepower but only a 311 mile maximum range! (tiny fuel tank)

2. BMW i3

The 2018 BMW i3 is the most advanced vehicle of the hybrids. This is because it sports a motorcycle-sized engine coupled only to a generator for putting juice into the battery when it starts to get low. It's the perfect solution but since it only has a 9 liter fuel tank only has a total range of 300 miles.

3. BMW X5 xDrive40e

The 2018 hybrid comes equipped with a turbocharged 2.0 L with 240 Hp and 113 Hp electric motor giving it performance equal to the 3.0 L. 14 mile EV range.

4. Fiat 500e

The 2018 121 MPGe City/103 MPGe Highway RatingsDriving Range of 84 Miles. Estimated Fuel Consumption Rate of 30 Kilowatt Hours (kWh) Per 100 Miles; 6 Electric-Drive Motor with 111 HP (83 kW) and 147 LB-FT (200 Nm) of Torque
MSRP* STARTING AT $32,995

5. Mercedes-Benz GLE 4 Matic Hybrid

Wow! The 2018 model 3.0 L bi-turbo w/ electric motor supplies 436 Hp. And goes 0-60 in 5.2 sec! A plug in that has a 21 gal fuel tank. Starts at $75,000.

6. Porsche Cayenne S E-Hybrid

The 2018 Porsche Cayenne Hybrid is an amazing performing car if you want acceleration. It works like this: Power option one is a 95 horsepower electric motor and battery with 25 miles of range for driving around town and in traffic. Power option two is a 330 horsepower gasoline supercharged engine for speed and acceleration out on the road. Power option three is both of these combined to produce 425 horsepower, making this one exciting four passenger car which is just about unbeatable off the line. Once it gets near 60 miles per hour it will smoke the Tesla. They currently are available in the United States and sell for about $97,000 dollars.

7. Volkswagen e-Golf

The all-electric eGolf has a range of 230 km. This is a bit less than a Leaf (241 km), but much better than other EV's except the Bolt and Tesla. Acceleration 0-60 in eight seconds. You can engage Sport mode with three different levels of regenerative braking. Around $30,000.

8. Volvo XC90 T8 Twin Engine

The 2018 Volvos XC60 and XC90 are attractive and high performing SUV Hybrids. The XC60 has 400 total Hp and 2.0 L turbocharged 4 cylinder gasoline engine goes 28 miles on battery only.

Other models:

Below are some other models to consider if you are looking for a luxury or large vehicle. Unfortunately at this time there are no hybrid designs available for Pickup trucks or vehicles of that sized chassis.

The **Acura RLX and MDX** includes the Sport Sedan and SUV. The MDX is one of the larger SUV's currently available as a Hybrid. Both of these Acura models come with 3.0 L engine plus two electric motors (one at each rear wheel) plus the main electric motor. 321 peak Hp with 27 mpg figures. 0-60 under 6 seconds.

Audi Q7 etron comes with a 3.0 L Diesel but will not be offered in the U.S.
BMW 330e, 530e and 730e I have watched several YouTube videos of BMW's line of Hybrids and I was impressed with each of the models.
Buick La Crosse E Assist
Infiniti Q50 HEV Unfortunately, this is a non-plug-in.
Infiniti QX 60 2.5 L v-6 supercharged to 250 Hp. Looks like a Nissan Pathfinder. The Acura is better. The Lexus is less sporty.
Jaguar I-Pace 400 Hp. 0-60 in 4 seconds. Goes 220 miles on one charge!
Lexus NX 300 h has a 2.5 L plus two electric motors.
Lexus RX 450 Hybrid 308 total Hp. One electric motor in rear. 30 Mpg.
Lexus LC 500h sports a 3.5 V-6 with 355 total Hp.
Lincoln MKZ hybrid 141-hp, 2.0-liter I-4 (regular gas) front wheel drive, 2 speed CVT with 40 mpg combined mileage.
Mini Cooper SE ALL-4 Hybrid has 221 total Hp.
Mitsubishi Outlander Hybrid: 2.0 L engine with 197 Hp.
Range Rover Plug in. 2 Liter 295 Hp. 25 mile EV range.
Toyota Highlander Hybrid has a 3.5 L engine plus electric motor. This mainly gives you a better Stop-Start motor.

Further Analysis of the Hybrid Program

Although it appears that today we have an interesting choice of power packages, with engines combined with electric motors that produce upwards of 500 peak horsepower, the fact is we are at the pinnacle of car complexity. There are so many features on these new hybrids that there is almost no way any one person can ever learn them all, and believe me that's part of the deception.

You will notice that from the Mercedes down to Kia that they all have hybrid technology, incredible as it seems, all at about the same level of performance. Notice that all of the models end up going about the same distance, and they all have mileage figures that are within a close proximity. Don't kid yourself; know what's going on.

All of the major "oil company approved" automobile manufacturers have acquired this technology and thus are able to offer it in a package that is reliable, competitive in performance and competitive in price. The only way that all of this mechanical and electrical complexity could have evolved into these peculiar power mechanisms that are already designed so well (they all seem to have been thoroughly tested) is through a well thought out program of collusion. There is no other reason to explain why they would have come up with the exact same complex configurations.

Today, as of June 18, 2018 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. For example, the current "hot" package in the BMW's and Mercedes as well as others is the use of a 2.0 Liter 4 cylinder turbocharged engine putting out around 240 horsepower and then combining this with an electric motor of about 110 horsepower, giving the vehicle a combined total of appx. 350 horsepower, on demand. I have to admit, even I want one of those new BMW X5 40e Hybrids. If the thing will just stay together (240 hp out of a 2 liter engine) and remain reliable, it's an exciting ride at 40 mpg, no?

But remember again, not only are all of them close in proximity of technology but also note the conspicuous lack of a diesel hybrid. Actually, Audi does offer a 3.0 Liter diesel in their Q7 etron and the performance is snappy. Don't expect them to be on sale here in the United States, however.

Green Technology?

You can't call a technology "green" when the fuel it runs on turns all plant life brown. So here is the number one Hybrid red flag. It is the fact that all of these new super-designs continue to run on the most toxic fuel on the market; gasoline. We should at least have an oxygenated fuel to prevent carbon monoxide in the 21st Century. It should have been developed right alongside the development of computer-controlled multi mechanical-electrical transportation mechanisms. Why wasn't it? Has there really been no progress here or is Big Oily just stuck on an old game plan? You can decide for yourself.

If you buy into this technology thinking that you are helping to reduce carbon pollution on the planet, 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 then it will really shine in comparison to 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 reduce "driver's cost per mile" to operate the car.

As for wanting to do your part in reducing pollution by driving one of these vs. a cheaper gasoline piston-powered vehicles, you will soon learn that in 2015 Fiat had a Wankel-powered prototype called the FEV. It performed brilliantly utilizing a Wankel-electric generator with no transmission. Audi has also researched the design. The industry is flat out dragging its feet.

And don't forget the 2010 BP/Deepwater Horizons toxic crude blowout disaster at 5,000 feet under the ocean. Don't forget that BP was allowed to dump it into the Caribbean Gulf where no attempt was made to skim nor salvage any of it. The U.S. Coast Guard even permitted them to set it ablaze in giant toxic flames that sent pollutants high into the air and around the globe. Is your green car really going to make a positive difference in the current big oily controlled environment?

Now do you still want to get the hybrid? Well, it's what choice we have. And yes it is possible to go further on the gasoline you buy. And, if you keep your hybrid charged you can cut your fuel bill in half. The hybrid is also a better performer in stop and go traffic. But it will not save you money!!

Prius verses Volt

If reducing your carbon footprint is still at the forefront of your quest to better harmonize with the environment then you will want to get a model of hybrid that gives you the best fuel mileage. There is a great spot on the internet to find actual fuel mileage results called Fuelly.com. These are recent overall actual mileage figures supplied by the car owners themselves.

Toyota Prius Prime:	2017: 74.4 miles per gallon
Prius standard:	2016: 54.7,
	2015: 44.9,
	2014: 47.1

The Chevy Volt slightly outperforms the Prius Prime by having a larger battery. It has an electric-only range of 53 miles.

Chevy Volt:	2017: 81.8 mile per gallon
	2016: 78.3

The Volt's mileage is a little higher because the Volt can recharge at home more of the energy needed to make the daily commute. The more electric-only mileage capability the vehicle has, the better fuel mileage it's going to get. Actually, this is only true if you plug the vehicle in for a complete recharge each night.

To get any electric-only range with the Prius you need to purchase the Prius Prime, in which case you will get 34 miles of electric only range. It comes equipped with a slightly larger gasoline engine (1.8L). The engine automatically comes on after just a few minutes of driving.

The Volt has a 1.4 L engine and will go 35 miles on its charge before the engine turns on. The base Prius is approximately the same base price as the Volt. Since it has proven to be so reliable, I would definitely take it over the Chevrolet.

The Prius contains a nickel metal hybrid battery that is warrantied for 10 years or 100,000 miles. These cars have been in production long enough to prove that their batteries are lasting upwards of 180,000 miles, which could be for the life of the car. If a person has to replace the battery after the warranty they can buy a kit and rebuild the battery themselves for under $1,000 dollars. That's another reason to purchase the Prius. The battery components are rebuilt and resold. This seems like a pretty good program.

Further Discussion of Hybrid Vehicles

From the outside it looks like the public is finally getting vehicles which utilize modern electronic knowhow. Unfortunately, the gasoline/electric drive hybrid designs are a concept that should be scrapped in favor of all electric fuel cell powered vehicles as neither one equals the performance of an all-electric car or a piston powered car using diesel.

The fact that a small diesel piston engine can outperform the gasoline-powered hybrid is more than just a glaring design contradiction,

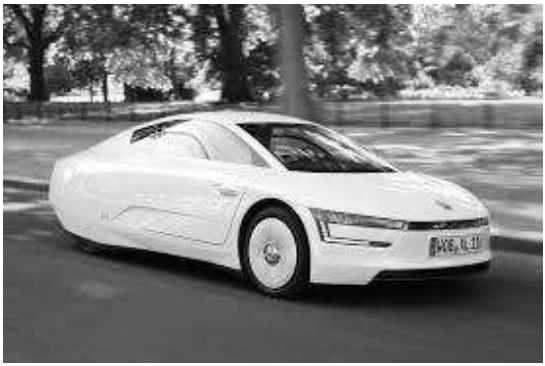
when a more fuel efficient type of engine could have been chosen from the beginning. Providing Americans with complicated gasoline-powered hybrids rather than simple efficient diesels is nothing more than a roadblock in the way of a true electrical vehicle.

Volkswagen's 300 MPG Car

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.

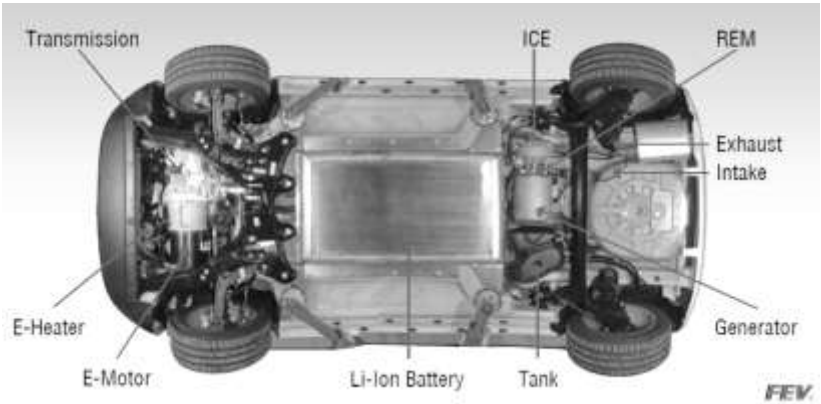
Cost is not the issue either. Even after being hand made with "exotic" materials in an intentionally limited edition, the Xl1 still only costs $60,000. There is a lot more of a market for this car than 2,000 units at that price. For the bottom line is a 1,700 plus pound Xl1 can get 300 mpg. This indicates 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 June 2018 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 should wake up though. This is solid proof that they can dramatically increase fuel mileage beyond what the best hybrid will ever deliver.

The Wankel Hybrid

Now that you have seen what a small 2 cylinder diesel engine can do when it is linked up electronically to the drive wheels it is time to reveal the next obvious level of technology that we should be seeing in all of our automobiles on the road today. The combination of a diesel Wankel engine into the hybrid concept, could revolutionize the car industry. The picture

below represents the underside of the prototype FEV which demonstrates a superior hybrid concept. Notice that the engine is a compact Wankel direct-coupled to a generator. This power package is located underneath the car's back seat. The motor and transmission are placed just in front of



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

the front wheels. 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 could be the first mechanical-electro vehicle to appear in a production car if it receives approval from the auto/oil dudes. Don't bet on that happening anytime soon.

This design replaces the big clunky piston engine with a small Wankel engine (about 1/5 the size of the Mazda engine). The resulting package is compact and lightweight so as to provide a potent gasoline powered generator that can be easily fitted into an existing electric car. They call it a "range extender", meaning that this powertrain can also charge batteries

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

while on the go using its own gasoline powered engine. But the main improvement in the car is the fact it is free of a piston engine, drive shaft and torque converter. There is no mechanical connection between the engine and the wheels ever.

This is the proper way to build a true hybrid car, and to finish off the revolutionary concept it could and should incorporate wheel hub motors in place of a gear reducer and planetary drive. This would make the vehicle even lighter and more efficient. Don't expect to see it soon!

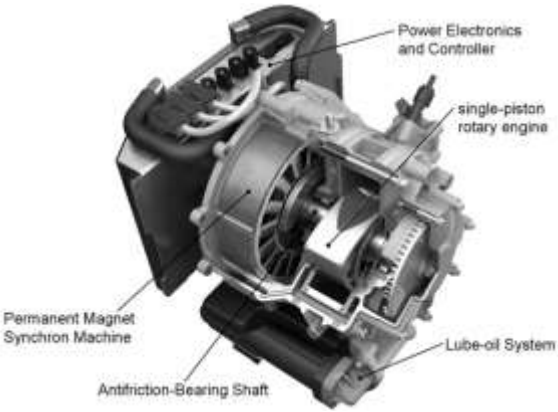
This vehicle concept has virtually unlimited range. First it can charge 100 miles worth of electricity off the grid into its battery, then it can charge on the go, later it can refill at gas stations anywhere if it goes beyond this distance. If a diesel Wankel engine could deliver the same mileage as the BMW, a small five gallon reserve tank could get you 3,500 miles. I know this sounds unbelievable but it is achievable by today's standards in engineering, manufacturing and design. This can and will all happen the day the auto industry is allowed to employ much smaller engines while at the same time doing away with the heavy mechanical drives.

In the 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 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.

The two prototypes that I recently studied both employed a scaled-down Wankel engine that put out plenty of horsepower. In the case of the FEV, the engine is 295 cc and puts out a maximum of 60 Kw, which is over 100 Hp. The Audi is smaller at 265 cc and puts out 75 Kw in short bursts, giving it upwards of 150 Hp. This more than indicates that the Wankel

engine in scaled down versions not only performs well but could have a very bright future, provided any auto manufacturers will be allowed to offer them to the public. More about these two prototype vehicles is in Appendix A2.

At right is the most advanced Wankel powered generator package for an automobile I have found. Note how this type of engine can be made so much smaller in size than a comparable piston engine. This one-rotor design provides over 100 Hp. yet 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

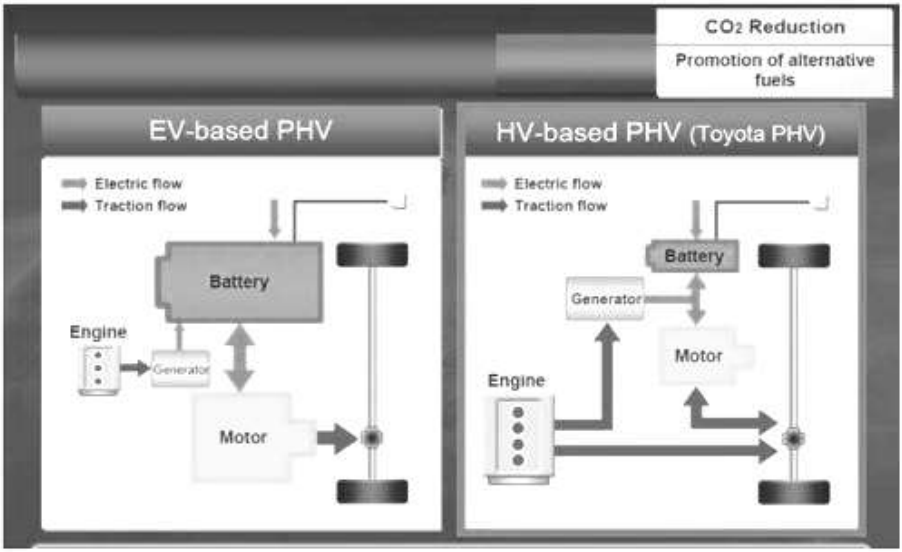
Air-cooled Wankel engines of 50 to 100 Horsepower for military drones are only 25 lb, making them the preferred choice of power for these cheap lightweight planes. Rotary motion is harmonious with high rpms, which these scaled down Wankels can deliver.

The Wankel engine comes into a new realm with the addition of a turbocharger, which Mazda confirmed dramatically increases horsepower output. Now keep in mind that a turbocharger in itself is a rotary engine. In this case it is in the form of a turbine running off the engine's exhaust. The problem is they run hot and are not easy to fit within the vehicle. I think Rolls Royce already designed the ultimate Wankel with their two stage version which used the first rotor as a compressor.

Why a Hybrid with a Standard Size Engine Won't Significantly Improve Mileage

The chart on the next page illustrates the design flaw of today's hybrid cars by comparing two types of Hybrid concepts. 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.

In the second concept, such as the ones present in the Prius and Volt, the design employs a much larger gasoline engine which is used to either power the car mechanically or power the generator which then powers either the battery or the motor. This system utilizes a gasoline engine that is way too large.



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.

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.

A properly designed electric driven vehicle would yield savings in engine and drive train weight allowing for a larger car body as part of the package. It wouldn't have to be some miniaturized space capsule. Electric should not be synonymous with tiny. Electric propulsion is what should be employed on the largest vehicles. I look forward to the day when we get the body design for an electric car of Packard quality. That's what the public deserves.

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 which ever hit the highways. Sporty and economic performance 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, and thus have the whole electric car idea 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 each who signed up for and were lucky enough to get one. This gave General Motors the ability to recall them at any time.

You guessed it! As soon as the eco-law was rescinded GM put out a work order that insisted all EV-1's be returned to them for further modifications. 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.

After the last 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 controlling mechanism.

Tesla Motors?

I'll tell you why I'm worried that the current Tesla Motors' situation is gearing up to become a major bankruptcy event. Three things are happening: One; the introduction of the Tesla Model 3 is going much slower than expected. Approximately 34% of customers who put $1,000 dollars down on the first batch of new models have cancelled their order for the fact that two years have gone by and many are still looking at months before their car is available. Secondly, Tesla Motors has just laid off 4,100 workers comprising 10% of the workforce. Thirdly, Tesla Motors cars are getting extremely bad publicity as they keep catching fire or having accidents.

I might add the coveted Model 3 is not a design that will be coveted in the future All-Pro museum of great American Cars. Problem one; it's a full foot shorter than the Tesla Model S making it less sleek-looking and a bit on the small size for $35,000. Another problem is the fact that it comes as a base color in black and to get another color costs extra. The three Tesla Model 3 videos I watched stated that their models were equipped with self-steering and a larger battery giving the car a final cost of $57,000.

This car is all about the car's software program. That's the way it's been sold, and that's the way people are buying into it. I watched a number of videos produced to describe and test the Tesla Model 3 and found the car to be extremely complex. You have to learn how it works before you can drive it. The software program that controls it resembles an AutoCAD program, so don't expect to master it without due diligence on your part.

Personally, the

complex undersized Model 3 gives me the creeps. Why? Because the Tesla Company sends out software patches on a daily to weekly basis that actually change the control features of certain control knobs and buttons. The drivers are told, "The car gets better with age!" Several of the excited owners act like they actually believe this. They forget that Tesla's keep crashing. They also didn't notice that Elon Musk just recently announced that an employee had committed treason within his organization by sending all kinds of proprietary software data to a number of undisclosed recipients. I hope you see the potential for disaster!

More to Worry About

Experience with past companies that introduced promising new petroleum-free designs to the public makes me consider that this whole Tesla story is being played out from a script. Why? Because the power of Big Oily and their behind-the-scenes gerrymandering can take this company down just like they destroyed the EV-1 all electric car. Other notable include the De Lorean, the Tucker, Studebaker, Hudson, Duesenberg and every electric car put on the market hence. Musk is no Tesla, therefore why should his fate be any different?

In fact I've wondered from the start why they let Musk use that name. The only way it makes sense is that if the plan all along was to let Tesla Motors go down in hailstorm of bad publicity. Big Oily never liked Tesla's AC energy; they definitely don't want his technology now. What they do want is another "De Lorian" type failure that would tarnish Tesla's concepts even further, resulting in another major setback in the manufacture of a reliable electric car.

As you have seen, the manufacture of a reliable electric car has long been accomplished. Big Oily simply wants another 20 year run on oil. Beware! When the De Lorian car company went bankrupt Big Oily had just found a way to keep us from having a stainless steel car that wouldn't rust.

2018 Tesla Model S
(shown next page)
2018 Tesla Model X
5 passengers, 518 Horsepower, All wheel drive. $75-$135K

According to Tesla Motors, Model X is the safest, fastest and most capable sport utility vehicle in history. You can get it equipped with all-wheel drive and a 100 kWh battery providing over 300 miles of range for $135,000 dollars. The 100 kWh version is ludicrously fast; accelerating from zero to 60 miles per hour in as quick as 2.9 seconds. If racing is what you want, this car will beat anything on the road. For $75k you get the 75kWh Model with just rear wheel drive and a range of only 259, miles.

Summary

The industry is fooling the public. Electric powered vehicles should be cheaper than their piston powered counterparts, not more expensive. Secondly, any serious hybrid contender should be equipped with larger energy storage systems.

Remember, Exxon bought and holds the patents to the hydrogen fuel cells that went up with the Apollo moon launch in 1969. We have absolute proof that the last thing the oil/auto gang wants is to have vehicles on the highway that are powered off the electrical grid. The cheapest energy is produced using giant steam turbines, not multi-cylinder piston engines.

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. And thus they have allowed themselves to

create a worldwide dilemma; what to do with all of the oil that is right now loaded into super tankers and headed toward us on the high seas?

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 the business and have a good reputation to boot. But Big Oily is Big Greedy and they know it.

It is time for Big Oil to face the Big Dilemma. Available designs which could put an end to our current gasoline madness are becoming more known to the public. It is time to end this insane toxic madness as it has been going on for so long we have come to embrace it as a necessary evil.

It is no longer a necessary evil.

A Review of Inventions/ Inventors and Dates:

James Watt	First reliable steam engine	1775
Eli Whitney	Cotton gin, interchangeable parts for muskets	1793, 1798
Robert Fulton	steamboat service on the Hudson River	1807
Samuel F.B. Morse	Telegraph	1836
Elias Howe	Sewing machine	1844
Isaac Singer	Improves and markets Howe's sewing machine	1851
Cyrus Field	Transatlantic cable	1866
Alexander Graham Bell	Telephone	1876
Thomas Edison	Phonograph, first incandescent lightbulb	1877, 1879
Nikola Tesla	Induction electric motor	1888
Rudolf Diesel	Diesel engine	1892
Orville and Wilbur Wright	First airplane	1903

CHAPTER 9

The Chrysler Turbine Car

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.

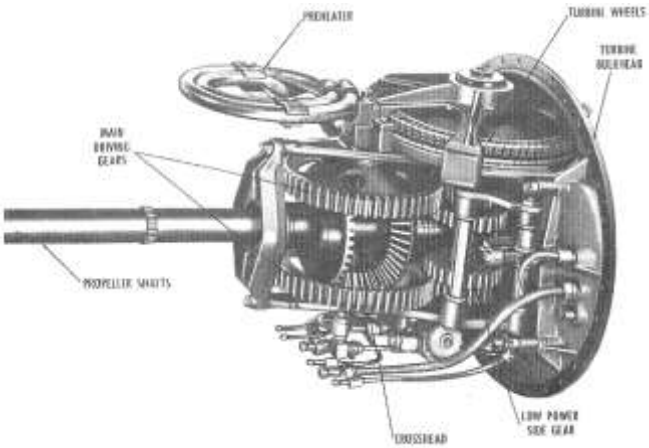


Figure 1211. Main engine.

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 finally, 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 the pressure from the combustion of methanol. This dramatically increased the power.

The turbine designed for use with the 21-inch Mark-14 torpedo was known as a wet-heater 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.

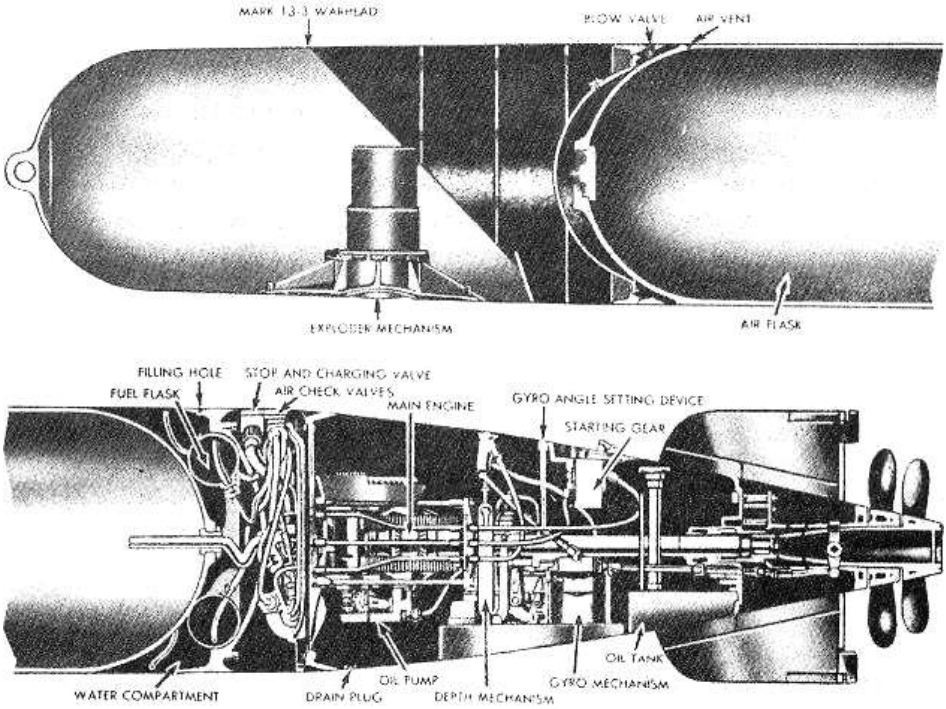
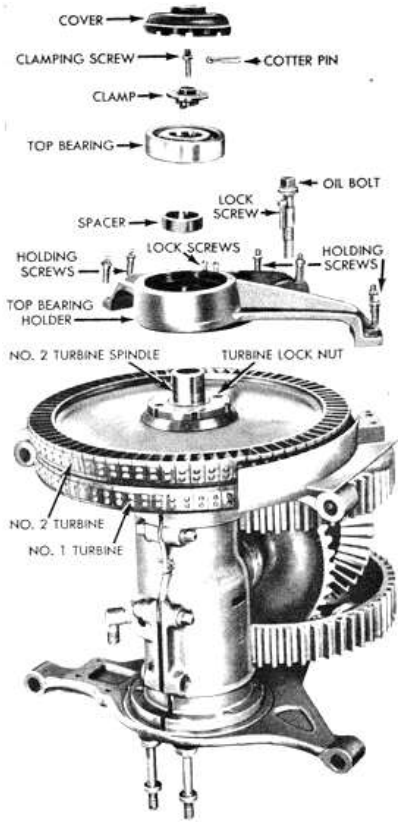


FIGURE 12H1.—The Mark 13 torpedo.

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 above 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

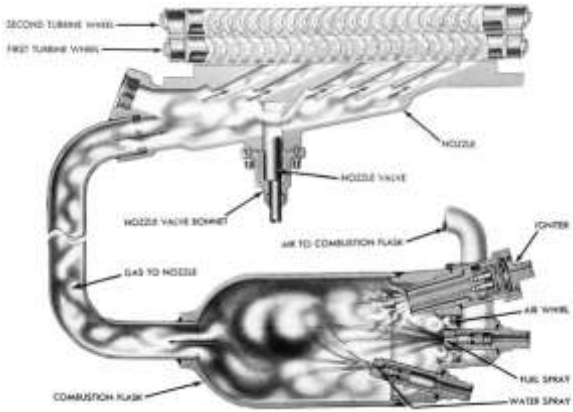


turbine engine is obviously much cheaper to manufacturer than a piston engine.

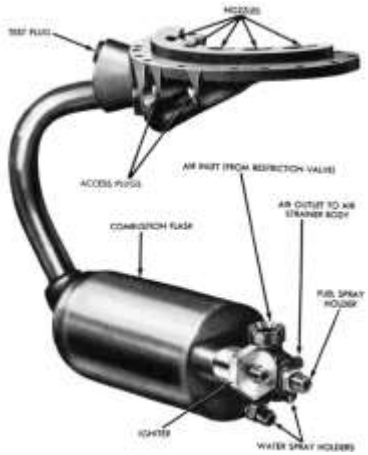
Combustion Flask and Nozzle Unit left and next page; note the presence of an inlet for air, fuel and water. Fuel and water get burned together to produce super-heat steam! In the diagrammatic view, note the cupped turbine blades.

This is not rocket science here; one directs the pressure toward the other which spins in the opposite direction. The Chrysler Turbine used two turbine wheels spinning in opposite directions that were not geared together.

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

Of course the auto industry could adapt the design of this turbine engine, and they could do that by adding a supercharger for continuous running in addition to the compressed air tank for startup. Since one of the output shafts would need to be fixed, this might require an extra set of blades. The high pressure air tank would be recharged by the supercharger.

As you can see from these drawings, the gearing mechanism in this torpedo design provided two output shafts, one inside the other turning in the opposite direction, and this was to provide for counter-rotating props at the stern of the torpedo.

This brilliant work of engineering does leave me wondering why the submarine itself was not given the same level of technology. 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.

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 created super-heated steam as well as combustion gasses. The use of methanol plus water in these piston engines demonstrated a power multiplication many times greater than typical gasoline combustion designs.

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.

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 the 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 turbine 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. It took demented corporate wishes to stop the development of such a superior design.

This 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. This is not so with gasoline. 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 greater concern about air quality and smog-producing engines than they are about the overall safety of the system itself.

A Worthwhile Review of the Chrysler Turbine

I'm going to attempt to make an honest overall assessment of the Chrysler turbine program. This is how successful I think it was: By using available materials and innovations that were discovered through their our own research and efforts, they produced a basic transportation vehicle that could go 100,000 between maintenance, travel 1,000,000 miles between overhauls and get 50 miles per gallon. This is not only a realistic statement but does not even take into consideration the revolutionary breakthroughs already discovered in alternate formulations of fuels.

The performance of the turbine made every other car look and sound like a model T, but they never tried to show it off. Just look at one

of these typical turbine-equipped vehicles that were either a standard Dodge Dart or Plymouth Fury manufactured in the mid 60's. They looked about as souped up as a failed Edsel. 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 anticipation?

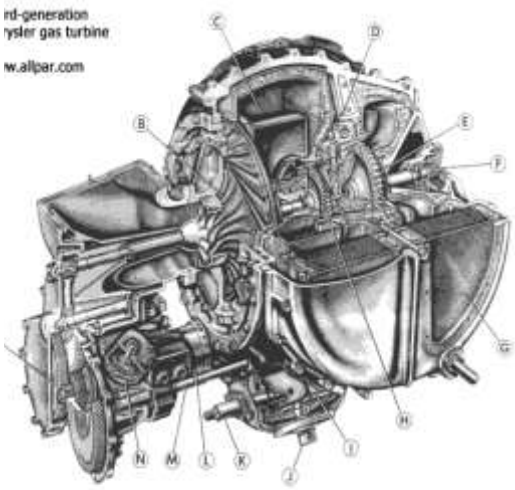
For example, the turbine was air cooled so the only thing behind the grill is a lot of empty space. This could have been streamlined into a wedge or nosecone, or made into an interesting air-scoop that would have given this car the futuristic look that it deserved. Imagine if they had just designed two exhaust nozzles built into the rear of the car!

A quote from Chrysler

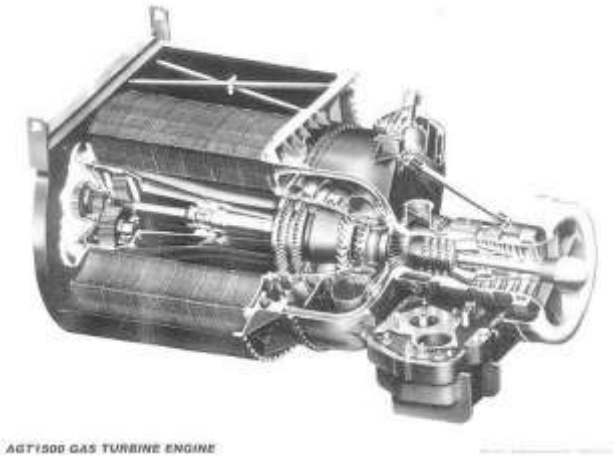
> *"The adoption of a gas turbine power-plant in a car imparts a unique personality and makes its experience unforgettable, both for the driver and the passengers. The total absence of any kind of mechanical noise or vibration in the passengers' compartment is surprisingly combined with fierce, effortless 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.

Here is an 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! 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. Note that exhaust gas temperatures were half that of piston engines then and today.



MAIN COMPONENTS OF THE TWIN-REGENERATOR GAS TURBINE: (A) accessory drive; (B) compressor; (C) right regenerator rotor; (D) variable nozzle unit; (E) power turbine; (F) reduction gear; (G) left regenerator rotor; (H) gas generator turbine; (I) burner; (J) fuel nozzle; (K) igniter; (L) starter-generator; (M) regenerator drive shaft; (N) ignition unit.



Previous page: 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.

Above and left: The Chrysler turbine today: The 1500 Hp. gas turbine engine for the Abrams tank, shown at left. Fighting in a war, you get a turbine. After fighting in a war, you get a thumper.

The Advantages of the Turbine As Summarized by Chrysler:

Below is taken from 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!

But, then 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 powerplant 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 beforehand.

The most spectacular display of performance was the STP car #40 that was 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 children who have refused to grow up into men and move on from their throbbing piston toys. Their memories have dimmed and their curiosity 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?

Here is a major component of the reason. 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 breaking 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. That's because 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 very purpose of Indy type car racing is to validate petroleum, petroleum consuming piston engines and petroleum containing 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, twice as much fuel can be crammed into the combustion chamber as can be accomplished using 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.

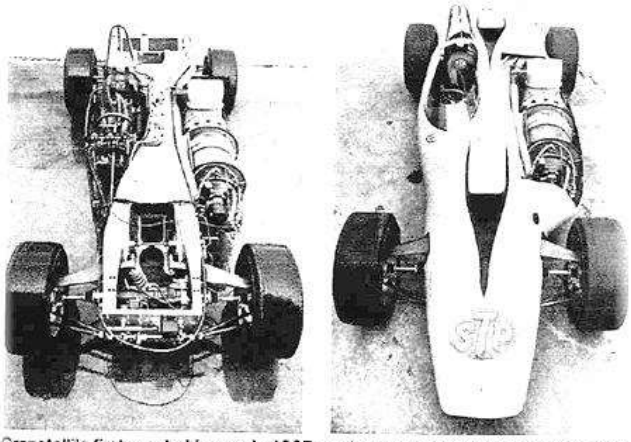
The turbine engine could utilize a non-oxygenated fuel AND still produce much more power than the best piston engine running with an oxygenated fuel! This is solid proof of its superior design. Now let's take a fun read about the 1967 Indianapolis 500.

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.

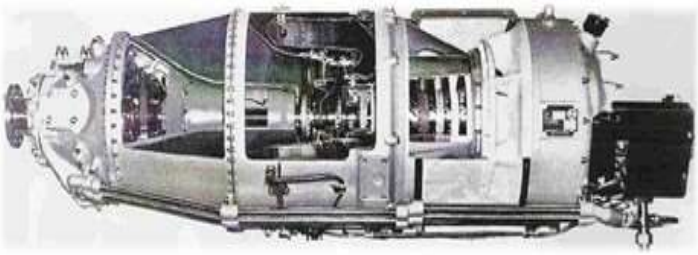
The STP turbocar showed promise and it was turning competitive if not record-shattering speeds. The main advantage, as Granatelli saw it, was the tremendous torque available from a turbine engine. A turbine produces torque very quickly in its power band. It actually achieves peak torque with its output 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 1and 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 only 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 would 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 the 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 being signed.
>
> 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.

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 Hemi's, 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. The automobile industry has made absolutely zero progress in fuel mileage. Thusly, Big Oily negated the people's investment in energy conservation and pollution reduction.

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.

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 it was endlessly abundant.

Peak Oil

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 of the rest of us are losing ours.

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 nearly 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 international 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. Plus 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. But Big Oily Canada doesn't like this designation for a variety of reasons. Firstly they believe that these vast tars sands are the second largest reserve of carbon in the world after Saudi Arabia. Secondly they know it will make their dirty fuels appear less attractive for European importers. And thirdly this designation will <u>officially</u> label tar sands fuels as being more harmful in terms of driving global warming as well as highlight facts such as destroyed forests, poisoned lakes and fouled air. But it gets worse.

> "Environment Canada has not implemented its long-term scientific research plan. This plan was supposed to gird the country to mitigate air and water pollution and other environmental risks whilst in the meantime the department has stopped issuing reports to its representatives in the provinces as they did in the past.
>
> In similar fashion to the American Government dropping the ball in the Gulf of Mexico by allowing the British Petroleum oil volcano to spew

> nearly a year without remedy, the Canadian government agencies are not enforcing safety regulations for shipping chemicals on highways and railroads nor for the pumping of oil and gas.
>
> 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. Never the less, this is what Canada's environment minister Peter Kent said at the UN climate change summit in Durban:

> *"There is a disproportionate amount of criticism of the oil sands which is a responsibly and sustainably developed resource, of which we are proud."*

Can you believe that Canada would have such an environmental coward oil lackey calling the shots about some of the most valuable ecological forests on the planet? You have to ask yourself where they managed to find such a madman to support this 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.

Dirty Oil, Dirty Roads

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 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 note how they were built to last. 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. That dream car you've got in the back of your mind, let it go. We can all take a liberating step forward by beholding our cars and trucks for what they are; money-gobbling variations of the same lousy designs.

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 business plan goals, shown below in 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 to 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. That would just about pollute the human race into oblivion.

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 under its own weight 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. If you are still supporting the oil industry then you need to know that the majority of oil consumed within the United States is still imported. Meantime, Big Oily conveys the image that the product they sell us comes at a high cost when the fact is the vast majority comes at very low cost.

Total consumption of oil in the U.S. is approximately 21,000,000 barrels per day while domestic production is just 6,000,000 barrels per day. This leaves a shortfall of 15,000,000 barrels per day. As a result of this disparity the U.S. sends $547 billion dollars a year out of the country. Whoever set this system up and whoever continues to support it are guilty of treason against the United States as their actions clearly demonstrate that they have no interest in maintaining the United States as a free and sovereign country.

The Largest Export Product from the United States: Gasoline

Gasoline consumption itself represents about ½ of the oil producer's sales; a big portion of the total pie. Yet here in the U.S., the world's largest importer of crude oil, we still manage to export gasoline, which is made from crude oil. From January to October of 2011 the U.S. imported 2.7 billion barrels of oil and during the same period exported 848 million barrels (this is nearly 1 billion barrels!) of gasoline.

Here's another eyebrow raiser: During this same period U.S. Refiners imported 750 million barrels of finished crude in the form of fuels.

Add it all up and here is absolute proof that Big Oily's money-producing-branches of corruption sends America's needed fuel overseas while at the same time misleading the public about supply/demand. This makes them guilty of theft, extortion and endangering the nation's ability to maintain its national defense.

The oil companies have one motto: Sell to the highest bidder every time! For struggling American workers and families their actions have brought higher and higher gasoline prices that have dramatically cut into people's ability to travel beyond work and school. This goes well into the domain of criminal behavior. Their practices result in the movement of about 50 % of our nation's gasoline supply overseas and force us to buy more oil from a foreign country.

Don't be fooled into becoming angry with Arabs because they cut production to deliberately cause us a tightening of the supply leading to economic hardship. In the process, the media puppets cover up what more resembles a drug cartel than a corporation. In this case the drug is oil and it produces more money every time there is a "shortage".

Serious Reasons to NOT 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 oils, 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. This is the biggest contradiction Big Oily demonstrates on a daily basis.

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 miracle 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.

The British Petroleum Deep Water Horizons run-a-way well in the gulf allowed us to clearly see that Big Oily cares nothing about our gulf and possess only arrogance and indifference toward human air quality. Now we have learned that they don't care about the fact we are eating it.

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

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.
16. As a dust control agent for rice	ISO 100 oil viscosity (100 centistokes (cSt) at 100deg. F) applied at a level of no more than 0.08 percent by weight of the rice grain.

journal of Food and Chemical Toxicology in 2008, found that **"mineral**

The chart above is a current list of all places where petroleum-based oils can be used in food plants and for what purposes.

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 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: 1500^0F and a room temperature of 60^0F 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.

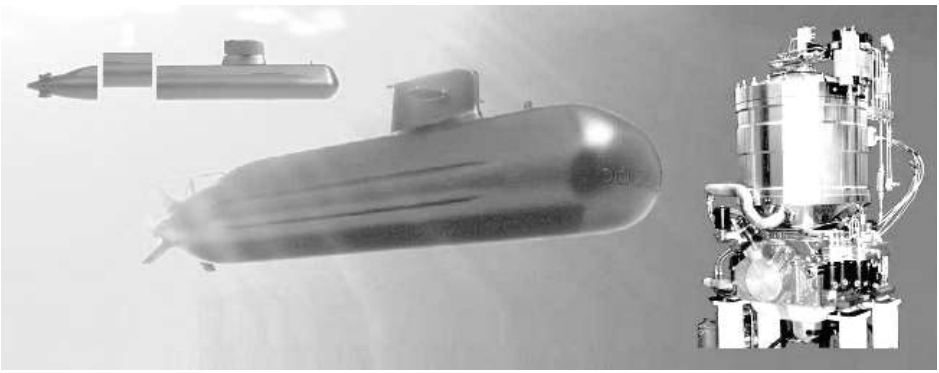
As has been pointed out earlier, the Stirling engine is not an engine that ever went into mass production beyond the units Ericson built during the 1800's. Stirling engines were in fact researched by both NASA and Chevrolet during the 1970's. They got gas mileage figures of 60-70 mpg in normal-sized 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 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

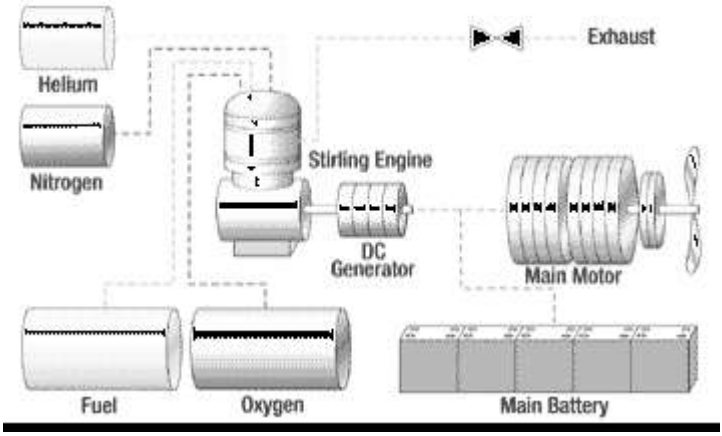


More than 20 years of operational service

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!

submarine is able to remain underwater for such a long duration, and we have even more confidence in the Stirling engine design.

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



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.

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**.

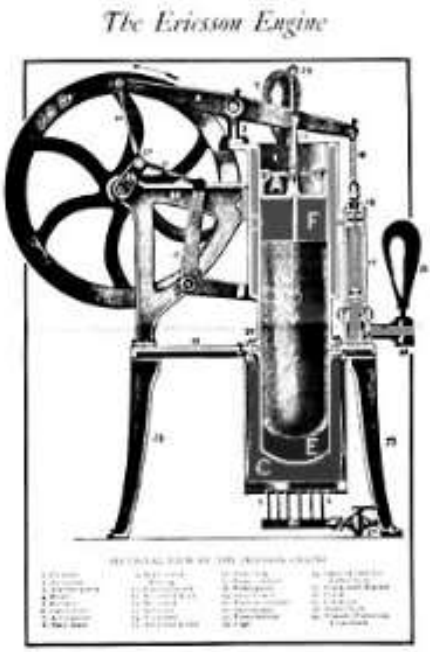
The grass was grown from the energy of sunlight. Since the energy of sunlight is provided to our earth free of charge, by utilizing grass for heat we effectively tapped into a free source of energy which is unlimited.

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.



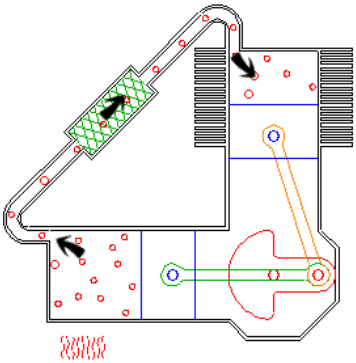
Over the course of a few crop cycles the land will be producing more crops than before and with enough power left over for lights and machinery. It is easy to see that any farmer's life would be greatly improved by this simple engine. This is why the Stirling engine was heralded by the scientific community as being one of the greatest inventions of all time back in 1862.

Two Cylinder Stirling Engine Operation

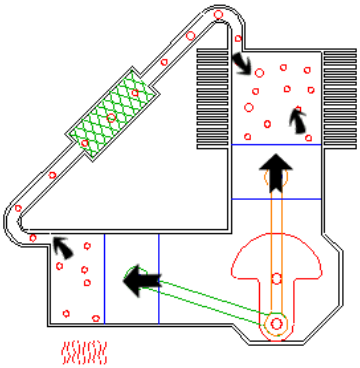
The Stirling engine's basic design utilizes two pistons which work together transferring the cylinder gas back and forth, over and over again, in a loop. The engine is a sealed unit. It only requires the first charge of gas that is put inside it. More modern designs utilize multiple cylinders in a continuous 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.

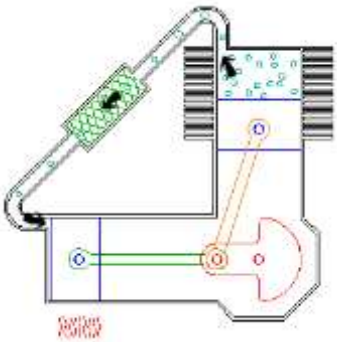
Expansion Most of the gas in the system has just been driven into the hot cylinder. The gas heats and expands driving both pistons inward.



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

A Stirling engine portable generator that was manufactured in the 1960s

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 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

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

Four Stirling engines in a row. Photo: Stirling DK

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 engineering thought 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. <u>But you will get toxic pollutants as a reward.</u> 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.

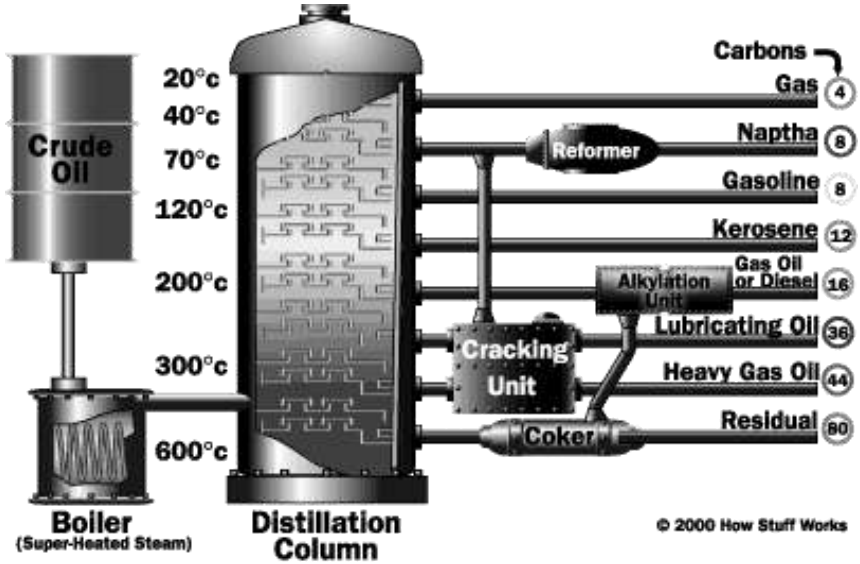
Folks consider in a nutshell what the situation is that we currently face: Farmers grow the same stuff on the surface of the planet that mindless-insane oil companies pull out of the ground. The only difference is their stuff is polluted and our stuff isn't. In order to pull off this stunt they have 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 (must read)

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. The next lightest molecules of hydrocarbons are slightly longer, such as those in automotive gasoline. And then just below this; slightly larger molecules again, these are normally classified as kerosene, diesel fuel and so on. At the top of the tower (boiling point is the lowest) we have aviation gasoline. At

the bottom of the tower (boiling temperature is the highest) we have asphalt tar.



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.

Gasoline is typically made from the fraction of the crude oil that boils at temperatures between about 50 degrees Celsius (122 ^{0}F) and 200 degrees Celsius (390 ^{0}F). As you can see from this wide temperature range, gasoline can thusly have within its makeup a range of molecular shapes and sizes. For the most widely used fuel on the planet, this is too broad of a defining specification, especially for 21st century standards.

Since every refinery processes different batches and types of crude oil, it is impossible to tell what compounds are present in the variable gasolines that are produced. As a result of the endless chemical variations, oil chemists are not expected to provide accurate test data on all of the toxic constituents of their product. As a result, even today in the 21st Century, only a few of them have been long-term tested. That's because if they have been long term tested such information would have made it impossible for them to reconcile gasoline as a safe and useable fuel.

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. 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.

The attitudes of the state and federal government are an over-emphasis of mandated 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 to be a cover from the beginning. If our smog laws were really there to protect us, they would have prevented the use of gasoline from day one.

Gasoline is made up almost entirely of hydrocarbons, which are carbon chain molecules that contain roughly two hydrogen atoms for each carbon atom. If you could look at gasoline under a microscope it would have between 6 and 12 carbon atoms in each molecule. A typical gasoline formula they use is called octane. This 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 a lose specification considering what is at stake and that is the quality of air we breathe. Just for starters, the variation of molecular sizes that makeup gasoline will therefore pose variations in vaporization tendencies which will of course effect the way these liquids combust. There is no doubt about it; longer chain molecules are harder to combust and they are slower to combust. Shorter molecules combust more completely and with increased expansion power.

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. It has also proven that even when the longer chain molecules are fully vaporized that they burn

slower than the shorter chain molecules. This tells us that we should not have such a broad mix of molecular sizes in our choice of a fuel to be burned in the environment as the two extremes work against each other. In this case, certain of 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. This is exactly correct. A much more efficient fuel vaporization system would resemble a car muffler with all its baffles as part of an intake system. The carburetor supplies raw fuel vapor into the heated muffler where it is swirled around and heated for a time before going into the engine. Now that's a 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:

$$2C_8H_{18} + 25O_2 \Rightarrow 16CO_2 + 18H_2O \quad \text{and} \quad 2C_8H_{18} + 17O_2 \Rightarrow 16CO + 18H_2O$$

The first equation is a theoretical chemical equation that only occurs in an ideal world. In the real world, there is usually not quite enough oxygen available fast enough inside the engine to allow the reaction to occur

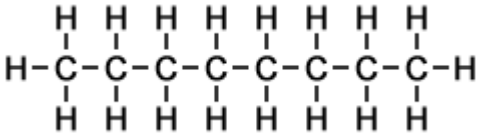
completely, so there is also some carbon monoxide (CO) formed as well. This reaction is shown in the second equation. As discussed in Chapter 3, gasoline's propensity to detonate unless it is supplied slightly on the rich side of a stoichiometric mixture makes the process of the second equation a done deal.

CO unfortunately stands for "carbon monoxide" which 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.

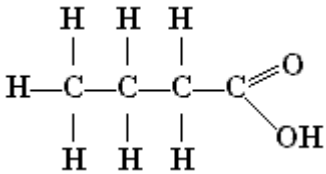
Another one of the properties particularly nagging about CO is the fact that its density is almost the same as atmospheric air, meaning that it hangs around right where we live and breathe, or try to. In order to calm our fears about the possibility of being poisoned by CO the oil-funded-and-trained 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.

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.

The Miracle of Living Organisms (must read)

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

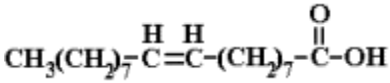
this is indeed not the case. As we will see, the addition of these extra Oxygen and Hydrogen atoms only helps in the combustion process. Combustion is an oxidation reaction, after all.

Here is the line formula for Butyric acid. There are four bonds for every carbon atom.

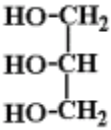
$$\mathbf{CH_3CH_2CH_2COOH} \quad \text{or} \quad \mathbf{CH_3(CH_2)_2COOH}$$

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.

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".

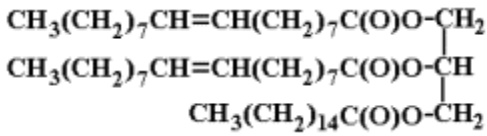


Oleic Acid



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?

This is the miracle of organic 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 assigned a project to provide energy. 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 stating there is no water, sunshine or living organisms on Earth.

Fatty acid composition of common edible fats and oils.

From the previous 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

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

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.

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:

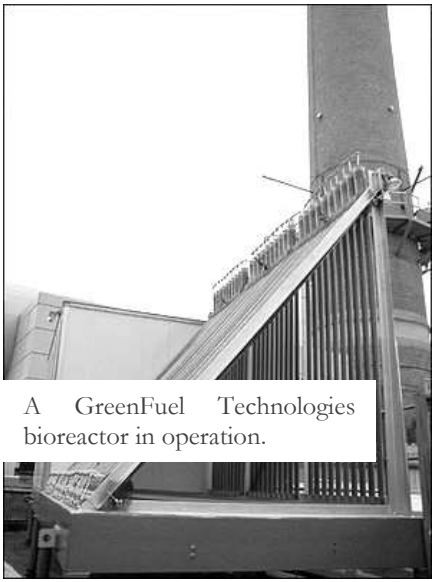
- Under optimum growing conditions micro-algae will produce up to 4 lbs./sq. ft./year or 15,000 gallons of oil/acre/year. Micro-algae are the fastest growing photosynthesizing organisms. They can complete an entire growing cycle every few days.
- One quad (1015 BTU or 7.5 billion gal.) of biodiesel could 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.

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



A GreenFuel Technologies bioreactor in operation.

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."

A plastic-to-oil processing plant. It is not only a simple process but a viable supplement for gasoline and diesel.

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 hydro-carbons 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.

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 they do with old tires. This is a nonsensical way to add pollution to an already polluted atmosphere. Numbers 2, 3 and 4 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. 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.

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 oil 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. Read the appendix section: *Russia and Abiotic Oil.*

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. He 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 6th 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? Believe it baby!

Perhaps if they had cared just a little more about the protection and maintenance of earth's priceless life forms they never would have used petroleum in the first place.

This planet at least deserves to have a Head Gardiner; somebody who would have the authority to enforce laws like the following: "If a person or company does not have proof that a chemical or product poses no long or short term health detriments to humans and animals or presents negative environmental concerns, then it cannot be used until there is such proof to validate its safe use." All that, just for living under the guidance of one wise farmer.

Chapter 13

Steam Locomotive Development
In the United States

CAN YOU GUESS; what is the most glaring contradiction that persists in our existing rail system? It is the fact that our locomotives are powered by self-contained diesel engines 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). But we can't see the forest for the trees! 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.

Previous page: Santa Fe steam locomotive #3768 entered service with the Santa Fe Rail Road 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

Now let me point out that as late as 1965 steam piston locomotives were still more powerful than their diesel counterparts as they were still being used to haul ore over the Rocky Mountains. It helps to update our memories with the factual knowledge that 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. 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 steams 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. And 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

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.**

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 that what this means is that 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.

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 easily 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. Before the "Chessie" design made its debut 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. Even though the Jawn Henry may have had a few bugs its design was truly superior to what we ended up with and are using today which is diesel powered reciprocating engines like this EMD shown that are 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.

As you can see the postwar period began with a most promising era of public transportation for Americans who were quite used to and comfortable with 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? 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. "Publicly committed to protecting the coal market, the Chesapeake and Ohio Railway chose as a symbol of this position a technologically-advanced motive power unit for the premier train that would streak through the coal fields. The C&O's promise of the "Chessie" looked like a dream come true. Marking the end of the preliminaries was the roll-out of the largest passenger locomotive in all history, before or since; this magnificent M-1 Class steam-turbine-electric.

The "Chessie" 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 coal-fired steam-turbine concept was not new, however, the consortium embarked on a bold, even radical, design. Weighing in without the tender at more than 428 tons (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, backhead in front, smokebox and stack to the rear. Next came the turbine and generator for the electric motors, with the water tender 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, numbered 500- 502, 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." Wikipedia

Was the whole program designed to fail?

"Between its public appearances the "500"did manage to pull a few passenger trains. However, the machines were hampered by excessive firing rates and poor draft conditions and seemed to spend as much time out of service as working. In the autumn of 1948, the "Chessie" idea was dropped and the very reason for the S-T-E's existence was gone.

It was stated and written that the M-1s would never be able to match the diesel's economy or availability, interest in the turbines waned, and the locomotives were quietly retired and returned to Baldwin in 1950, after nearly two years of less than spectacular revenue service between Charlottesville, Virginia, and Cincinnati.

After all of this splendid engineering and transportation design had been carried out America somehow manages to end up back at square one. This is another one of those episodes in the United States that somehow manage to turn innovation into failure. That's the mark of the oil industry virtually every time you see its occurrence.

Another "Chessie" first: the family coach (32 seats). This unique concept, to be the domain of the hostess, offered every conceivable comfort for the traveling family. From changing rooms and suspended bassinets at the seats to a glass-enclosed "Junior Club" play area furnished with the latest in children's toys. There was a movie theater (11 small seats) featuring cartoons for the scooter set. The family coach represented the Chesapeake and Ohio Railways's greatest hope to bring all families to train travel.

All this and yet the "Chessie" never ran. What American's got was some half-baked explanation that the directors of C&O realized in 1948 when the train was delivered that there was little business potential for a daylight run between Washington and Cincinnati. Quietly the equipment was transferred to other runs and/or sold. By 1950, all six Domes, and indeed most of "Chessie's" equipment, had disappeared from the railroad's passenger car roster. One of the most spectacular Domeliners of all had gone down in history as "The Train That Never Ran" (in revenue service)." End of article.

<u>This design had the following advantages and still does to this day:</u>

Coal was burned as boiler fuel to make steam.

A steam turbine powered the train, the most efficient mechanical design to date.

The turbine connected directly to a generator which supplied power to the drive wheels eliminating the need for a clutch, transmission and connecting shafts.

The "Chessie" design aspect that posed the greatest danger to the oil industry was the boiler. Mechanisms equipped with boilers means they can run on many different types of fuel. This includes bunker fuel, coal, tallow, lard, natural gas and alcohol. That's why we never saw this train.

1950-2011 Gas Turbine/Generator Traction Motors

This locomotive power configuration kept the turbine design but dropped the use of steam. This is more like powering a train with a stationary jet engine. This is a better design than a piston engine, but less fuel efficient than a steam powered turbine.

UP 18, preserved at the Illinois Railway Museum.

Thankfully 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 locomotive to be very powerful without being inordinately large. However, a turbine's power output and efficiency drop dramatically when the rotational speed of the turbine is reduced. This is the one disadvantage of a turbine, and the one which was exploited as a reason to maintain the use of piston engines, even though 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 (eventually leading to the 1973 oil crisis), gas turbine locomotives became uneconomical to

operate, and many were taken out of service. Additionally, 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.**

Union Pacific ran a large fleet of turbine-powered freight locomotives starting in the 1950s. *These 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.* **Leftover fuels from the oil industry that were dramatically raised in price after these units went into service. You would have to be creative in order to come up with a way that pistons could possibly beat a turbine. Switching fuels around and jacking with the price would give the right CEO the right leverage.**

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.**

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!**

Pictured is a modern Diesel Electric Locomotive. Is it an improvement? Not really. It has more moving parts and uses more expensive fuel.

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. Wow! What an accomplishment for the diesel. A steam piston train from 1938 had just as much horsepower.

16 Pistons, rods, wristpins, bearing caps plus 64 rings; All this iron comes to a stop and changes direction 33 times per second!

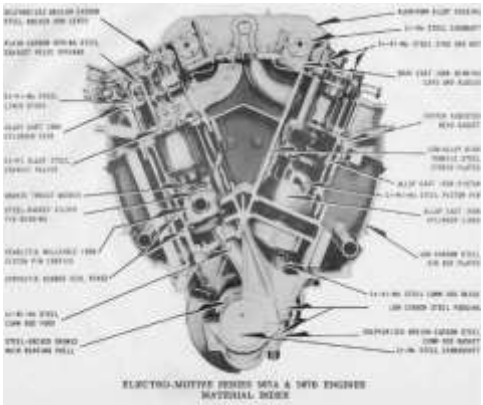
Something seems terribly wrong with this picture when reviewed from an engineering perspective. How could a diesel reciprocating engine ever replace a steam turbine? The only way this obvious engineering back-step could have transpired is by a cancerous group of powerful individuals who were bent on insuring excessive fuel consumption of petroleum type fuels.

Another part of the answer may come from a rear-looking analyses regarding the development of the Gas Turbine Powered Electro-Motive design. This design utilizes the turbine engine concept but instead of using a boiler to create steam it uses petroleum fuel that is burned inside the turbine itself. It is more compact than a steam turbine, but note that almost all of our electric power generated today relies on steam turbines as they are much more efficient than the gas turbine design.

It took 50 years of development of the diesel powered electric to develop the same power as the steam powered locomotive. The oil shackle exists about the railroad industry, just as it does the automotive industry.

In both we see the shunning of better designs such as steam and turbine power and the inevitable "arrival" of the one and only 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 to be shouldered by the public?

2011 Model Electro-Motive's new 16-cylinder, 4-cycle, GM16V265 H-Engine delivers 6,400 horse-power.



This is a cross section of the 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: That they are shackled to a piston engine design and thus they are still using pistons.

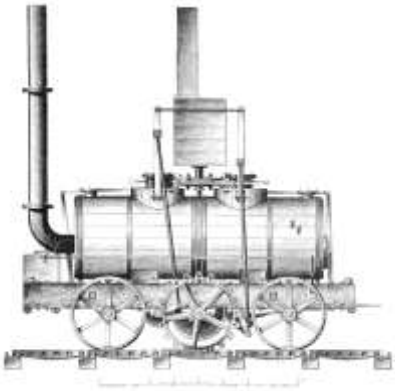
The volumes of petroleum material that gets pulled up out of the ground, refined, stored, pipelined, sea-transported, trucked and pumped over and over again from giant tanks and into millions of vehicle tanks is astronomical. As a result much of the energy granted to our bodies through nourishment gets spent on all of the extra work necessary to maintain such a behemoth industry that could totally be replaced electrically. The rest of our energy goes toward hours that are worked to cover the cost of gasoline and car payments.

Remember, crust-produced petroleum always brings with it pollutants and toxic materials, and that these would not be present if we derived fuel and energy from natural sources above ground. Due to the insistence that such massive quantities of fuel must continue to be utilized, all of us pay a hefty price in the degradation of our health and quality of life. We shouldn't be asked to keep paying this kind of price, especially now that through our own efforts and research we know so many ways to produce energy that is non-polluting. The fact of the matter is, piston engines are an oil company's pride and joy.

The Oil dudes only care about consumption and nothing beats a piston engine in this category. Oil dudes care nothing about our air or our health as they have demonstrated unmitigated preference for piston engines since day one.

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.

I almost forgot to mention wood gas. You can also run an engine on Carbon Monoxide (wood smoke). During World War II gasoline was rationed and in short supply. In Great Britain, France, the United States and Germany, large numbers of such generators were constructed or improvised to convert wood and coal into fuel for vehicles.



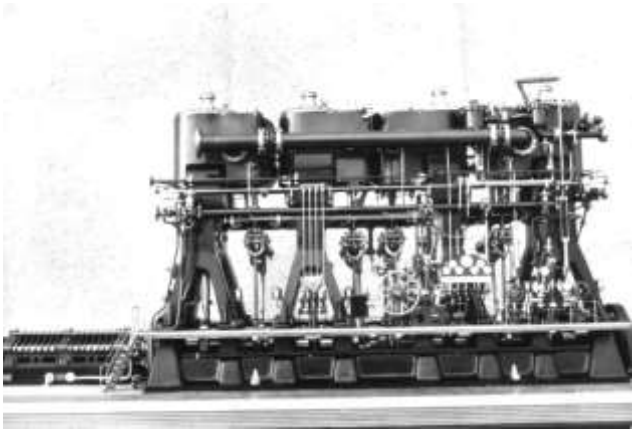
In 1812, Matthew Murray's successful twin-cylinder rack locomotive Salamanca first ran on the edge-railed rack-and-pinion Middleton Railway.

Below, the Doble Steam Car; a car I almost missed! 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 and 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.

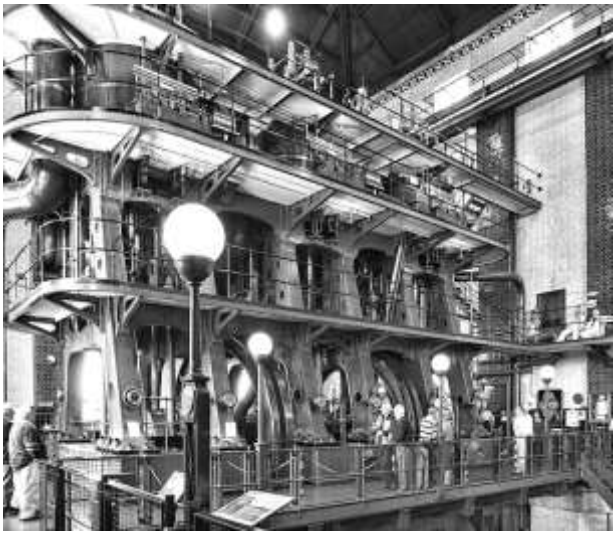
The older way of powering ships was by no means a poor design, quite the contrary. The most important consideration for designing the power plant for a ship is to understand that they require lots of horsepower to move them through a viscous fluid, waves and prevailing headwinds. These steam powered 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



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.

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.

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 again fall for the oil industry 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.

Tankers and large freighters have gravitated back to the use of monstrous 800 Ton petroleum-powered piston engines. These engines are so large they have a 6 to 10 foot stroke and turn at only 50 to 75 rpm. This allows them to be direct drive connected to the screw, without the need for a gear reducer, and 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.

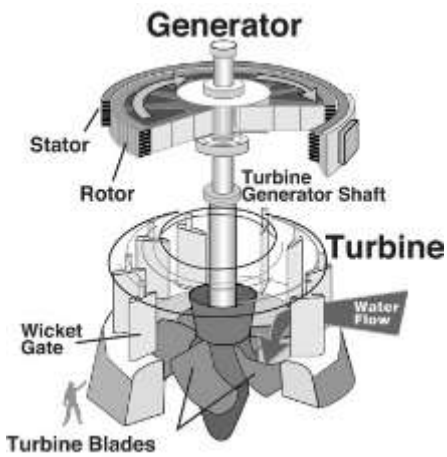
The manufacturers of these amusing relics of the past will be more than happy to quote you all of their supposed advantages over engines of the past. Just keep in mind this engine is upwards of 70 feet tall and weighs enough to equal 20% of the ship's total cargo capacity. All this weight has to be pushed 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. For example, today if you select a hybrid car like the Chevrolet Volt as your next small transportation automobile, you will still not be getting true electro-motive technology.

Instead of using the electro-motive concept, what we actually get is a vehicle with a large gasoline engine that is hooked to the wheels via a transmission and gears. If they loved us at all they would just give us 1.0 liter two cylinder diesel engine with a manual transmission. This would dramatically outperform the hybrid system for less than half the price. A real hybrid design should eliminate large reciprocating engines, clutches, transmissions, drive shafts and a large fuel tank, but it did not.

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 draining these poor people dry.

A Design Flaw in 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."***

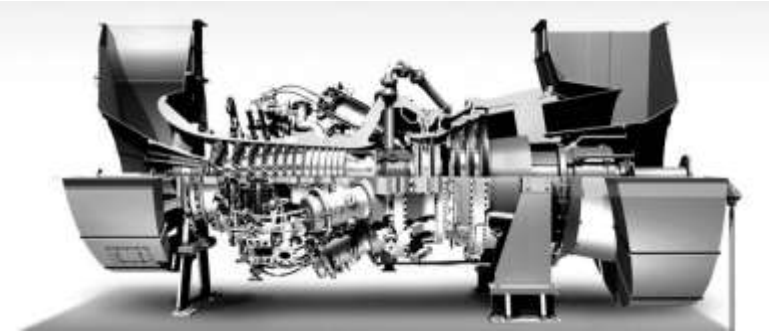
In other words, in the nuclear plants they can't run nearly as high of a steam pressure because this would not allow them to cool the core of the reactor enough. So they use 600 lb. steam instead of the normal 1200 lb. steam that is standard in modern coal and natural gas fired plants. This is just part 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 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.



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.

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 and with as little as 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 the oil boys can't allow this; they shudder at the concept.

Gas turbines are more compact, cheaper, lighter, easier to maintain than piston engines, but unfortunately if you design the things 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.

We should have a tiny turbine or Wankel engine that is 1/10 to 1/50th the current size of our existing engine, and it should be coupled to a generator. This would not only dramatically increase fuel efficiency but would be a much easier package to build than a piston engine complete with transmission, clutch, final drives and drive shafts.

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 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. From Wikipedia:

> "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.

There is a very basic flaw in the turbine that may be obvious at this stage: since the interaction of the fixed and rotating blades is critical to the efficient operation of the turbine it is not possible to create a device with variable speeds. Later developments included variable pitch on the blades, but at this stage, just getting the blades to hang on was challenge enough!"

"Another problem developed from the fact that a turbine will only operate efficiently at high speed, in the order of thousands of revs. Therefore in order to fully utilize his turbine Parsons also had to invent a better method of gearing down high speed shafts to a more useful speed. Convinced his engine was right he turned to the propellers and constructed a glass tank and a strobe light to study the effects of the propeller at high speed. He soon discovered what is now known as Cavitation, at the 2,000 RPM output by Turbinia the outer tips of the propellers were turning so fast they were unable to form a grip on the water and were generating pockets of vacuum instead, in extreme circumstances the whole propeller would simply spin around and produce nothing but bubbles, no movement at all.

Ten years after filing his patent and with turbines making their mark on land Parsons built the Turbinia, a 44 ton yacht a 100 feet long, 9 ft beam and 3 ft draught and demonstrated it at the 1897 Diamond Jubilee of Queen Victoria. Here it tore up and down the ranks of warships at 34 knots when the fastest ships of the day were limited to 27 knots.

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 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.

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.

This secondary "parasitic" turbine was sometimes used to drive a separate shaft, as on the Titanic whose 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.

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.

As mentioned previously, the premier electro-motive propulsion system utilizes a storage battery from which to draw extra juice when getting under way. This negates the need to have a larger turbine which would be necessary to provide increased electrical power to the drive motor during these most-high-load times, such as accelerating and docking.

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 1200 psi operating at 1200^0F. 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, a petroleum piston powered drainfield.

And 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 savings is in 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

For Big Ships; Ones over 10,000 Tons

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 below how large they are compared to a man. This one 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! If piston engines are still viable, then this looks like an improvement since it replaces former designs that were even larger for the same amount of horsepower.

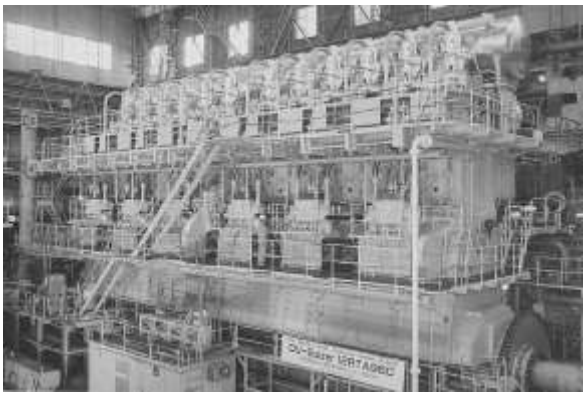
Try to picture in your mind these mammoth-sized parts coming to a stop and changing directions 3.4 times every second? And remember the

Wartsila-Sulzer RTA96-C Turbocharged Diesel. Note the man in the picture for scale.

wasted energy to turn a valve equipped reciprocating engine robs appr 30,000 hors red.

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.



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.

At right is an example of the largest of these that I could find. It turns at approximately 100 rpm. 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."

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.

If piston engines were really efficient they would route the main

exhaust gasses into another piston engine. But they never do that because piston engines are designed to waste exhaust heat.

> **"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/Auto is caught here in an obvious disgrace.

Ignoring the Steam and Gas Turbine

One of the much desired benefits of the aero-derived engines or gas turbines was the short amount of time for the engine to reach full operating temperature. This was due to the relative small amount of material used in the construction of the engine itself as opposed to a steam turbine with its 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, but since still relies on piston engines that are heavy and inefficient. This it remains a poor choice to what is currently available.

During the early era of gas turbines and their fuel comparisons performance verses piston engines, during light and moderate loading, the industry seems to have gotten off the track. This is because in the process of evaluating non-steam engine performance they let themselves forget about proven-steam performance. 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 the ship with an engine of 1/10 to 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".

For instance, if a ship only needs 20,000 horsepower to maintain a speed of 18 knots, then you size the ship with a 20,000 horsepower gen-set rather than a 100,000 horsepower engine of the size that you would need for starting from a dead stop. The gen-set is going to operate at designed max load the whole time whereas the direct drive engine is going to operate at 20% of maximum load most of the time. When you subtract the savings in horsepower between running the large engine at partial loads, verses running the smaller engine at optimum loads, you come out with a system which is 50% more efficient.

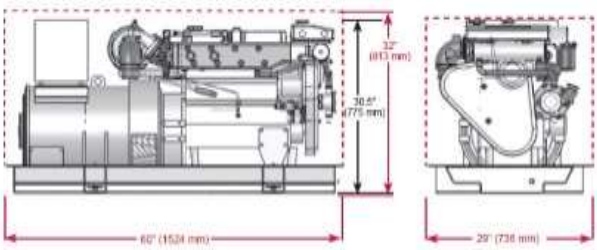
Shown below is a typical piston powered generator set. It is a superior system than mechanical drive but still a bit archaic due to its

employment of a piston engine. The fact is this and all piston-electric packages sold in the year 2017 are an engineering joke.

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.

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. You think that's ok, well it's not because you're carrying too much weight. You're carrying too much weight because you're carrying a large iron block piston engine as your power converter instead of a weight

saving turbine engine. This would be saving 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. This kills your fuel consumption. 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 systems have been built around the use of petroleum fuels, and that their designs have gradually morphed into ones which consume even more petroleum than 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 Boeing and Airbus 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 above.

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.

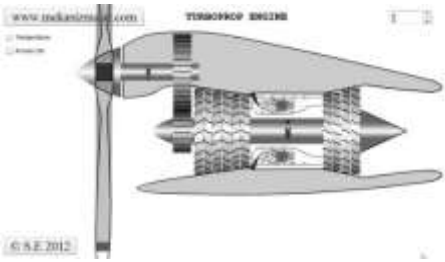
The flow of air into a turbine is open and straight, making them much more efficient at compressing air into the combustion chambers and expelling it out again. This is where a piston engine is at its worst, having to do an extra stroke just to get air into itself. More drawbacks emerge for the piston 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.

Obvious 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.

This is one of the most efficient fixed-wing aircraft ever built, the piston-powered Constellation of 1955.

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. I know for a fact that 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 <u>no fuel being stored in the wings of any of our jet powered airliners.</u> 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? Both of these gasses 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 verses altitude*!

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. Now notice 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 combusting water vapor? 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 blanket. But for those who still have a rational mind note: the simple fact is 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. Not CO_2.

Never forget: **CO_2 is heavier than the density of air, thus it tends to be concentrated near the ground.** Evidence of this can be seen by looking at the sides of a mountain that is higher than 13,000 feet, and you will notice that there is nothing growing there. Trees don't grow above the "timberline", and that's because there is no carbon dioxide at this level.

You have seen that to label excessive CO_2 as a "cover" is flawed but let's just go along with their "blanket-effect" scenario for now. It becomes quite difficult to trust them, however, when we take into consideration the fact modern air transportation produces CO_2 in amounts that would stifle most accountants and engineers. According to their own figures, if a 747 is up for six hours, it has consumed 20,000 to 30,000 gallons. Now for the inconvenient truth: for each gallon of hydrocarbon fuel burned, 20 lb. of Carbon Dioxide is produced. Today, just from the airline industry, which burns 180,000,000,000 gallons per year it results in 3,360,000,000,000 (three trillion) pounds of CO_2 into the atmosphere every year.

And still we pay for expensive smog tests!

What hypocrisy that amidst this we car and truck owners are saddled with billions of dollars being required to purchase expensive smog-equipped vehicles along with permit fees which are mandatorily required. Yes, on top of all this, we lowly folks have to purchase a "burning permit" just to operate our vehicles with the toxic fuel they force us to use.

Consider that if all of this equipment and expense was indeed for the purpose of insuring that our air quality is better, then there should be even more effort on the airline's behalf to help out with this supposed threat to our climate. As it is the overall petroleum energy picture requires us to

accept an industry's indifference to human health that is so severe few people can reconcile with it.

It is time to fully 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, please go to the website the-rise-and-stall-of-the-piston-engine.weebly.com. It's time for the world to know 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 see appendix 2: Stalin and Abiotic Oil.

Imagine if everybody knew that in truth the world's supply of petroleum is unlimited? As it is, we all slumber in step with false high-tech industries like the auto industry, the airline industry, the racing industry, the tv/movie industry, that serve as backdrops for the scenes we humans have to act out. Now the statistics document exactly what their plans have been and what they have done to the public as a result. 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 the consumption of fuel in the 1950's, when they were equipped with piston engines! This is a giant waste of technology and a colossal disservice to the people.

Or, have we been doubly had? Is it possible the truth is that these consumption figures have been over-inflated 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 you needed to import!

Another strange story is that during this time many airline companies engaged in the practice of dumping their reserve fuel just before landing at airports to supposedly save tire and runway wear. We even got a

report that the forests outside of Los Angeles near Victorville were all dying and the industry actually admitted they had been dumping fuel for 10 years. But now I know, if they had been dumping fuel, they would never have admitted it. At any rate 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.

CHAPTER 16

Superior Car Designs Now Forgotten

THE FIRST GASOLINE powered car came about in 1887. Today everyone figures the gasoline engine was a superior design to the other types of propulsion that were used and experimented with at the time. Most believe the public's gravitation toward, and later embrace of the gasoline engine was inevitable because the gasoline engine itself was such a sound design. 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.

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 gadgetry that is now available to similar entrepreneurs of this age. Here is a copied article which gives a description of this vehicle from 1904. Note that Riker had already solved the problem of the drive differential by applying a separate electric motor to each rear wheel. http://amhistory.si.edu/onthemove/

This electric automobile's tubular front and rear axles were connected by tubular side members, and the frame was strengthened by short tubular diagonal members. The four wheels were of the artillery type, having wooden spokes and felloes. The tires are of solid rubber. The front wheels, 30 inches in diameter, are mounted on pivoted steering knuckles connected by a tubular tie rod. The wheelbase is 82 inches, front tread 54 inches, and rear tread 65 inches. ***A large electric motor is mounted in front of each end of the rear axle. Each motor is geared directly to a large spur gear bolted to the spokes of its respective wheel.***

The enclosed wooden body, creating an impression of great bulk, accommodated four persons on facing seats. There is a voice tube that allowed communication between passengers and the driver outside, plus glass windows that can be raised and lowered, leather-covered fenders to shield the four wheels, and electric side-lamps. This sounds like a nice quiet way to travel. You could speak directly to your friends and even play a game of cards.

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 contains a single set of 12 cells, and the rear one holds three sets, making 48 cells altogether. 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.

The exposed seat for the driver and footman is seven feet above ground, over the rear battery compartment. The steering tiller, at the left of the seat, is attached to the upper end of a long, vertically mounted shaft that is connected to the left steering knuckle by a long rod. In front of the driver's seat is a combination 150-volt voltometer and ammeter that indicated the state of charge and the rate of charge and discharge of the batteries. On the left is a lever that operated a horizontal, drum-type controller (located under the driver seat) that governed the speed and provided the reverse. Contracting brake bands on the rear-wheel brake drums were operated by means of a pedal that is pivoted in the floorboard.

With the driver seven feet off the ground, this was no wimpy little electric vehicle. But why should it have been when it was made for royalty? 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 compacted 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 two 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; it operated 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, mounted beneath the seat, 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.
>
> Stanley Motor Carriages, while rated in boiler steaming capacities of 10, 20, and 30 horsepower, had engines capable of developing 100

horsepower and more for short periods of time. Conversely, the internal combustion (Otto cycle) engine must develop the needed power on demand and has no way to store it.

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.

Both the Stanley pilot that operates continuously as well as the main burner which operates on steam demand is based on the simple principles of the Bunsen burner. In the Stanley the heat of the fire vaporizes the liquid fuel before the fuel vapor is fed through an orifice, mixed with air, and burned below the boiler.

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 wide availability.

A Stanley steam engine on a 20 horsepower car 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

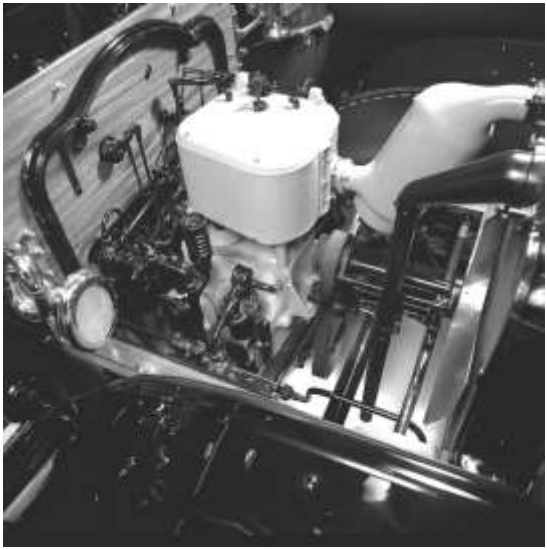
It is estimated that during the 24 years the Stanley Motor Carriage Company built steam cars that somewhere around 11,000 to 12,000 were built. Today there are perhaps 600 Stanley cars still in existence.

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.



The White Steam Engine.

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.

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 standard1.5:1. 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.

After WWII, the public was ready for totally new car designs. The Big Three Detroit automakers had not developed any new models since 1941. This provided great opportunities for new, small automakers that could develop new cars more rapidly than the huge legacy automakers.

Studebaker was the first to introduce an all-new postwar model, but 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.

Tucker's first design for the car appeared in a December 1946 *Science Illustrated* magazine article entitled "Torpedo on Wheels", showing a futuristic version of the car with a hydraulic drive system designed by George Lawson, along with a photo of a 1/8 scale model blown up to appear full sized. This was only an early rendering of the proposal, with its design features yet to make it off the drawing board. But the article helped make the motoring public aware of the Tucker.

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, to finalize the design, 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 (180 cm) 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

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

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.

obviously much lighter in weight.

Air-cooled engines 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 Carmengia 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 which could have revolutionized the power trains in modern day autos. That's because it 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.

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. 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.

1936 Tatra T97
Here's an example of an air-cooled engine car that was 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.

For a brief moment we had just doubled our gas mileage and did it with a car with the same comforts as the largest full sized cars. Darn it all! We deserve this technology! We could have had luxury, safety and economy.

In the next ten pages is a summary of aircooled 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:

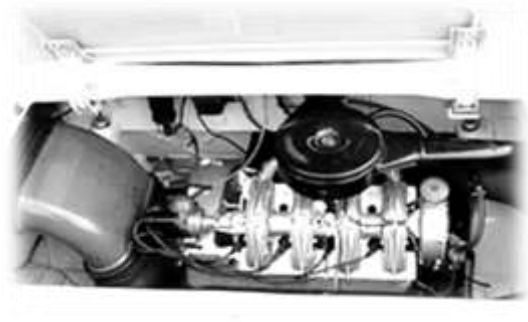
The Last Air-Cooled Automobile Engines

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 of their 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 twin. The Nuova 500 was also produced under license in Austria by Steyr-Puch who developed their own engine for the car; a horizontally-opposed air-cooled twin with hemispherical combustion chambers. The Styer-Puch 650TR, using a high output version of this engine, won the Group 2 European Rally Championship in 1966. In 1959, Chevrolet introduced the Corvair with a horizontally-opposed air-cooled six-cylinder engine.

Then came the final generation of air-cooled powerplants. 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 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.

NSU 1000, 1963-1973

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

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 cylineer 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. These were topped with a common camshaft carrier, one per bank. The dual overhead camshafts, four in all, were gear driven.

Low weight, both in terms of the complete engine, and the rotating masses within, 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. This one utilized no less than seven pumps. A triple unit in the sump provided pressure and scavenging of the front and rear of the crankcase, and four small pumps located at each end of the exhaust camshafts allowed for scavenging oil from the cylinder heads. 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.

The Citroen GS Engine

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.

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 that would have reduced fuel consumption

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.

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.

My comments interjected from here: If the designers had chosen to utilize hot exhaust gasses to run an evaporative air conditioning system this

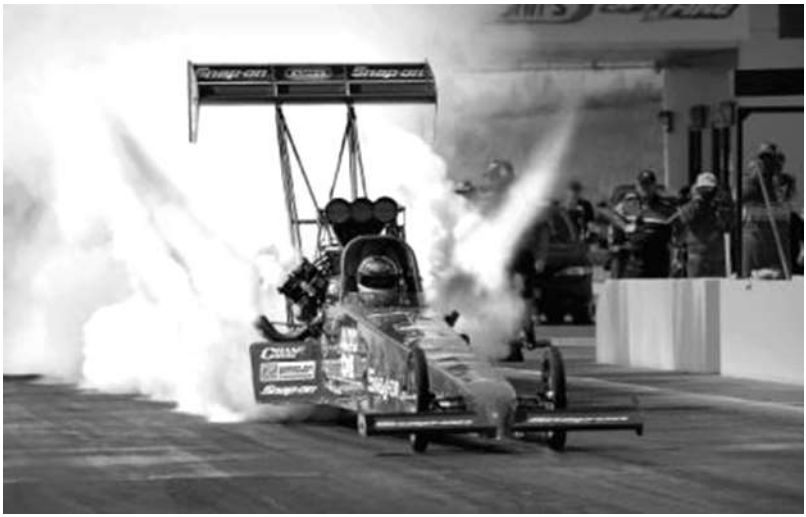
would not have been a concern. Power steering and brakes can be powered using small electric motor driven pumps driven off the battery which is charged by the engine anyway. This is the system most electric cars use. And, this is a good time to remind ourselves about the use of water injection as not 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.

Secondly is the comment that air cooled engines have to run a bit rich to keep from overheating. We know this is true for water cooled engines as well since gasoline detonates when it is run lean. In addition, a larger engine that supposedly produces fewer emissions is a contradiction that we allow the EPA to get away with. A larger engine might produce a lower emission of one category of combustion by-product, but overall any engine which consumes more fuel is going to produce more carbon dioxide per mile traveled and this means it discharges more harmful pollutants of virtually every category. This myriad of other pollutants categorized as VOC's, volatile organic compounds, mysteriously escape the notice of the EPA, such that even though they are produced in greater abundance with these larger engines they are treated as inert elements.

We should also give mention to the Chevrolet Corvair. 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. This 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, but 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.

CHAPTER 17

Top Fuel Dragsters and Turbo Rocket Engines



Top-Fuel Racing

TOP FUEL RACING refers to a class of drag racing in which the cars are run on a maximum of 85% nitro-methane and about 15% methanol also known as racing alcohol, instead of gasoline. The nitro-methane used to power the engines of top fuel dragsters costs about US$30

per U.S. gallon (US$8/L). Top Fuel dragsters use between 10 and 12 U.S. gallons (38 to 45 L) of fuel for a complete pass, including the burnout, backup to the starting line, and quarter-mile run.

The engine used to power a Top Fuel drag racing car has its roots in the second generation Chrysler Hemi 426 "Elephant Engine" which was manufactured from 1964 to 1971. Although the Top Fuel engine is built exclusively of aftermarket parts, it retains the basic configuration with two valves per cylinder activated by pushrods from a centrally-placed camshaft. I hope you noted the fact that overhead camshafts are not fitted, therefore they must not be required for any of our automotive engines.

The engine has hemispherical combustion chambers, a 90 degree V angle; a configuration identical to the overhead valve, single camshaft-in-block "Hemi" V-8 engine which became available for sale to the public in selected Chrysler Corporation (Dodge, DeSoto, and Chrysler) automotive products in 1952. A piston engine is a piston engine. What makes the big difference here is the fuel.

The NHRA competition rules limit the displacement to 500 cubic inch (8193.5 cc). A 4.19" (106.4 mm) bore with a 4.5" (114.3 mm) stroke are customary dimensions. Larger bores have been shown to weaken the cylinder block. Compression ratio is about 6.5:1, as is common on engines with over-driven superchargers where the supercharger is driven a minimum of 9 times faster than the crankshaft speed.

I am not the biggest fan of the top fuel dragster other than to say they are fun to watch blow-up. But they do utilize some interesting technology. How do they get such huge amounts of horsepower, upwards of 8,000 horsepower, from a 500 cubic inch engine and is it possible that we might use some of their ideas to improve the performance of our regular car engines? We need to start with a lesson about nitromethane.

In previous sections we discussed how an internal combustion piston engine has to labor as it pulls massive volumes of air from the outside and into itself. This is because the fuel won't burn without oxygen. So the fuel is normally vaporized in air first. But remember that typical air contains only about 21% Oxygen while the rest is mostly Nitrogen and Carbon

Dioxide. So about 80% of the air piston engines have to pump in and out just to maintain combustion is nothing other than an inert gas that is in the way!

Now it is possible for some fluids to burn without the pressence of air and nitromethane is one of them. I am sure that most have heard the term "nitro-methane", you just weren't privy to the fact that this fuel contains oxygen in liquid form as part of its makeup. So whereas neither diesel or gasoline contain any oxygen within their chemical composition, this fuel does. What that means is when the fuel starts to burn the oxygen is released from a liquid state into a gasseous state and then combusts with the fuel itself. Since Oxygen expands by a factor of 600:1 in going from a liquid state into a gasseous state, it's a great way to get oxygen into the engine.

Nitromethane is an organic compound with the chemical formula CH_3NO_2. It is the simplest organic nitro compound. It is a slightly viscous, highly polar liquid commonly used as a solvent in a variety of industrial applications such as in extractions, as a reaction medium and as a cleaning solvent. As an intermediate in organic synthesis, it is used widely in the manufacture of pharmaceuticals, pesticides, explosives, fibers, and coatings. It is also used as an important component in the fuel for the miniature internal combustion engines used, for example, in radio-controlled models.

The chemical reaction of nitro-methane with oxygen is shown below. Note the presence of two parts of oxygen in each molecule of nitro. This component of nitro-methane is obviously in a liquid state along with the rest of the fuel. This added oxygen enables it to burn with much less atmospheric air, in fact it can even burn without any extra air. You could say that most of the oxygen is put in for free. That's exactly what allows the engine to produce so much more power.

$$\mathbf{4CH3NO_2 + 3O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2}$$

Now let's make a comparison with gasoline fuel.
It takes 14.7 lb. (6.7 kg) of air to burn 1 lb. (0.45 kg) of gasoline.
It only takes 1.7 lb. (0.77 kg) of air to burn 1 lb. of nitro-methane.

An engine running gasoline has to ingest 8.7 times more air than one running nitro.

This is not quite the end of the comparison. Nitro-methane has a lower energy density: Gasoline provides about 42–44 MJ/kg whereas nitro-methane provides only 11.3 MJ/kg.

Combining the two analytical comparisons yields the overall comparison; nitro-methane generates about 3 times the power of gasoline when combined with a given amount of oxygen. Where the top fuel dragster gets most of its horsepower though is by the sheer volume of fuel that is pumped into the cylinders with each stroke combined with a supercharger that can generate 5 bar of pressure.

These simple facts about nitro-methane indicate that it's not that hard to dramatically improve the fuels that we currently use by simply adding oxygen into the molecular structure. For a moment I wonder why there isn't one single oil company that is willing to give us a better fuel than gasoline or diesel, when all they have to do is bind some oxygen into the formula.

Secondly, if we had an oxygenated fuel we could dramatically reduce the size of the engine as it would not have to inhale so much air in order to burn the necessary fuel to make the necessary power. If a dragster can get 8,000 horsepower from a 500 cubic inch engine, then perhaps we could be able to design a 5 cubic inch engine that produces 80 horsepower. OK. Be conservative and make it 10 cubic inches so it will last. Just imagine having such a small engine in your compact sedan.

Thirdly, the use of a super charger to boost the intake air pressure would also aid in the development of powerful engines in smaller sizes. Since air intake is such a limiting facet of piston engines, superchargers should be standard equipment.

The Beginnings of Nitro-Methane

Although nitro-methane did not make its appearance onto the American racing circuit until the early 1950's it had been invented much earlier as it was tested as a fuel for torpedoes as early as 1870. It has been

produced industrially ever since. The most common method of manufacture is by treating propane with nitric acid at 350–450 °C (622–842 °F). This results in an exothermic reaction that produces four industrially significant nitroalkanes: nitromethane, nitroethane, 1-nitropropane, and 2-nitropropane.

The reaction involves free radicals, including the alkoxyl radicals of the type $CH_3CH_2CH_2O$, which arise via homolysis of the corresponding nitrite ester. These alkoxy radicals are susceptible to C—C fragmentation reactions, which explains the formation of a mixture of products.

Although available at moderate cost, nitromethane can be prepared using other methods. It can also be used as a monopropellant, i.e., a fuel that burns without added oxygen. The following equation describes this process:

$$\mathbf{2\ CH_3NO_2 \rightarrow 2\ CO + 2\ H_2O + H_2 + N_2}$$

Nitro-methane has a laminar combustion velocity of approx. 0.5 m/s, somewhat higher than gasoline, thus making it suitable for high speed engines. It also has a somewhat higher flame temperature of about 2,400 °C (4,350 °F). The high heat of vaporization of 0.56 MJ/kg together with the high fuel flow provides significant cooling of the incoming charge (about twice that of methanol), resulting in reasonably low temperatures.

In drag racing, nitro-methane is usually used with rich air/fuel mixtures because it provides power even in the absence of atmospheric oxygen. When rich air/fuel mixtures are used, hydrogen and carbon monoxide are two of the combustion products. These gases often ignite in the exhaust pipes. As they are very rich mixtures of the still burning fuel the flames can be quite spectacular. Very rich mixtures are necessary to reduce the temperature of combustion chamber hot parts in order to control pre-ignition and subsequent detonation. Operational details depend on the particular mixture and engine characteristics.

Hydrazine

Hydrazine is an inorganic compound with the formula $\mathbf{N_2H_4}$. It is a colorless flammable liquid with an ammonia-like odor. Hydrazine is highly toxic and dangerously unstable unless handled in solution. Approximately 260,000 tons are manufactured annually, so the stuff is available.

Hydrazine is mainly used as a foaming agent in preparing polymer foams, but significant applications also include its uses as a precursor to polymerization catalysts and pharmaceuticals. For our interests hydrazine is used in various rocket fuels and in F-16 fighters to provide an emergency power package. The famous WW2 German ME163 rocket plane used hydrazine mixed with 90% hydrogen peroxide. A mixture containing 90% peroxide, when sprayed on a silver screen, breaks down to form 1300^0F steam! It has been used for compact steering rockets by NASA and the military. So the stuff definitely packs some power.

A chemist named Theodor Curtius synthesized free hydrazine for the first time in 1889, meaning hydrazine is nothing new to the oil/auto industry. Today hydrazine is produced in the Olin Raschig process from sodium hypochlorite (the active ingredient in many bleaches) and ammonia, a process announced in 1907. This method relies on the reaction of chloramine with ammonia:

$$\mathbf{NH_2Cl + NH_3 \rightarrow H_2N\text{-}NH_2 + HCl}$$

Another route of hydrazine synthesis involves the oxidation of urea with sodium hypochlorite:

$$\mathbf{(H_2N)_2C{=}O + NaOCl + 2\ NaOH \rightarrow N_2H_4 + H_2O + NaCl + Na_2CO_3}$$

The most noteworthy way to make Hydrazine though is to synthesize it from ammonia and hydrogen peroxide. This is accomplished according to the Pechiney-Ugine-Kuhlmann process, using the following formula:

$$\mathbf{2NH_3 + H_2O_2 \rightarrow H_2N\text{-}NH_2 + 2H_2O}$$

And not to be left out is the Atofina–PCUK cycle. Here hydrazine is produced in several steps from acetone, ammonia, and hydrogen peroxide. Hydrazine can also be produced via the so-called ketazine and peroxide processes. As you can read, there are many ways to make this extremely powerful fuel which would have given Big Oily flexibility in available feedstocks. I'll bet you already know why don't let us have it.

Perhaps at this moment you would like to learn how to make Hydrogen Peroxide, H_2O_2? After all, this looks like possibly the ultimate formula for energy. Why? Because it contains both Hydrogen and Oxygen, and they are in a stable liquid state. When you see this formula you have to wonder why anyone would try to run a vehicle on gaseous Hydrogen from a compressed tank which is dangerous, expensive and space-robbing when they could just use this liquid version of it.

Turbine Jet Engines

This unique section documents a brilliant compact design formerly known as the turbonique turbine engine. These add on automotive power output boosters made the standard reciprocating engine look like the heavy fuel-robbing dinosaur that they were. Here's from an article:

> **Thermolene** was the trade mark under which Turbonique Inc. marketed **N-Propyl Nitrate.** It was sold in 8 pound cans at a retail price of $ 12. A 475 pound drum would have cost you $ 437 back in 1966. It is not a more hazardous liquid than gasoline or kerosene but it does have a far more energetic yield. According to some Thermolene fuel in itself had some weird properties. *"It could be stored in jerrycans, in the shadow. It had, nonetheless, some peculiar side effects: it was irritating to the skin, it would melt most plastics, rubbers, etc. and it would react under certain circumstances if in contact with some metals, like mild steel, in the presence of water."*

The fuel system and installation

The propellant installation for a Turbonique engine required 3 containers: a high pressure cylinder containing oxygen (needed for starting the flame only), another high pressure cylinder containing nitrogen, equipped with a regulator valve. This nitrogen was injected into the third cylinder so as to create a high pressure inside it that would expel the Thermolene towards the burner in the engine. The third cylinder was the "the fuel tank" and was the biggest of all three. Once the pressure was released it could be opened to refill. This third cylinder had to be upright all the time whilst the two other could be laid down on their side.

We know that oxygenation of a fuel can have a dramatic effect on the efficiency of an engine. This section will also document that oxygenated fuels have not only been manufactured for many years but have also been tested thoroughly where they proved superior to non-oxygenated ones.

False reports tended to indicate how expensive turbine engines were to manufacture. This section will document that a high horsepower device can be manufactured cheaply and with materials we already possess.

The interesting short story of Turbonique

The architect of Turbonique's madness was Mr. C. E. "Gene" Middlebrooks Jr., a native of Jonesboro, Georgia. He studied mechanical engineering at Georgia Tech where a former colleague described him as having "an innovative mind and could solve just about any mechanical problem." He turned out to be in the right place at the right time; when Middlebrooks graduated from the Cold War was in full swing. He landed a job with aerospace contractor Martin-Marietta working on the company's propulsion system for the Pershing nuclear missile program. In 1957 the Soviets

surprised the United States with the launch of Sputnik, the world's first artificial satellite. This helped to spark the Space Race, lending urgency to Middlebrooks' work at Martin. This is where he gained rocket experience.

For a brief period Middlebrook owned his own company which produced the products shown on the next few pages. Sadly, none of his innovative design ideas were allowed to go forward within the domain of the public. His operation mysteriously shut down and not much has been heard from him since.

Turbonique Auxiliary Power Supercharger

Unlike conventional superchargers (which are driven by a belt from the crankshaft and take some crank horsepower to run), and unlike conventional turbo chargers (which use the exhaust energy to spin up the turbo), the Turbonique Auxiliary Power Supercharger had its own fuel source to power itself.

When the switch was flipped, liquid oxygen and a rocket fuel named Thermolene were fed to the supercharger.

Reported testing in 1963 on a Chevy 409 showed a horsepower gain from 405 horsepower stock, to a mammoth 835 hp. with the supercharger engaged.


Section VII - Liquid Driven "AP" Superchargers

Model C-4-AH shown "Horizontal Buffer"

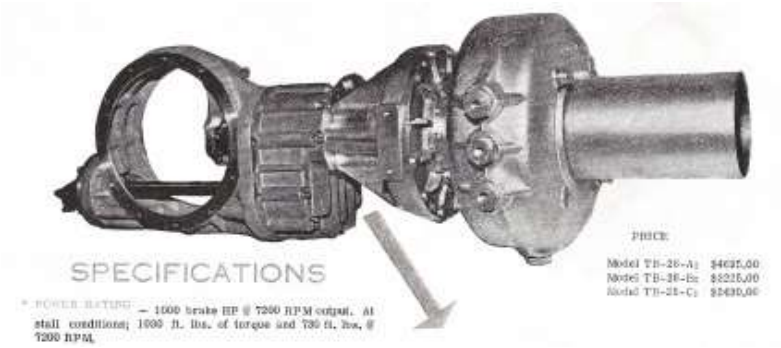
ADJUSTABLE PRESSURE-FLOW

Model C-4-AH shown "Vertical Buffer"

30

If the Turbonique Auxiliary Power Supercharger sounds amazing to you, bear in mind that the Turbonique AP superchargers were at the **mild** end of the Turbonique catalog.

The Turbonique Drag Axle



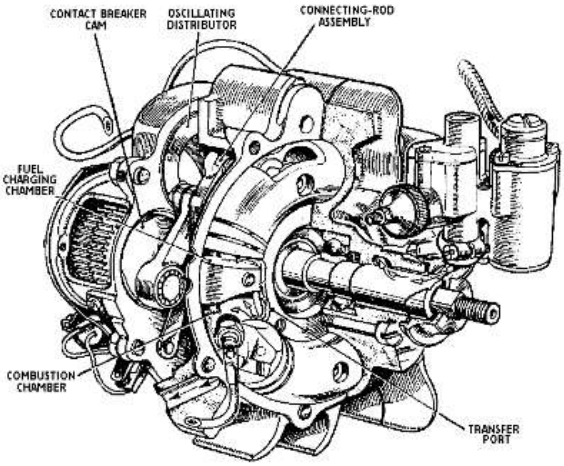
The Turbonique Drag Axle (pictured above) was geared to the rear differential and in addition was a thermolene powered rocket nozzle. At the touch of a button, it would add an extra 1,300 horsepower! The power was only partly thrust power like a rocket engine on a plane. Most of the power was passed through the differential housing to the rear axle. This gave many cars enough horsepower to smoke their tires the whole way up the 1/4 mile using 1960's drag slicks.

A picture of the inventor and president of Turboniques, C. E. "Gene" Middlebrooks Jr.

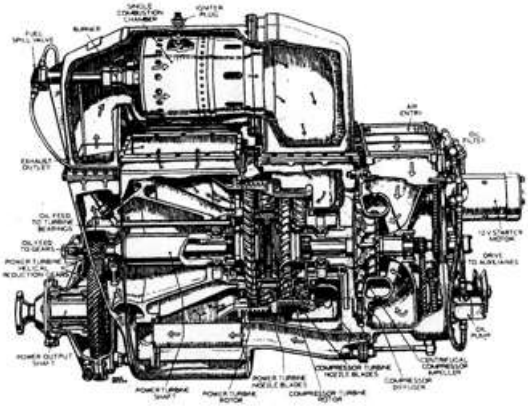
Shown below are the additional components of the fueling system ; a high pressure solenoid valve and piping, an on-off solenoid valve placed on the oxygen line close to the turbine burner or the engine chamber, a hand valve to set the operation pressure inside the Thermolene tank, a solenoid operated valve to open or close the Thermolene supply into the burner spout (the shut-off valve), a pipe from the O^2 cylinder to the engine, a pipe from the nitrogen cylinder to the thermolene tank and a pipe from the Thermolene tank to the engine.

The last part of the Turbonique power differential was the Electric wiring and switches. One switch sets the electrical system under tension in ignition stand-by, a second switch triggers the flame. Another device, called the control unit is in fact a box containing the necessary solenoid contacts and connections to open the oxygen and the thermolene inputs, and, after a preset time gap, cut the oxygen arrival.

For the micro-turbo engine and the superchargers, the ignition was made using a mere spark plug that was, in the case of the chargers, plugged to the coil hi-tension output. This spark plug was placed right in front of the thermolene feeding spout, in the flame chamber. The continuous spark of the plug kept up a "flowing explosion".



Here's some more engine designs. Top left: the BSA Torroid engine 1955. At right, Raphial Morgado's Massive Yet Tiny (MYT) engine, which packs by far the most powerful punch for its small size, compared to other diesel engines in the world. Below: the British Rover turbine engine which was built in 1951. It held a world speed record for a gas turbine powered car in 1952 with a speed of 152.691 mph.



CHAPTER 18

Better Fuels

AS YOU HAVE progressed through this book your mind has been massaged by innumerable mechanical contraptions and concepts like combustion gasses and compression ratios. Now we are going to focus on liquids and this is going to necessitate some chemistry. This is where I worry that I might start to lose you as an interested reader. I guess that's why I put this chapter at this point in the book. Still, I also wish that I had read this chapter before I ever started to tinker on my car's engines to get more horsepower out of them. Now I know how easy it would have been. I could have saved the camshafts, pistons, carburetors and headers by just adding some oxygen to my fuel.

There are many fuels that are better than gasoline. The most obvious one is a mixture of gasoline and water. Yes, that's correct; this fuel is better than straight gasoline. Hundreds and thousands of people, having observed that engines worked better in damp weather, have as a result experimented with adding water to fuel or to the engines. In the process they have witnessed that their engines produced more horsepower, especially under high loads.

In the USSR water was routinely added to improve the horsepower in tractor and aircraft engines during fuel shortages caused by the many wars that have ravaged the people since the Bolshevik Revolution. Every airplane buff knows that water injection was used on the WWII Corsair. So, why are we so asleep today regarding water/fuel mixes?

Aquazine and Russia

During the 1980's, a Russian scientist named Eduard Isayev, unaware of the existing tests and trials that had already been performed using water emulsions, set out to design an alternative fuel. Shortly thereafter he solved some of the major problems with existing fuels (detonation, high temperature, poor fuel economy, etc.) by using water, emulsifiers, naphtha and gasoline to form a stable emulsion that performed superior to gasoline. He called the new fuel Aquazine, for which he holds the patent. (note: as of 4-1-18 his name has been scrubbed from google).

Next time you are in a discussion with an oil executive, an automotive engineer, a mechanical know-it-all, a nuclear physicist, a university research PhD, etc. and they are blathering on and on about petroleum, alternate energy and what we should do for the future, be sure to ask them what they know about **Aquazine** and why we are not using it.

This is something any person willing to discuss energy from other than a child's viewpoint should know: **Aquazine** is a lead-free high-octane fuel made by mixing water either with refined products or with naphtha using an emulsifier. Aquazine contains from 10 to 30% of water and is suited to petroleum powered engines with spark-plug ignition and requiring few if any adaptations.

Aquazine is an excellent alternative to various types of gasoline, aviation and diesel fuels. When used in piston combustion engines it reduces carbon oxide gasses by 80%. In addition nitrogen oxides are reduced by 30%. Other advantages of **Aquazine** are its antiknock rating which yields higher engine capacity due to a higher degree of compression. In other words, engines could be built much smaller and this would result

in the engine's rotational parts being much lighter.

A smaller, lighter engine with "reduced rotational inertia" would have dramatically enhanced acceleration and performance; especially in stop and go conditions that motorists must contend with today. It would also dramatically increase fuel efficiency.

And plans are in the works by the inventor for an alternate type engine that will utilize a water content of 70%. Still, the public as a whole remain asleep with regard to fuel-water technology, even in the face of a huge trade deficit caused by the importation of foreign crude. How is it possible such a simple and effective form of fuel enhancement could be swept under the rug as if it never happened? Couldn't we call this treason against the citizens of the United States (for running up our debt?)

Aquazine would be an obvious and better alternative to various types of gasoline, aviation and diesel fuels. Its advantages over traditional types of fuel include having a lower content of harmful substances not to mention a total absence of lead compounds. If used, the typical exhaust gasses from gasoline-powered vehicles would contain only a fourth of the carbon dioxide and 25% of the nitrogen oxide. Other advantages of Aquazine are increased antiknock rating, reduced combustion exhaust gas by 200°C and substantially higher engine power due to a higher degree of compression.

This is not some "super technology" as finding an emulsifier is not difficult. I'll give you the most obvious example: detergent. An alkyl phenol detergent works the best, if you can find it. The optimum amount of water to add is considered to be about 10%. If more is added the engine's capacity starts to fall. As the water ratio is moved above 30% problems with engine startup begin.

For this reason, if you want to run a gas/water emulsion, keep two fuel systems in place such that you can supply straight gasoline into the engine at startup. Once the engine is warmed up the emulsified fuel starts to work in your favor.

One more factor needs to be stressed: it is better to use distilled water in water-fuel emulsions. In addition, catalytic discs made of nickel or

platinum screwed to the underside of the combustion chamber further act to break water molecules into hydrogen and oxygen which is re-combusted.

Alkyl phenols dramatically aid in the formation of a stable water-gasoline emulsion. Check for laundry detergents which contain it as a source for it. In addition, Manganese Oxide is an effective catalyst when used in the presence of water, hydrogen peroxide (50% technical grade or better) and methanol. These are all good components to get your hands on in the event of a serious fuel shortage and subsequent price rip-offs.

Learning more about liquid fuels

I would say that my oil company experience did more to cloud my chemical understandings of hydrocarbon fuels than it did to enhance it. My actual knowledge of chemistry came from learning on my own. As I researched the chemical connections that exist between hydrocarbon fuel and hydrocarbon spent-fuel, it became possible for me to evaluate the connections between organic chemistry and fuel-combustion chemistry.

Perhaps I should have known this all before. Then again, perhaps I did not make the connection because my college curriculum was organized so that I wouldn't? Remember folks, this is a big game. The chemistry of hydrocarbon fuels when compared to the chemistry of organic matter is not just similar, it is dramatically similar. This is what should have been emphasized!

There are many fuel combinations that are possible just using Hydrogen and Carbon atoms (hydrocarbons). As the consumer we see them as natural gas, propane gas, aviation fuel, gasoline, kerosene and diesel fuel. For racing and only for racing we can purchase pure methanol (CH_3OH) in 55 gallon drums.

Like methanol, these fuels can be dramatically enhanced with the additions of Oxygen and Nitrogen using simple chemical processes. What is noteworthy about this statement is the fact that both oxygen and nitrogen are the two most prevalent gasses in the atmosphere, making it both

abundant and free. You see the power of these ingredients working at Indy and drag-racing strips.

Most of the processes that are used today to combine oxygen and nitrogen atoms into hydrocarbon fuels were discovered in the mid to late 1800's. One of these, the Haber process, converts hydrocarbons into ammonia, NH_3. This would have been a great fuel to use. But NH_3 is just Hydrogen power, not hydrocarbon power, and somehow the oil industry knew not to steer the public in this direction if they were to have any chance of establishing a fuel monopoly. The oil industry had great chemists working for them. So now note that there is not the slightest presence of Oxygen in the chemical makeup of hydrocarbon fuels and that is the first issue we will address.

Composition of air in percent by volume, at sea level at 15°C

Nitrogen -- N_2 -- 78.084% Oxygen -- O_2 -- 20.9476%
Argon -- Ar -- 0.934% Carbon Dioxide -- CO_2 -- 0.0314%

Neon -- Ne -- 0.001818% Methane -- CH_4 -- 0.0002% Helium -- He -- 0.000524%

Krypton -- Kr -- 0.000114% Hydrogen -- H_2 -- 0.00005%
Xenon -- Xe -- 0.0000087%

Ozone -- O_3 -- 0.000007% Nitrogen Dioxide -- NO_2 -- 0.000002%
Iodine -- I_2 -- 0.000001%

Carbon Monoxide -- CO – trace Ammonia -- NH_3 -- trace

Reference: CRC Handbook of Chemistry and Physics, edited by David R. Lide, 1997.

As you can see most of the Earth's atmosphere is made up of only five gases: nitrogen, oxygen, water vapor, argon, and carbon dioxide. Several other compounds also are present. Although the table above does not list water vapor, air can also contain as much as 5% water vapor and it commonly ranges from 1-3%. Thus water vapor is the third most common gas.

It occurs to very few people that nearly 80% of the air that we

breathe is Nitrogen which behaves similar to an inert gas within the piston combustion engines of the cars we drive. You see the problem. Almost 80% of the air the engine has to ingest is worthless Nitrogen. This means about 80% of the work that the piston engine performed in the process of ingesting compressing and expelling exhaust air is wasted work.

Nitrogen adds nothing to the power of the combustion process because there is nothing in the fuel mixture to react with it. There is the presence of oxygen from the air that was drawn in and combusted, and some of this oxygen will be lost to Nitrogen rather than being available to combust the hydrocarbon fuel. The formation of NO and NO_2 during the combustion process does not contribute to power; it actually robs power and in the process produces the nitrous oxides that have been labeled villainous by the State Board of Environmental Quality. So in the process of burning hydrocarbon fuels like gasoline and diesel fuels with air, the main component of air, Nitrogen, does two things: One, it gets in the way resulting in wasted work. Two, it leads to harmful exhaust pollution. This clearly illustrates that the current formulations that are utilized, non-oxygenated hydrocarbons are not just a poor choice for the world's fuel; they are a horrible choice.

In several of the proceeding chapters you were introduced to oxidized fuels, that is, fuel that has oxygen molecules within its formula in the liquid state. You learned that Oxygen expands when it goes from a liquid to a gas by a factor of 800 times the liquid volume. So there is no question that it is a lot easier to get oxygen into an engine by placing it first in a liquid state within the fuel chemistry than by forcing the engine to suck in gobs of air, of which only 20% is oxygen anyway. Gasoline is a poor fuel in any engine for the reason that it has no oxygen in its makeup, and thus it should not be used in modern times.

Currently in the United States gasoline is being blended with either MTBE or Ethyl alcohol. Note; both of these chemical gasoline additives contain one oxygen atom per molecule. So to say that today's fuel is non-oxygenated is not exactly correct, since they do contain about 10% by

volume oxygenated additive. It does dramatically help with smog but it's not nearly enough to make much difference in vehicle power or fuel mileage.

How important is Carbon?

We are all programmed to embrace the concept and accept the necessity of hydrocarbons as a source of energy, but now it's time to take another look at the true energy situation that exists here on earth. Now here is another remarkable fact about hydrocarbon based fuels; the carbon atoms themselves are not the source of energy during combustion. The source of the energy during combustion comes from the Hydrogen atoms coming lose from Carbon Atoms and igniting with Oxygen that produces the combustion expansion. Carbon goes in bonded to Hydrogen and it comes out bonded to Oxygen so there is no real energy release from Carbon. It is the energy released from the Hydrogen that counts. When we get into the section on hydrazine (N_2H_4) and hydrogen peroxide (H_2O_2) you will thoroughly understand why to never equate "hydrocarbon energy" with "potential energy". Much better would be to equate "hydrogen-oxygen" energy with "potential energy".

Gasoline is the most common fuel so I will start with it from which to establish a base line. And it is a low baseline at that. Gasoline has many chemical formulas, as you learned in Chapter 16, because the feed-stocks of gasoline come from a rather broad $280F^0$ temperature range. This could be dramatically improved if the industry would just narrow the current temperature range. It could be further improved by specifying a certain fuel grade by the number of Carbon atoms per chain.

The typical formula for gasoline is written C_8H_{18}. But because of the broad range within the temperature boundaries the number of carbon atoms will actually range from 6 to 12. Thus there should be many formulas to describe the combustion of gasoline. The formulas would need to encompass a range from: C_6H_{14} up to $C_{12}H_{26}$.

Well, forget about that ever happening. Instead, most always will the equation for the combustion of gasoline with air be written as follows:

$$2C_8H_{18} + 25O_2 \Rightarrow 16CO_2 + 18H_2O$$

Now in the illustration above the combustion of gasoline only takes into consideration the combustion of Octane. It looks great on paper, but did you notice that the above reaction did not yield any carbon monoxide? We certainly know that car exhaust contains it and here is the equation for it:

$$2C_8H_{18} + 17O_2 \Rightarrow 16CO + 18H_2O$$

But then they tell us not to worry because this reaction seldom happens. Sure, ya, em huh, right! Close your garage door with your car's engine running sometime and then tell me that this second reaction doesn't happen that "often". Are you starting to wonder how they ever got away with such slock chemistry analyses when they had so much expertise and knowledge to do better?

Because of all the variations of chemical hydrocarbon atoms that are allowed to be present in gasoline, chemists would have to write at least twelve more equations than this to accurately describe all of the chemical reactions that occur when combusting gasoline within an engine. But even this would not take into account many more possible formulas, such as benzenes which are in rings rather than chains. Have we ever seen these actual equations worked out and summarized? Do we know what kinds of gas byproducts they produce and all of their long term effects?

From an environmental standpoint, gasoline has to rank as the very worst possible choice for a fuel for the simple reason that there are so many chemical variations of it that precise control of combustion and the formation of undesirable by-products is virtually impossible.

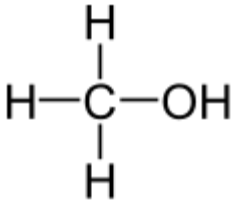
Ammonia, NH_3: no carbon atoms yet just as powerful as propane, how?

For the past 120 years the oil/auto companies have managed to convince us that we need hydrocarbon fuel. But what about ammonia, NH_3, which produces about the same power as propane (both liquefied under slight pressure) and there is no carbon present in it at all? What about Hydrazine, N_2H_4, which is extremely powerful when burned in air and again no carbon atoms are present? Who ever said we need hydrocarbon fuels in the first place? Was it an oil company representative by chance?

The truth is: When there are no carbon atoms as part of the fuel makeup, it is impossible to make carbon dioxide or carbon monoxide as products of the reaction. This point is especially important when discussing global warming or smog pollution. The fact that ammonia reduces both CO_2 and smog, CO, should be foremost on their minds.

The successful use of Ammonia to power our cars in the past proves that the power from the combustion of any hydrocarbon is a result of the Hydrogen atoms combining with Oxygen atoms thus forming water. It also proves that there is no significant energy gained or released from the carbon molecules going from octane (for example) to carbon dioxide. And there is nothing in any scientific literature that says that we should use hydrocarbons as fuel in the first place. So from now on, when we go looking for possible fuels we should look for ones that have lots of hydrogen and oxygen in their formulas. Non oxygenated Hydrocarbon fuels should be relegated amongst all of the available fuels that can be burned to produce heat, and this category includes bio-mass and trash. As for our automobile engines: it is high time to give us fuels that <u>don't</u> contain carbon in order to stop forcing people to tolerate carbon monoxide in their cities towns and school playgrounds.

Alcohol: Legends and Myths



Now that we've established the fact that gasoline could be easily improved upon as a fuel by adding oxygen to its current formula we will consider the easiest way, and that is to convert it to alcohol. You will note in the formula for methanol alcohol above that it is identical to methane gas except for the presence of that one Oxygen atom. So in order to produce methanol from methane gas the only missing ingredient is Oxygen and this is available from the air or from water in unlimited quantities and free of charge. There exists in water all of the oxygen and hydrogen we will ever need. In fact we learned in the Introduction that gasoline can be combined with water using a nickel catalyst, heat and pressure to produce a fourfold increase in fuel volume than what you started with. The oil industry does not want us to know this, you can be sure!

It is possible with the right reaction to transform petroleum methane gas into alcohol very cheaply. From Wikipedia:

> "In 1923, the German chemists Alwin Mittasch and Mathias Pier, working for BASF, developed a means to convert synthesis gas (a mixture of carbon monoxide, carbon dioxide, and hydrogen) into methanol. A patent was filed Jan 12 1926 (reference no. 1,569,775). This process used a chromium and manganese oxide catalyst, and required extremely vigorous conditions—pressures ranging from 50 to 220 atm (3200 psi), and temperatures up to 450 °C (842 ^{0}F).

In this case the chemists first used combusted hydrocarbon gasses, CO and CO_2, then added Hydrogen to somehow end up with methanol alcohol, CH_3OH. The process demonstrated a valuable relationship between hydrocarbon gasses and alcohol. Too bad they never taught this in public schools.

Forget About Making Ethanol Alcohol From Corn.

Whenever a discussion of fuel occurs and the subject of comes up, remember; only drinkable alcohol needs to come from fermentation. Granted there are some foreign countries that have a surplus of certain organic crops like beets or corn that can be fermented into alcohol and used as fuel. But this currently held notion that alcohol for fuel has to come from the fermentation of a food like corn, which is a needed human food staple, is horribly misguided.

We should forget about the use of using food stocks to produce alcohol-based fuel. There are at least four grades of alcohol. The first, methanol alcohol is a smaller molecule than ethanol and makes a better fuel in the first place than its drinkable cousin. Methanol can be made from combustion gasses plus hydrogen and it can also be made from hydrocarbon gas, like methane, as well as hydrocarbon liquids, like gasoline.

I don't deny the fact that the cheapest way to make ethanol is by fermenting the sugars left behind in shrub-like plants that have been pressed of their oils. And in chapter 12 I discussed another cheap way to make alcohol through the use of microbes (bacteria needing CO_2) to eat exhaust gasses (CO and CO_2) thus producing lipids and fats. The fats can be pressed out and turned into bio-diesel, or, the fats can be broken into short chains and combined with H and OH, thus to make alcohols of varying carbon lengths.

It should be taught how methane is a miracle of design, making possible a circle of organic life which includes Carbon, Phosphorus and Nitrogen combining with Hydrogen and Oxygen to produce all of the living

plants and animals. They are all built of fatty acids, lipids, proteins, carbohydrates, etc. In the process of producing organic methane, which rises up to combine, with sunlight and oxygen in the atmosphere, both water and Carbon Dioxide are produced. Completing the circle we have the plants taking in CO_2 and water to produce hydrocarbon liquids that don't look any different than their crust-produced counterparts known as petroleum hydrocarbon.

When alcohol is to be used as fuel, whether it be methanol or ethanol, it should first come from exhaust stack discharge gasses, secondly from surplus petroleum gasses which are being flared and thirdly from existing gasoline stocks (remember you get a fourfold increase in yield by combining it with water).

Virtually all of the ammonia produced today is made from natural gas otherwise flared off, so this is where it should come from when more is needed. There is a huge world surplus of petroleum industry gasses as well as factory produced gasses.

Alcohol for fuel and Prohibition

After all this time you probably thought that Prohibition was about the people's tendency to overdrink, and that our benevolent government was honestly trying to reduce a misguided people's obnoxious behavior. They did it so that we would live better lives and live longer too. They did it out of love. Just when has Big Oily ever done anything out of love?

The fact is, as early as 1923 Big Oily knew how to reduce their need to do constant drilling. At the same time, they knew how to clean up our nation's fuel requirements and improve the whole energy program by using existing petroleum sources as feedstock to produce a much cleaner energy like alcohol. It is not coincidental that this is the same time The Prohibition Act was in effect in the United States.

In case you were wondering who is in control; the government or Big Oily, I would suggest that you consider that they are one in the same. The fact is we now know that the purpose of this ridiculous law was so Big

Oily could get control of the alcohol market. And so it was by the time Prohibition laws were repealed they had essentially shut down all of their alcohol fuel competitors. It had nothing to do with drunk women or men cussing in public.

Methanol verses Ethanol Alcohol; quick lesson

The basic difference between the two is ethanol is made by fermentation. Ethanol is usually made using organic ingredients that can be eaten, thus ethanol is drinkable. When ethanol is made using a commercial process that involves chemicals for stripping the liquors used for fermentation, it is not drinkable.

Methanol can also be made by fermentation. All wines and beers contain some methanol so you cannot classify it as poisonous, however, at present this is the way it is classified.

Most methanol is made using heat, pressure, catalyst and steam to thus add an oxygen atom to the methane gas molecules. Methanol is the most oxygenated of the alcohol family making it the most powerful fuel.

Methanol alcohol

Molecular Formula:	CH_3OH
Appearance:	Colorless liquid
Density	0.7918 g cm^{-3}
Melting point	-143 °F
Boiling point	149 °F

Ethanol alcohol

Molecular Formula: C_2H_5OH

Density slightly less than methanol: 0.787 g/cm^3. Appearance: Colorless liquid

The chart on the previous page indicates how similar methanol and ethanol are. Methanol has one oxygen atom for four hydrogen atoms, while ethanol has one oxygen atom for six hydrogen atoms. Therefore, methanol is half-oxygenated; it only needs one more Oxygen atom for the one it already has to fully oxidize during combustion. Ethanol is one-third oxygenated; it needs two more Oxygen atoms for the one it already has to fully oxidize. Therefore the preference should be to use methanol alcohol, not ethanol alcohol, as fuel for combustion engines. And this is for the simple reason that it is more highly oxygenated thus it is going to provide more power for the engine's limited combustion volume. And this is the reason that methanol was used at Indy, although currently they claim to have switched to ethanol since around 2004. In Europe, Formula 1 racers continue to use a special blend of gasoline. I would like to see that special blend formula!

Wood Alcohol

The subject of alcohol is clouded further with the term "Wood Alcohol". In seeking out the reason for this description I discovered that alcohol was being extracted from wood sawdust at the turn of the century and for who knows how long beforehand! Here is another way to produce alcohol; from wood or any bio-mass. Basically you extract liquor from wood or chips using an acid, then ferment the liquor to produce alcohol for distillation.

Now folks, this is industrial grade alcohol since an acid has been used in the process. But the liquor is going to be fermented isn't it? And so the liquor is going to produce ethanol alcohol, just like the kind we drink. Not really. Because of the industrial process it is an industrial ethanol meaning it is not ok to drink. Wood alcohol is ethanol alcohol but it is not ok to drink. Got it? Alcohol like scotch or whiskey has been made by fermentation of the sugars contained within the grains when their sugars were not extracted by an extra acidification process.

You can bet that from times past when people were in a pinch, wood

alcohol has been drunk by unsuspecting humans. You can bet that there have been times when one has been substituted or mixed in to make up volume and increase sales. You can bet that third world countries get this kind of alcohol on a regular basis and that it tends to mess them up a bit when they drink too much. Is it their lack of sophistication because they have a brown or black skin, or is it the type of alcohol they are fed that causes their ill behavior?

Then you can research the kind of alcohol that was traded to the American Indians and start to understand why they gave away their lands for the stuff. Were they that stupid or were they poisoned? We shall someday know the truth on that one.

There's a thousand ways to make alcohol and an endless number of combinations of mixtures and blends. Beginning in 1910, a chemist named Tomlinson implemented on a large scale in America the manufacture of alcohol from sawdust, which was a leftover by-product of the wood products industry.

> *The process used at the Georgetown works was the following: pine sawdust is placed in rotatory digesters made of sheet steel lined with ceramic tiles, along with dilute sulfuric acid. Heating is accomplished with direct steam injection, under pressure, for one hour. The steam is exhausted and partially condensed to recover spirits of turpentine (200 to 300 grams per ton of dry wood). The sawdust is then extracted in a diffusion battery, pressed and used as fuel.*
>
> *The juice obtained is partly neutralized, filtered, cooled and sent on for fermentation. This is accomplished by first preparing a yeast culture with malt and barley, then propagating the yeast thus obtained in a cooled decoction of malt sprouts in the saccharine juice. After development, the yeast is used for inoculating the saccharine juice in the fermentation vats. Industrial yields, under normal conditions, reach 7.3 liters of 100-degree alcohol per 100 kilograms of dry wood, and the factory's annual production is 20,000 hectoliters of alcohol.*

Wood extraction is not a method by which a significant amount of alcohol is being produced today but the term has managed to stay around to keep us confused about alcohol. There is little dry wood around for making alcohol out of today as most of the chips and sawdust are being made into

ply-board using oil-company-produced epoxy glues. Smart marketing strikes again; all of our solid wood has been stripped and sold overseas leaving us with no choice but to purchase composite materials for home construction.

Now that you are somewhat knowledgeable about ethanol alcohol you can start to see how wood alcohol has been associated with blindness as a result of humans consuming it during the period of prohibition. But this is just one of the possible sources of toxic alcohol. The other and much larger one is the production of alcohol via the petroleum industry; a practice that is largely unknown to the public.

There is toxic alcohol that is consumed in the world and because it was made toxic from feed-stocks which also produce turpentine. This is what the world's poorest people get to drink, and yes they will drink it when they have no idea what they're drinking. It is my personal belief that this kind of alcohol makes native peoples have destructive reactions. I have lived next to such villages while on a five year trip to Fiji where I witnessed grown men become transformed from peaceful into belligerent with just one drink.

The major source of Methanol today

Methanol is one of the most heavily traded chemical commodities in the world, with an estimated global demand of 27 to 29 million metric tons. Most of this will be used as a gasoline additive or for the production of MTBE, another gasoline additive. Folks, this is a huge market. Don't for a moment think that it is not a significant part of a parent conglomerate's annual business plan.

The current world's production of alcohol is no small town project, being not only large but a critical part of gasoline sales. In recent years production capacity has expanded considerably in South America, China and the Middle East. Methanol factories are based in areas with access to abundant supplies of methane gas. Coal-based production, which is another petroleum feedstock in the production of alcohol, has dramatically grown in China. Any politicians who won't forget corn are political turnips.

The major source of methanol production in the world today is from the catalytic conversion of methane and natural gas. Over the past fifty years Methanol production has been made more efficient through the use of catalysts, commonly copper, which allows the reactions at lower temperatures and pressures. That's another reason why you can forget corn and wood as a serious supply of alcohol. The fact that plants for producing methanol alcohol are near abundant supplies of natural gas should make us wonder why they would ever want to consider corn; a feedstock that has to first be grown, then ground, fermented and distilled, as a source of industrial alcohol in the first place.

The process of producing an alternate energy by fermenting corn instead of bringing gas up out of the earth, when you are going to use natural gas to distill the corn anyway, is an energy dichotomy. Why not just take the petroleum gas molecules and add an oxygen atom between the carbon and the hydrogen atom, thus to produce alcohol directly? Well, as it turns out they have been doing it for a very long time, all whilst the public has been left in the dark.

Alcohol should be cheap, cheap, cheap! This is a most damning truth about the oil industry that shakes out when the full alcohol story is told. Facts about alcohol being easy to make by many processes, and, that there are cheap feed-stocks such as exhaust gasses from power plants, steel mills and chemical processing plants, have been cleverly disguised and overlooked.

Adding to the overall alcohol market are additional applications for methanol for the production of formaldehyde (used in construction and wooden boarding), acetic acid (basis for plastic bottles) and for the formation of methyl esters in the production of bio-diesel. You can see that it is a market that extends well beyond the capabilities of corn production.

In China, demand for alcohol is even being accelerated by new applications, such as direct blending (with gasoline), Methanol-to-Olefins (e.g. propylene) and DME. Methanol can also be used to produce gasoline, although why anyone would is beyond rationalization.

I hope you are getting the picture. Alcohol can be made from

petroleum, petroleum gasses, any hydrocarbon material whether it is petroleum, plant or animal based by oxidizing it with water, H2O, which is in unlimited supply and is free. Alcohol can be made into chemicals that are components of epoxy glue for glued-wood construction material. Note how easy it is to jog these hydrocarbon components around to arrive at just about any kind of gas or liquid that is desired, and all of this is made possible with either water or atmospheric air as the necessary additions.

Just get rid of Gasoline

The use of methanol as a motor fuel received attention during the oil crises of the 1970s due to its availability, low cost and environmental benefits. By the mid-1990s, over 20,000 methanol "flexible fuel vehicles" capable of operating on methanol or gasoline were introduced in the U.S. In addition low levels of methanol were blended in gasoline fuels sold in Europe during much of the 1980s and early-1990s.

But come on folks this only scratched the surface of what methanol fuel technology offered. All this time and during the tests we could have been supplied enough methanol to convert all of our gasoline powered vehicles to it. The oil producers would not have lost any volume since they are the suppliers of this methanol itself. They would have simply been converting it from hydrocarbon surplus gasses and oils for us, not eliminating prior sales for themselves.

This would have resulted in the transportation sector using an oxygenated fuel that produced no carbon monoxide. It is this very aspect that is not in the cards for the world's fuel demands. Producers do not want a more efficient fuel, nor do they desire a non-polluting fuel. That second part is a troubling aspect to consider.

So during the 1990's there was a sudden rise in the price of methanol (by the petroleum companies who produced it) and this gave the automaker cowards consortium a reason to stop building methanol FFVs (ones powered by petroleum-produced methanol). What a perfect way to kill the program. How the price of methanol could take a sudden jump and be more

expensive than gasoline when you get a fourfold increase from gasoline to methanol production flat out proves oil dudes are crooks. They would have had to seriously cook their books in order to raise the price of methanol. It worked; by the late-1990s carmakers switched their attention to ethanol-fueled vehicles (ones powered by corn produced alcohol). The public got screwed in that deal.

I hope you are not confused by these designations of methanol verses ethanol, but my guess is the public is totally in the dark. There is a public preference for ethanol as it has been touted as solving the corrosion challenges that its baby brother methanol is known for. I think we should settle on methanol and work out the fuel system problems. They obviously have already done this in the oil industry where they make millions of gallons of it per minute. So I believe that the corrosion issue is just a way to steer us towards ethanol, C_2H_5OH, which is an inferior fuel compared to methanol, CH_3OH. Either way, here is a fuel that can be burned in an engine, dumped into a wound to heal it and safely eaten if accidentally ingested. Why won't we wake up? What could be a better fuel than that? Whether it is methanol or ethanol, both can be made from petroleum gasses and liquids.

One giant advantage of an alcohol powered economy is for the fact that alcohol can be immediately applied to the existing internal combustion powered vehicles. Converting existing engines would require a minimum of modification in engines, while most of the infrastructure to store and deliver this superior liquid fuel is already in place. We could begin phasing out gasoline powered engines today by the oil producer's willingness to convert more and more of their gasoline to methanol at the refineries. This would end the oil supply game overnight.

As it now is, the fuel blends offered by the petroleum industry don't have enough alcohol in them to boost oxygenation enough to super-charge mileage efficiency the way straight alcohol does. These fuel formulas were

blended with just enough oxygen to alleviate smog components created during cold startup and operation of gasoline engines. These clever oil companies are always on guard against water emulsions and they are also on guard against oxygen itself. The important thing to note is alcohol blended fuels, supplied by the oil industry, are nothing like 100% alcohol. But of course they want you to believe this.

As we mentioned before, methanol alcohol is a half-oxygenated fuel. What this means is that one half of the oxygen that will be needed to combust the fuel is already part of the liquid formula. Therefore, when you switch a gasoline engine to alcohol you can inject or mix in exactly twice as much fuel per stroke of the engine. This is the reason it is used at Indy. It gives an existing engine more horsepower.

More available power at the throttle, however, invites the operator to use twice as much fuel. This is the last thing you want to do with one of these big oversized gasoline engines since it will produce much more power than you need not to mention dramatically reducing fuel mileage. Using alcohol in an engine that was set up for gasoline is not a way to utilize any of the benefits alcohol has unless you increase the compression ratio.

When we make the switch to alcohol initially, gasoline-designed engines will perform boldly and powerful, but as they are oversized and with low compression ratios they will not get great fuel mileage without some clever engineering. It is impossible to make an inefficient design perform efficiently even with alcohol, but there would be a marked improvement in air quality right from day one. Just the savings in gasoline by catalytic cracking with water and copper or nickel to produce methanol increases the yield by a factor of four. Plus, methanol works best when it is diluted with 20% water, this would increase the total yield to nearly 500%. Yes, you are reading this correctly.

You can make some adjustments to these large engines that we are currently stuck with if you find yourself switching to a cheap source of alcohol. One of the first things I would try is using a blend of water and alcohol rather than straight alcohol. This would help increase BMEP, reduce engine heat and allow you to advance the spark timing by 5-10^0. These changes would increase fuel mileage and exceed previous fuel mileage achieved with gasoline. It has already been proven that a vehicle running on alcohol plus water (hydrous ethanol) performed better than the same vehicle running on straight alcohol (anhydrous ethanol).

To fully utilize alcohol properly we would need to redesign smaller engines with higher compression ratios, and they would need to build for high-load continuous duty as in the marine industry. Only these kinds of sturdy engines could properly match up to the performance of better alcohol fuel in a higher compression engine. What we're really looking for is a bullet-proof engine that can run these higher BMEP's. Diesel engines are equipped to do this. Current gasoline engine designs present us with a dilemma for alcohol conversion in that they are both low in compression and flimsy in the block, thus must always be operated in a throttled-down mode.

I think the place to start during conversion of gasoline to alcohol would be to add water to the ethanol or methanol. I invite you to consult Appendix 4C for more reading on methanol/water emulsions, in the meantime let's take a look at U.S. gasoline additives.

Ethanol and MTBE

Anytime you see the word ethanol then you are likely dealing with an alcohol that has been produced by fermentation of sugars or extracts of organic materials. Methanol is actually a better blending additive because it is more highly oxidized than its heavier counterpart ethanol. Currently the

demand for alcohol, be it methanol or ethanol, is at an all-time high worldwide and climbing. The biggest factor driving the demand is the need to blend alcohol into gasoline in order to reduce smog in industrialized cities. In order to be effective alcohol must be added to gasoline in the ratio of 10% of the fuel mix and this has created a colossal-sized world demand.

By the way if the gasoline you are using is not being blended with ethanol then it is being blended with MTBE instead. MTBE, methyl-tert-butyl-ether, is the preferred additive which they use everywhere they can get away with it. That's because it does not contain as much oxygen on a per weight basis as methanol and is also toxic to water. It may interest you to know that MTBE is made from methanol alcohol! Adding to the demand for ethanol alcohol is the fact its use is spurred by federal and/or state mandates that stipulate fuels must contain a certain amount of oxidizer to combat smog. (Why don't they just convert gasoline itself to methanol alcohol, thus to eliminate smog and polluted waterways?)

The amount of MTBE and Ethanol blended into fuels varies with the seasonal temperatures as more oxidizer is required during cold weather startups to prevent the formation of smog. (As I stated before, oil producers never give us any extra oxygen than they absolutely have to, even though they can make four times as much alcohol from the gasoline they started with!). Today with current regulations in effect, the total alcohol market is approximately 10% of the overall gasoline market in the United States.

As a result, today in the United States the oil companies are having a field day confusing motorists and politicians about alternate fuel resources such as alcohol. Just how stupid are their current statements and practices? For one, instead of stipulating methanol as a gasoline additive they have steered us toward ethanol, which is less oxidized, more costly and less abundant. Then they go on to state that corn-produced alcohol represents a viable alternate source of energy, all the while ignoring the catalytic cracking of gasoline into alcohol and/or the cheap production of methanol

from natural gas. Nor do they acknowledge that methane and natural gas are being flared off and wasted all over the world.

Hydrous Ethanol

The current Federal and State motor fuel specifications for gasoline/ethanol mixes stipulate only anhydrous alcohol as being acceptable. Anhydrous alcohol is almost completely dry, meaning it is 99% pure. You can easily get this if you are making alcohol from petroleum gasses. You cannot get this level of purity, however, if you produce alcohol by distillation. Distillation produces only 95% purity with the remaining 5% being water. This is called hydrous ethanol.

Since the production of ethanol by distillation produces only 95% "hydrous" ethanol on its first pass, it has to go through a secondary process, such as filtration absorption or chemical leaching to remove enough free water to get it up to 99% pure. Only then is this alcohol in the category of anhydrous ethanol such that it can be legally blended into motor fuels. This is a colossal error!

One reason this is erroneous is the fact that the secondary process performed on hydrous ethanol to remove 4% of the water adds almost as much cost to the process as the first stage distillation process, thus doubling the cost and lowering the yield. But the public needs to know that this added processing is completely needless! In fact, it is worse than that.

The second reason is due to the fact that the use of hydrous alcohol has been tested at least as far back as the 1905 and found to be superior to anhydrous alcohol when burned in an engine. The fact is Big Oily had been developing water and gasoline emulsions for reciprocating engines since the turn of the century. They bore this out at the race track where the addition

of water improved combustion, added power and reduced lap times.

The public deserves an awareness of what is truly available in the form of liquid energy. Methanol has been mixed with water and used repeatedly in military applications, such as to power torpedo turbines before and during WWII. Bombers and Corsair aircraft engines were equipped with water injection during the war to reduce overheating at takeoff and climb. There is no doubt we do not have water technology simply because of a few political lobbyists and sell-outs who defend the motor fuel regulations currently in place. Such Big-Oily-compromised individuals are unqualified to have anything to do with politics, much less energy.

As a result of leadership stupidity and political cowardness, we have gone on for fifty plus years dehydrating all ferment-produced alcohol even though it was totally unnecessary. In fact this has only produced a degraded fuel blending additive. The stipulation to remove approximately 4% of the remaining water by government and industry has been a waste of approximately 30% of the energy involved in distillation. But worse, it has resulted in damaging the public's perception of the viability of alcohol as a competitor to gasoline.

If You Blend With Ethanol, Use Hydrous Ethanol

Let me reiterate that we should be using methanol alcohol that is produced from catalytic cracking of waste oil field gasses or using ethanol produced from algae/microbe processing of waste gasses from power plants and factories. We should not be using alcohol from fermentation anytime that it involves a food source such as corn. Never-the-less in some countries there is an overabundance of foodstuffs such as grains, potatoes, corn such that they can make alcohol from these feed-stocks at a price competitive with gasoline.

A fuel company called HE Blends, in collaboration with other European organizations, has completed initial vehicle tests confirming that hydrous ethanol can be blended effectively with gasoline without phase separation or other problems. An unmodified Volkswagen Golf 5 FSI was operated successfully on a 15% hydrous ethanol blend with gasoline, meeting European exhaust emission standards in testing conducted by the Netherlands research organization TNO Automotive and by SGS Drive Technology Center of Austria.

Besides confirming the effectiveness of hydrous ethanol for gasoline blending in actual vehicle trials, these initial tests have shown measurable increases in volumetric fuel economy, indicating higher thermodynamic efficiencies resulting from hydrous ethanol. In other words; **adding water to alcohol that is used for fuel inside a combustion piston engine results in an increase in overall efficiency.** And now you know the reason that the oil industry has stipulated anhydrous ethanol and methanol all this time.

Fuel-water emulsions and formulas you can try

Now that we have seen how an addition of water is able to enhance the performance of alcohol when used as a fuel in a combustion engine we now turn our attention to the possibility of applying the same miracle molecule to gasoline. And as it turns out this technology was patented long ago by the same man who co-invented the internal combustion engine in the 19th century, Nikolaus Otto.

The word on the street is water and gasoline doesn't mix. So you might be leery that this cheap way of modifying gasoline could actually be a promising ways of saving fuel and improving the environmental

characteristics of existing combustion engines. Well, here are some formulas for mixing a gasoline/water emulsion using alky-phenol detergents. You can try them for yourself:

EXAMPLE I

1 ml. of IGEPAL CO530 and 1 ml. of CALAMIDE C were poured into 78 ml. of gasoline and then 20 ml. of tap water was added. **A slight shaking of the container formed a clear emulsion.**

The IGEPAL is manufactured by GAF Corporation and is a non-ionic ethoxylated alkylphenol containing 6 moles of ethylene oxide per mole of nonylphenol. The CALAMIDE C is manufactured by Pilot Chemical Company and is a coconut oil diethanolamine super amide.

EXAMPLE II

1.5 ml. of IGEPAL CO210, a non-ionic ethoxylated alkylphenol having 1.5 moles of ethylene oxide per mole of nonylphenol was added to 82 ml. of gasoline in a beaker. 1.5 ml. of CALAMIDE C was added and 15 ml. of water. **A gentle shaking of the beaker produced a clear emulsion of the gasoline in the water.**

EXAMPLE III

3.5 ml. of VARONIC N30-7 and 3.5 ml. of VARAMIDE MA-1 were mixed with 70.5 ml. of gasoline and 22.5 ml. of water. The VARONIC N30-7 is produced by Ashland Chemical Company and contains 30 moles of ethylene oxide per mole of nonylphenol. The VARAMIDE MA-1 is also a product of Ashland Chemical Company and consists of a coconut oil diethanolamide super amide.

EXAMPLE IV

2 ml. of VARONIC N-6 was poured into a beaker containing 88 ml. of gasoline. 10 ml. of tap water were added and emulsified into the gasoline by gently shaking the beaker. The VARONIC N-6 is a product of Ashland Chemical Company and contains 6 moles of ethylene oxide per 1 mole of nonylphenol.

Unfortunately, a specific detergent that contains these alkyl phenol detergents is hard to find at the local grocery store for the fact that the manufacturers don't want to tell you what the active ingredient is. Read the label on these powerful cleaners and you won't get much. This is not by accident. Remember how acetone is additized with additional "stabilizers" which render it ineffective for gasoline blending. It does not surprise me that these detergent manufacturers are performing similar tricks on the gasoline-consuming public with their knowledge of chemical formulas that emulsify water with gasoline just fine.

With gasoline now established as the primary fuel for the world's transportation vehicles, we should take a look at every possible way of enhancing it. One of the inherent problems with internal combustion engines running on gasoline is their excessive heat generation and carbon monoxide production. This would be another positive reason to embrace the use of a gasoline-water emulsion.

<u>Field research has shown that a switchover to water-fuel emulsions:</u>

Helps improve fuel and air mixing,

Increases the local values of the air ratio and combustion speed (as a result of droplet micro-explosions, discharge of steam and splitting of the particles of the original fuel),

Reduces soot formation and the temperature of the working medium in the combustion chamber and the content of nitrogen oxide in the exhaust gases.

Reduces the combustion temperature and combustion speed of the fuel and water mixture,

Accelerates the transformation of harmful carbon monoxide into neutral carbon dioxide,

The steam created during the process of combustion acts as a catalyst for the chemical reaction of oxidation and gasification of carbon.

Increases volumetric efficiency and fuel mileage.

In addition, the economic efficiency of using water-fuel emulsions reduces the cost of separating water during the manufacture of types of water-oil fuels. In the process of Water Fuel Emulsion production, the fuel is also homogenized.

You might be interested to know that the method used to homogenize fuel was proposed by the French inventor, Auguste Gaulin, in 1899. This approach proved particularly efficient when medium and high-viscosity fuel mixtures were used for ships. Such technologies were used by ships of many countries and produced high economic and environmental results approved by Lloyd's Register in 1978.

Fuel Water Emulsions are approved by Lloyd's Register

"Theoretical research in the sphere of thermal fuel combustion has demonstrated that a substantial cut in harmful emissions is to be anticipated from equalizing the temperature field within the combustion chamber, together with a sharp drop in the number of local high-temperature zones. ***This condition can be met if water-***

fuel emulsions (WFE) are used in engines. This type of fuel, with an energy-intensive neutral additive, helps extend the self-ignition delay period and promotes a better mixture of air with the combustible charge, resulting in rapid and even mixture combustion together with a substantial evening out of the temperature gradients in the combustion space. *In addition, at the WFE ignition temperatures, water dissociates into hydrogen and hydroxyl, which results in fuller after-burning of the fuel. Thanks to these specifics, the main harmful components in exhaust gases can be reduced. This explains the considerable interest in water-fuel emulsions and the fact that developments are being actively carried out in this sphere throughout the world."*

Historically, the emergence of an interest in water-fuel emulsions is connected with attempts to use heavy water-cut fuel oil and oils as fuel for diesel engines. Being cheap, these fuels have a number of unfavorable characteristics. One of these is the presence of water contained within them.

It turns out however that water which is evenly dispersed within heavy fuels does not hinder their combustion in diesel engines and even improves the mixing and ignition processes, thus making the fuel more economical to use. In addition the engine can be loaded heavier as the presence of water vapor reduces the temperature of the working parts and increases the reliability and service life of the engine. The presence of water in certain proportions dramatically improves the combustion process of petroleum fuels.

Other Mystery Fuels

The fuels that are discussed in the following pages are neither theoretical nor potential fuels but ones that have been available since the World War Two and they are available right now, but only for military purposes.

During WW2 Shell had a gasoline type fuel called Triptane. It was developed for use in highly supercharged aircraft engines to resist detonation. Triptane had an aircraft octane rating of around 200. Triptane allowed blower boost pressures around 38 psi in engines with 150 cubic inch

plus cylinders.

Triptane (2,4,4 tri methyl pentane) was also used in Allison powered P-39's used for air races in the late 1940's. This airplane with an Allison blew away all Merlin's and big radial powered pylon racers of the day. A fairly stock Allison 1710 produced about 2900 Hp in over-boost. Triptane was tried with along with mixtures of methanol, benzene and acetone at various times and with varying degrees of success.

Mixtures of Oxidants, NO_3, with Hydrazine, NH_4

I included these two experimental fuels due to their composition with Ammonia Nitrate, NO_3. Because of the three parts of oxygen added to the molecule it is a very effective way to get a lot of extra oxygen into the combustion space thusly to be able to burn more fuel and produce more power.

Secondly I was intrigued with the presence of powdered aluminum in the formula. Powdered aluminum, now known as nano-aluminum is a component of Thermite. Thermite is an explosive substance that burns so hot it cuts right through steel. As a side note, thermite also contains iron oxide as an oxidizer for the aluminum. I have seen this mixture set off using a magnesium fuse. The heat and light from the reaction was a white hot reaction that melted down into the plate of steel.

Nano aluminum is a relatively recent invention and is now readily available. Consider these dense harbingers of energy as "super-igniters" of the fuel charge. These tiny particles, upon burning, take over where the spark plug leaves off. Former research indicates that higher-voltage spark ignition coils provide significantly improved fuel combustion (another invention the auto-makers ignore). It makes sense that the use of nano-particles that burn at 4,000 ^{0}F and higher could provide significant improvements in combustion as well.

Nano sized particles are of such fine size that they can be added into

liquid fuel formulations in stable mixtures and pass through fuel injectors and filters. There are already a number of patents for such formulas. One in particular used nano-titanium in conjunction with silicon based oil. By mixing the titanium first with the oil and then with the gasoline, a stable mixture was obtained.

Imagine super-charging your car's engine without the need for of a supercharger! Normally a super charger would be run off of your engine and would rob about 30% of the shaft horsepower it produced from the fuel provided. A small amount of Titanium added to the car's gasoline would have a dramatic effect for the fact that it causes a more complete combustion of the fuel because of the extreme heat. Extreme heat in the combustion chamber means that a catalytic breakdown of the hydrocarbons will occur if water and pressure are present. The pressure is there from the combustion. Therefor this is a perfect application for water injection and/or using a fuel/water emulsion.

I have in the past run across fuel "tablets" that were supposedly dropped into a car's fuel tank for extra mileage. Now I believe that they may have really worked. You have seen how it is possible to produce such a potent ingredient such that just a pill added to your car's gas tank would indeed have a significant effect. Such types of fuel enhancers are either branded unscientific or totally ignored by the media. Now you know there is a definite possibility such a product exists right under our noses. Ammonia nitrate (NH_4NO_3), iron oxide, titanium and aluminum are just a few of them.

Let's summarize what we now know about the super fuel of the future: It would contain H_2O within the formula thus to take advantage of the extreme heat energy supplied by the use of nano-particles. This extreme heat can produce steam, and this produces increased pressure during combustion. Now the heat and pressure, combined with gasoline and water vapors, causes catalytic cracking of the gasoline molecules into molecules of methanol and methane. The additional oxygen required for the reaction is pulled from the intake air.

The significance of this secondary reaction, which disassociates the

water vapor into separate hydrogen and oxygen which is then combined with the hydrocarbon fuel, is the key to understanding how certain inventors from the past, like Pogue, were able to boost fuel mileage in a typical automobile to 200 miles per gallon. This is how it was done. The only difference was that the metal catalyst was part of the engine itself, not part of the fuel. Either method works. It is probably harder to mount the catalyst in the combustion chamber than it is to add nano-particles to the fuel. This is why I find fuel-additive research so intriguing.

Certain metals like titanium and aluminum burn extremely hot. Certain metals like nickel, platinum and iron work as a catalyst such that catalytic cracking (breaking water molecules into hydrogen and oxygen and combining with hydrocarbon to form methane and methanol) can occur at lower temperatures. So we are just scratching the surface of available ways to formulate very powerful fuels. Here are the fuels that some oil company chemists came up with:

Astrolite A and Astrolite G

Appearance: both are a clear liquid Molecular formula: NH_4NO_3

Volume of gaseous detonation products: 1,112 liters/kg
Density: 1.36 gr/cm^3

Detonation speed:
For reference the detonation speed of nitro-methane is 6,800 m/sec.

Astrolite A: 7,800 m/sec Astrolite G: 8,600 m/sec

Astrolite A and Astrolite G were developed as explosives in the 1960s by combining an oxidant: **ammonium nitrate**, with **hydrazine** at a stoichiometric ratio of 1:1. Astrolite A also contained 20% aluminum powder. These substances are considered as binary materials, since both components are not explosive until they are mixed; this action can be performed even on site.

Astrolite A and Astrolite G are not widely used in applications that I am currently familiar with. My guess is they are so potent and powerful they would expose gasoline and petroleum based fuels as the wimps that they truly are. For example they have a higher detonation speed than nitro-methane and much more oxygen and hydrogen in their makeup. Now we can't go powering our top fuel dragsters with 50 cubic inch four bangers. They wouldn't produce the right sounds because the pistons wouldn't be big and numerous enough to make that loud, roaring sound. It's a sound designed to please the crowd.

Imagine watching a dragster line up to the start that has an engine so small the crowd can't see it clearly as the centerpiece. That wouldn't do. Drag racing is all about engines. The piston engine they do put there is just the right size so you can visualize it in your own piston powered vehicle. And you fall for the supposed hi-tech that produces all the power. This in turn makes you think there's something special about the piston V-8 engine design. Very clever these people. There's nothing special about the V-8 design. It was a good formula for vegetable juice at one time, but that's it.

Think about this: If a dragster's engine was smaller than a Mazda Wankel engine yet put out the same power as a 500 cubic inch hemi piston engine, piston engines would be exposed as the over-weight slugs that they are. However, if they are about the same size as your engine, then souped up to sound like a reenactment of the Civil War, people in the stands are going to be entertained. But it's all a theatrical display.

At this point it becomes crystal clear that the performance of gasoline can be dramatically improved. Significant performance improvements are easily achievable, such as adding water which is virtually free and unlimited. You have also learned that it is also possible to enhance fuel combustion with the use of catalysts in the presence of water and pressure to break water molecules, thus to produce methane and methanol within the combustion chamber in place of hydrocarbon which is then oxidized. And you have learned that ammonia and hydrazine can be combined resulting in a further increase of available oxygen for increased combustion. Lastly, with nano particles of certain metals being added to

this mixture, there is even greater combustion efficiency. Note that in every case the fuel producers refuse to offer them to the public sector.

Gasoline is definitely in need of improvement. This gives rise to the next topic: What fuel should we be using?

Fuel options so far:

Alcohol: Methanol, CH_3OH and/or Ethanol, C_2H_5OH
Methanol/Ethanol water blend
Ammonia, NH_3
Gasoline, C_6H_{14} – $C_{12}H_{26}$ and others
Gasoline Water Emulsion
Hydrazine, N_2H_4
Hydrogen gas, pressurized, H_2
Hydrogen peroxide, H_2O_2
Kerosene and diesel, $C_{18}H_{38}$ and many more
Methyl nitrate, CH_3NO_3
Nitro methane, CH_3NO_2
Propane, C_3H_8
Thermolene, N-Propyl Nitrate. $C_3H_7NO_3$
Triptane, 2,4,4 tri methyl pentane, $(CH_3)_3CCH_2CH(CH_3)_2$
Astralite A and Astralite G

There are undoubtedly thousands of additional formulas for fuel that have been researched and tried. This would be a great area of study for PhD's in Chemistry to do for a research project before graduating and going off to work in the oil industry. As for me to do additional research I will when the time comes that I no longer desire to go on writing about the subject. Still, we are able to see from this incomplete list that there are many

choices other than gasoline that are much better than gasoline. Therefore as a fuel for the 20th and 21st Centuries, gasoline does indeed rank at the very bottom.

Fuel Ranking

No. 1 Methanol Alcohol, CH_3OH

Methanol and ethanol, as of today, are my favorites for the fact that a child can accidentally drink it (not a large quantity) and have no lasting damaging effects from the mishap. We can even poor it into our wounds if we get in a car accident. In many ways it resembles a god-designed material for the fuel needs of humans. We could be filling up our cars indoors, where we have heat and good lighting, since it produces a clean smell that is free of pollutants. There is no longer the need to stand outdoors in the wind shivering.

The half-life for methanol in groundwater is just one to seven days, while many common gasoline components have half-lives in the hundreds of days, such as benzene which is 10–730 days. Since methanol is miscible with water and biodegradable, it is unlikely to accumulate in groundwater, surface water, air or soil. And unlike petroleum fires, methanol fires can be extinguished with plain water.

The second reason that I like alcohol as a choice for fuel is because it can be manufactured in so many different ways. These include but are not limited to:

Fermentation of grain, fruits and vegetables and distillation
Acidification of biomass and fermentation of the liquor obtained
By converting hydrocarbon gas using steam reforming to alcohol
By catalytic cracking of hydrocarbon liquids and water to form alcohol
By converting coal, gas or oil
From manure by steam oxidation

From wood biomass
By synthesizing CO_2, CO and Hydrogen (from H_2O) into alcohol
By converting organic fats and oils to alcohol
From wood using pyrolysis

In the future when you have a discussion about the merits of alcohol as a fuel be sure to discuss the cheapest, easiest and most widely used source of alcohol today: it should be coming free of charge directly from the oil fields where gasses are being flared off. The world-wide alcohol market is a gigantic enterprise that takes hydrocarbon gas such as natural and ethane gas and converts it to alcohol. Thus the production of alcohol as an industrial fuel does not require the conversion of corn or any human or animal food source and should not as long as we have an oil industry in existence.

Alcohol produced using the existing oil production mechanism would be a way to clean up the environment. If and when alcohol is chosen to replace gasoline, it would initially be produced from ethane gas and other hydrocarbons, and in doing so a good portion of harmful pollutants could be stripped off. This would result in a fuel that is 10 times less polluted than the fuel that we are currently using. And remember that it contains oxygen within the formula so it is able to produce more power in our engines.

Alcohol is the safest fuel for cooking as it can be put out with water. It does not create pollutants in the burning process and can be used indoors. Alcohol points the way toward energies that are not poisonous to us. That is a concept that is way down the road from where we are at today, isn't it?

In the 12th chapter the World War 2 torpedo turbine engine was unveiled. This powerful engine was powered by methanol and compressed air. We saw conclusive evidence that water works in unison with methanol to create super-heated steam directly from the combustion of the two simultaneously. Here we have water droplets increasing in volumetric size by 1700 times and then expanding even further as they go higher into the super heat phase above the boiling temperature of water.

Alcohol for powering engines is usually used in the form of Methyl alcohol or methanol. CH_3OH is the chemical formula. Methanol burns at a

much richer mixture than gasoline does; with an air to fuel ratio of 6.0:1 as opposed to gasoline which is typically 12.8:1. The reason for this is the presence of the oxygen atom within its chemical makeup which gasoline does not have.

Note: hydrocarbon methane gas is very similar to methyl alcohol. Methane is written CH_4 and is the lightest hydrocarbon gas. So Methane gas plus one Oxygen atom = Methyl alcohol, methanol. In the same manner Ethane gas plus one Oxygen atom = Ethyl alcohol, ethanol.

Once you understand the chemical formulas of hydrocarbon gasses and alcohols it becomes obvious how easy it is to make alcohol from hydrocarbon gasses; you just add oxygen. Oxygen is readily abundant from the air. Folks, I know you're freaking out with this news as you might have a hard time with the concept of turning wellhead gasses that are normally lost into alcohol, but that is just what industrial grade alcohol is. You can't drink this stuff (regularly) because the ethane feed-stocks contain micro pollutants, but it sure makes a wonderful fuel.

During the OPEC 1973 oil crisis, Reed and Lerner proposed methanol from coal as a proven fuel with well-established manufacturing technology and sufficient resources to replace gasoline. Hagen in 1976 reviewed prospects for synthesizing methanol from renewable resources and its use as a fuel. Then in 1986 the Swedish Motor Fuel Technology Co. extensively reviewed the use of alcohols and alcohol blends as motor fuels. This company reviewed the potential for methanol production from natural gas, very heavy oils, bituminous shale, coals, peat and biomass. In 2005, Nobel Prize winner George A. Olah et al advocated an entire methanol economy based on snthetically produced methanol.

The availability of cheap methanol is an unknown secret. Anyone who is advocating corn production as a viable form of alcohol is completely illiterate on the subject of energy and should be fired or voted out of office immediately. Any congressman or senator arrogant enough to consider taking a food source from humans unnecessarily has an obligation to the people to check out what they are actually advocating beforehand. In the

wake of world hunger the practice of corn conversion has only a villainess appeal, and it has made the subject of alcohol appear inglorious in the eyes of the public. This is most unfortunate. We should be directing our scoffs and scorn toward our congressmen, not alcohol.

If I have over stated these remarks about alcohol, it is no accident. If you have read something twice or three times it is because of the extreme importance that the subject of alcohol is. Anyone seriously trying to improve the energy situation today needs to be on board with ways to make alcohol from nonfood garbage substances like flared off wellhead gasses, peat, biomass, natural gas, all surplus crude stocks, etc., and from any exhaust stack gas containing Carbon Dioxide using biomass-adapted algae to convert it to hydrocarbons and then oxygenate to alcohol.

By the way, all wines and beers contain some methanol as well as ethanol. Methanol is NOT POISONOUS. Unfortunately it is made to sound as if even the vapors are poisonous (Big Oily hates methanol).

How Methyl Alcohol, CH_3OH relates to Ammonia, NH_3

Now, while I've got you on this subject of wellhead gas, it is time to discuss ammonia, NH_3, and how it is basically made from the same stuff as methanol, using natural gas and methane wellhead gas. It just requires a slightly different process. If you will note from the two chemical formulas, alcohol and ammonia share an abundance of hydrogen.

Remember, the cheapest source of hydrogen is methane gas, CH_4. From this they strip off the carbon and then recombine the hydrogen with nitrogen to form ammonia, NH_3. Since the nitrogen was available free of charge from the atmosphere, it is not an expensive process to switch one with the other. Methane is the common link from which it can easily be converted to methanol by just adding an oxygen atom, or it can be converted to ammonia by stripping and then recombining the carbon atom for a nitrogen atom.

Ammonia very much resembles propane gas. It is liquid like propane at approximately 100 pounds of pressure, and it produces about the same amount of energy of combustion per unit of liquid, which is about the same as gasoline. Few people know this: ammonia can be burned in reciprocating engines just like propane. It can be supplied to a carbureted gasoline engine in the vapor phase (off the top of the tank) or supplied to a fuel injected gasoline or diesel engine in the liquid phase (from the bottom of the tank).

Ammonia is marketed as fertilizer to the farming industry with a market so huge that a pipeline has been constructed by the oil industry for distribution of liquid ammonia across the United States farm belt. The oil industry much prefers to sell us their converted wellhead gasses as ammonia and not alcohol for the simple reason that ammonia does not contain any oxygen in its formula. The oil industry makes ammonia for the public, but only makes methanol for their gasoline, and for petrochemical companies that require it as a feedstock.

We're going to get more into ammonia in the next section. For the meantime let me switch back to discussing alcohol and the fact that it contains one additional Oxygen atom and one additional Hydrogen atom within the liquid formula than ammonia. And here's the deal: Anytime you've got a liquid fuel that contains Oxygen and Hydrogen within the formula you've got the potential to have a potent fuel. The oil industry does not want the public to have a potent fuel. As long as the public does not know that alcohol is oxygenated, we have no way of properly comparing it to gasoline, which is not oxygenated. Because methanol is about half-oxygenated, it only would require an engine of approximately ½ the displacement to ingest as much air as necessary to combust the same amount of fuel energy. They don't want us to know this because the larger the engine; the heavier, less efficient and fuel hogging they become. That's why an oxygenated fuel like alcohol is not part of the game plan.

Methanol; poor in existing engines, great at Indy

For those engineers out there that balked at my statements regarding the potency of alcohol you probably have good reasons. Therefore I have provided further analyses of methanol compared to gasoline. Let's try to construct all the pieces of the puzzle.

> It takes 12.8 lb. of air to oxidize one pound of gasoline. Gasoline has a theoretical energy value of approximately **18,400 BTU/lb.**
>
> A 350 cubic inch engine consumes 567.53 cfm @ 6500rpm, which is 42.64 pounds of air and 2.89 pounds of fuel. Therefore if we are using gasoline in the engine, at 6,500 rpm and full throttle it is burning 53,176 BTU's of energy per minute.
>
> It takes 5 lb. of air (or 38% as much for gasoline) to oxidize one pound of alcohol fuel. Methanol has a theoretical energy value of approximately **9,500 BTU/lb.**
>
> Using our 350, example above running on methanol consumes 567.53 cfm @ 6500rpm which is 42.64 pounds of air and now at a 6.4:1 ratio for Methanol is 6.67 pounds of fuel. Comparing the amount of fuel and the BTU's available from alcohol the same engine at full throttle and 6,500 rpm is able to burn 63,365 BTU's of fuel per minute.

This represents an increase of potential horsepower of 19%. This doesn't look like much of a big deal. In fact it resembles a disaster when we realize that we have burned twice as much alcohol as we did gasoline and we only got a 19% increase in power we didn't need anyway.

In summarizing the process of converting an existing low-compression gasoline piston engine from straight gasoline to straight methanol the following results are obtained:

Power increased from 53,176 to 63,365 BTU's of energy per minute at 6500 rpm.

Fuel consumption increased from 2.89 pounds of gasoline to 6.67 pounds of methanol (per minute).

We got extra power, which was totally unneeded, and decreased our fuel mileage by 50%. That's not a very good endorsement for alcohol as a fuel. And it is this type of information the public currently has at its disposal to rate alcohol as a viable fuel or not.

This is what happened in our test; Since we started with an engine that was much larger than it needed to be when we ran it on a better fuel (which caused it to produce more power) it meant the engine's intake had to be restricted more than before in order that it produce the same horsepower as would normally needed to propel the car.

As discussed in Chapter 6, when a piston engine is run at reduced throttle, the efficiency drops off. And this is because a piston engine running in a throttled state will be operating at lower BMEP's since it is pulling against a higher vacuum than would a smaller engine with the throttle opened wider.

As a result of running methanol in this engine, we have set it up to operate below its normal compression ratio, which was already a paltry 8:1. This means it is drawing in air at a lower atmospheric pressure than before, thus this engine is now operating with a lower compression ratio than it was before. This is exactly the opposite direction that you want to go. We should be using alcohol fuels at higher compression ratios, not lower ones. And this is in fact exactly what alcohol fuels have in abundance over gasoline fuel; their ability to run with compression ratios up to 20:1.

We have to modify this comparison a little due to the specific gravity of gasoline, .713 lb. per pound and the specific gravity of alcohol is .791 per

pound. This means that you get more weight on a per gallon basis with alcohol than gasoline. Now when we compare the two fuels on a per gallon basis we get further increases for alcohol of .792/.713 or 11.1% times the figure of 63,565 BTU's to 70,408 BTU's, but this is only of small help in favor of alcohol.

The extra power we gained that we didn't need helps the engine at higher power settings somewhat, because after all the fuel is now half oxygenated. When we combine the available ingredients as best we can: lousy engines with alcohol fuel, in the end we end up consuming about 1 ½ times as much fuel as before when switching from gasoline to alcohol fuel.

Now, earlier I have stated that alcohol compared to gasoline would be 2 times as powerful as gasoline **and** that by using alcohol compared to gasoline we could make the engine displacement ½ the size of the gasoline engine. Yet when we put it into an existing gasoline piston engine the fuel consumption went dramatically up, not down. How could switching from gasoline to alcohol possibly make fuel consumption go down as I stated?

How to get 2 times the fuel mileage using methanol

First, advance the ignition timing by 10-20^0, if your car will allow it. A man successfully converted a 2007 Chevrolet Colbalt to 100% methanol and found that by advancing the timing, was able to take advantage of the higher combustion pressures that methanol tolerates. He was able to get 24.6 mpg using straight methanol. This compares to 28.6 mpg using standard gasoline, or 1.16 times that of gasoline. This is getting pretty close to equaling the performance of gasoline with just one modification.

But in order to get **mileage benefits** using methanol, we need to redesign the engine. Methanol is a superior fuel, therefor it needs a superior engine design. Of first concern, the compression ratio needs to be raised. In a typical gasoline piston engine the compression ratio is only 8.5:1.

However with methanol we can run a compression ratio as high as 20:1. Reading from an air fuel ratio compressibility chart reveals going from a compression ratio of 8 to a compression ratio of 16 results in a compression pressure that is more than two times the pressure at the moment before combustion with an 8.0:1 compression ratio.

This makes for a more efficient engine but obviously puts more strain on the pistons and engine block. That is why our flimsy existing gasoline engines must be redesigned. They would more resemble a diesel engine as they operate at these higher compression ratios. This is one of the main reasons why diesel engines get about twice the fuel mileage as their gasoline powered counterparts.

An additional note: Because methanol molecules are much smaller than gasoline molecules they burn faster and more completely. This increases power and decreases non-combusted fuel components.

The figures above for the energy contents of gasoline and alcohol are from experiments conducted in a laboratory where all of the combustible molecules were combusted. In actual practice this never happens with gasoline molecules because they are so much longer and do not fully break apart into single carbon molecules. As a result, more of them exit the combustion chamber as C2's and C3's, etc. meaning they are still combusting in the exhaust manifold and tailpipe, thus contributing to energy that was wasted. Methanol, being a single carbon molecule, combusts to the fullest extent.

Alcohol mixed with water

An important consideration using alcohol is whether to mix it with water. We have already seen that hydrous ethanol outperforms anhydrous ethanol and its use should be standard practice. The use of water in methanol is even simpler since the two are totally miscible. Water mixed

with alcohol permits higher compression ratios and increased combustion pressures because of the super-heat expansion of the water into vapor then super-heated steam. And it has been shown that methanol can be mixed with water up to a ratio of 50% in properly designed engines.

I have calculated that if we switch to alcohol, reduce the engine size by 50% and increase the compression ratio to 16:1 we will have as much power as before AND only use ½ as much fuel as before. So let's take a gasoline engine which is 1.6 times less efficient with gasoline and show how it can end up being 2.0 times more efficient.

If we were getting 10 mpg using methanol we would be getting 16 mpg using gasoline. We need to get to 32 mpg. This is how it is accomplished:

1. The compression ratio is increased to 20:1, and 20% water is added to the methanol to boost the engine's BMEP, and reduce lost exhaust heat. This makes the engine twice as efficient. Now we have gone from 10 mpg to 20 mpg. We only need 12 more mpg.

2. 20% of the Methanol is being saved by substituting water in its place. This adds another 4 miles per gallon, bringing us to 24 mpg.

3. The smaller engine requires less energy to run the engine itself, and is easier to keep cool. This is friction energy that accounts for a substantial amount of energy that is lost during rotation of the crankshaft, pistons, camshafts, rockers, etc. The amount is equal to roughly 30% of the total horsepower that a piston engine running on gasoline produces. We have just halved this amount with the smaller engine, saving another 15% and taking us to 27.6 mpg.

4. A smaller engine has lower inertia providing more torque per amount of fuel burned, thus it accelerates more efficiently. The Tucker proved this concept. Added to this are savings in engine and fuel weights, making for a lighter vehicle. The combination of a lighter vehicle, and, a quicker-

revving engine, saves another 20%, taking us to 33 mpg.

If an engine is designed solely to run on methanol and to maximize fuel economy, then with a lighter vehicle and a faster accelerating engine, combined with water injection to both increase power and offset the fuel price, we can indeed achieve a fuel efficiency factor of 2X that of gasoline.

This is why cars at Indianapolis used methanol until 2003 when they switched to ethanol and limited the displacement to 3.0 Liter. Extra fuel is rammed into the combustion space because it contains oxygen in the liquid formula. The compression ratios are turned up such to get enough power to go over 200 miles per hour. This requires a huge amount of horsepower.

Standard mathematical equations for traveling through a gas reveal that in order to increase speed by 2 times, the power required to do so would be 2^3 or 8 times as much. In other words, if it took 100 horsepower to go 100 miles per hour it would take 800 horsepower to go 200 miles per hour. So these Indy cars are really putting out some power. They are rated at about 700 horsepower but I think it must be much higher than that. All this power comes from a 3.0 Liter piston engine because it is running on oxidized alcohol fuel (or perhaps Astrolite or Triptane in disguise?).

Meantime many of us actually believe that Indy is all about technology and super metallurgy. Think again. Recently at Indy they switched from methanol to ethanol and increased the size of the engines from 3.0 Liter to 3.5 Liter (214 cubic inches). They did this as a result of losing a little power going from CH_3OH to C_2H_5OH. This is proof that methanol is a better motor fuel than ethanol. Fuel mileage went from 2.5 miles per gallon to 3.0 miles per gallon, indicating that ethanol does offer better fuel mileage.

Can you imagine still stopping for gas in 2014, while trying to win a speed race that only lasts a few hours? And at 3 miles per gallon the typical Indy car will require 167 gallons of fuel, meaning that with a 40 gallon tank

they have to stop 3 or 4 times just for fuel! Since when is stopping four times for fuel a way to win a shortest-amount-of-time race? Update: Formula 1 cars are now carrying 200 liters in one tank directly behind the driver so that they do not refuel during their race. Wow! Hard to believe!

Remember in top fuel drag racers they take the use of oxygenated fuels a step further with the use of nitro-methane, CH_3NO_2. Note: there are two parts of oxygen for one part carbon in this formula. This allows them to boost horsepower up by another 3 fold.

A world powered by alcohol is forever freed of carbon monoxide and smog. If a person, child for instance, mistakenly drinks some from an unmarked coke bottle they will end up nauseous but they aren't going to be seriously harmed. We can clean and cook with it in the home, and you could run your car inside the garage and survive because it would not produce any carbon monoxide. If you spill it into the grass, it will soon break down into harmless components. If you get it on your hands you will not have to worry about absorbing toxic compounds.

We could have drive-through fueling stations that offer shelter and comfort, and our hands would be sanitized not chemical-soaked from the process of pumping. These are darn friendly reasons to use alcohol in our engines and just one of the many why I rate it as my Number 1 choice for the current era.

No. 2: Ammonia, NH_3

I selected ammonia as my second choice for the main reason that it is currently available in large quantities via a pipeline and distribution system for farm-fertilizer anhydrous ammonia that currently exists within the United States. The combustion of ammonia is basically a hydrogen reaction.

Hydrogen, if used by itself, must be stored at relatively high pressures at ambient temperatures (2500-10,000 psi), or stored as liquid when chilled to -250°C (MacKenzie and Avery, 1996). Both of these storage systems are more costly than tanks needed to store ammonia.

When ammonia is used in a liquid state it results in 4.5 times more energy per liter than pure gaseous hydrogen at 6,000 psi.

Ammonia has safer handling properties when compared to hydrogen, which can produce flashback due to its high burning velocity and low minimum ignition energy. This is why I dislike the idiot engineers who are stupid enough to spend their time exploring the use of compressed hydrogen in vehicles, when they should simply be using hydrogen that is readily available from ammonia, NH_3. Once you strip the hydrogen all that remains is nitrogen; a harmless component of air.

Currently most of the world's ammonia produced is used as a source of nitrogen for farms. It is sprayed downward into the soil as a source of Nitrogen from 100 gallon cylindrical tanks containing pressurized anhydrous ammonia mounted on rubber tires and towed across the croplands using a tractor. In the United States, natural gas is allowed to be flared at the wellhead. So how do we get ammonia here? We buy it from Australia where they recover the wellhead gasses and make it for us. Does that make sense? No. They do it to confuse us about where ammonia comes from. They don't want us to know that it comes from the very natural gas we are allowing the oil industry here to flare off and totally waste.

Remember rule No. 1 of the fuel producing industry: "Keep the public dependent on a product that only we can make." As a result, they are terrified of any fuel that does not have carbon in its makeup, since that's all they have to offer.

If a trend to replace carbon, which is obtained at extreme environmental cost, with ammonia, whose elements are available as nitrogen from the air and hydrogen from water, was further supported, the oil industry would no longer be able to tout hydrocarbons as the premier formula for liquid fuel. In fact, nitrogen-based fuel would make gasoline look everything but premier.

Here's the big picture: without a presence or need for carbon in the fuel formulas, there is absolutely no reason or need to extract crude oil from the earth. And thus ammonia suppression is another part of the maintenance of an unjust petroleum monopoly worldwide.

Understanding hydrogen reactions

You will notice that the formula for ammonia contains only nitrogen and hydrogen. Thus ammonia can also be made from the air and water without using any additional feed stocks. This is an attractive process for cases where a free source of energy such as solar, tidal, wind, water, wave or a bio engine running on organic matter, waste oil, etc. is available. Using these systems to produce electricity allows nitrogen to be stripped from the air and hydrogen to be stripped from the water using electrolysis.

Ammonia can be extracted from animal waste or any organic reaction that will produce ammonia gas. Currently this type of ammonia production is largely ignored. The process is better explained in Chapter 9, but you see there are many cheap sources of ammonia.

One of the cleanest and most powerful forms of combustion energy is from hydrogen combining with oxygen to produce heat, expansion and H_2O. By attaching hydrogen atoms to nitrogen as in common ammonia, NH_3, an abundance of hydrogen is provided just as it is using hydrocarbon fluids like gasoline, C_6H_{11}, etc., only in this case we have merely substituted Carbon for Nitrogen as the bonding atom for hydrogen.

Ammonia is another pollution free, hydrogen-based renewable fuel that we should be using right now in place of gasoline. Anhydrous ammonia, meaning de-hydrated or free of water, is one of the most commonly synthesized chemical compounds on the planet. Due to its high hydrogen content anhydrous ammonia (NH_3) can be used in both gasoline and diesel type internal combustion engines with minor modifications that will be further discussed below.

The bad news concerning ammonia as a vehicle engine fuel is its ignition temperature is relatively high at 650 °C (1200 ^{0}F), and it must be combusted in concentrations of 16-25% by volume in air. This gives it a

slower rate of combustion than gasoline. If used as a fuel by itself in a compression-ignited engine requires compression ratios of 23:1 minimum to get it to combust properly.

When a applying it to a gasoline engine, spark-ignited, it will not combust properly because standard 8-10 compression ratios in gasoline are not high enough. For this reason, when using ammonia in a standard gasoline engine, it should be mixed with a combustion promoter such as Dimethyl Hydrazine.

In the U.S. Army studies, it was shown that ammonia could provide sustainable combustion when used as a primary fuel or in conjunction with a pilot fuel or spark source in either spark-ignition (SI) and compression-ignition (CI) combustion schemes. However, each method had its own advantages and drawbacks.

The best way to use ammonia, however, is in a hydrogen fuel cell. Ammonia could serve as a storage mechanism for hydrogen, in this case requiring only 150 psi instead of 6000 psi while providing hydrogen feedstock for standard hydrogen fuel cells.

It can also be mixed with gasoline at about 30% vs. 70% ammonia, which produces satisfactory results. Personally, I would not recommend using gasoline for the combustion promoter unless there was nothing else available as it contains the very carcinogens we would like to get away from. However, the blending of ammonia with gasoline does provide a reasonable intermediate solution to the over-use of petroleum, as its use as a blend greatly diminishes exhaust gas pollution and carbon monoxide.

Ammonia can handle compression ratios up to 23:1 but when it is used in a diesel engine at 100% the performance is below that of standard diesel fuel. This can be remedied by a combustion enhancer, the addition of #1 diesel or by fitting a spark-ignition system to the engine. The test engine performed best when it was fed ammonia as a vapor into the intake port and used #1 diesel fuel from the spray nozzles to help ignite the dual fuel mixture.

The only element ammonia needs to combust is oxygen, and that

can be taken out of the air just as your car's engine takes oxygen out of the air with each intake stroke. When it combusts with oxygen it produces NO_2 + H_2O. This H_2O leaves as super- heated steam and helps cool the combustion process.

The big worry concerning the use of ammonia as a fuel is the formation of NOx compounds from the combustion with nitrogen. However, it has been shown that the use of ammonia in a blend of gasoline yields the following equation if the intake air is properly balanced:

$$\mathbf{N_2 + O_2 + C_6H_{11} + NH_3 \Rightarrow N_2 + H_2O + CO_2}$$

The above equation is not balanced for the simple fact that I left off the molecular fractions that define the ratios of Nitrogen, Oxygen, etc. as it makes the equation very complicated. For more information go to "UMI Microform", publication 3343076. The point I wanted to make is that it is possible to have a balanced reaction that does not produce any NOx compounds nor carbon monoxide, CO.

Ammonia can and has been burned in gasoline engines as a gas vapor in much the same way that propane gas is burned in vehicles today. If you are familiar with propane and understand that it is a gas at standard pressure and a liquid at a slightly elevated pressure, then you have a good idea what it is like to handle ammonia.

The same fuel metering components fitted to an engine that has been equipped to burn propane will work with ammonia, but only marginally due to the slow flame propagation of ammonia. In order to get it to work properly the gas needs to be heated and subjected to iron catalysts which will begin to break the ammonia down into hydrogen and nitrogen before it is combusted. The introduction of some free hydrogen along with the ammonia itself dramatically aids in combustion. Unfortunately the technology is not up to speed.

No. 3 Hydrogen Peroxide, H_2O_2

Hydrogen peroxide is a viable alternate energy storage medium able

to compete with hydrogen gas, biogas, biodiesel and alcohol. H_2O_2 is an energy-dense fuel that burns as cleanly as H_2 but requires no oxidizer as it is provided in abundance within the formula itself. In actuality H_2O_2 does not burn but decomposes with the net result releasing tremendous energy. This amount of energy is close to the energy per mole of H_2.

H_2O_2 is like water and therefore does not need a pressure vessel to contain it. It is generally diluted by 96.5% water when used as a mouthwash within the home. When the concentration of H_2O_2 reaches 80% or above, where H_2O is the impurity, it is considered an explosive.

Extreme mechanical shock or heat can set H_2O_2 off. It is normally "burned" in jets and other devices by catalytic decomposition using silver screens and other catalysts. If ignited and contained it will produce 3500 psi steam. Prototype helicopters have been designed that flew with rotors containing H_2O_2 jets on their blade tips with no tail rotors needed (and no central engine). Very cheap and simple propulsion is possible with hydrogen peroxide, if only they would allow its use as an energy and not just a mouthwash.

Properties:

Stable storage
Relatively easy to produce
High energy output
Only emits water vapor and oxygen
Automobile retrofits would not require much in the way of modifications
Would not require overhaul of existing fuel storage and distribution infrastructure

Uses of H2O2 as a Fuel

Rocket Propellent In this case, the H_2O_2 is typically passed over a catalyst, usually a silver mesh. The catalyst causes the oxygen and hydrogen in H_2O_2 to separate into O_2 and H_2 which then recombine explosively to form H_2O (water).

This hydrogen-rocket-powered car can accelerate to 450 mph in less than 4 seconds. At 60 bars, the rocket engine will produce 4200 pounds of thrust for 5 seconds.

In the foreseeable future, shaft turbine engines which burn H_2O_2 and produce zero emissions will be lighter, faster and more economical than internal combustion engines.

Hydrogen Peroxide injected into fuel at the temperature of the steam and oxygen mix ignites spontaneously.

Modified Internal Combustion
Habo No. 1 - Chinese-built prototype runs on H_2O_2. Its only emisions are water vapor and oxygen. (*LiveScience*; Oct. 18, 2004)

Hydrogen and Oxygen in liquid form make powerful fuel. H_2O_2 hydrogen peroxide in a highly concentrated form referred to as HTP was used as a fuel for torpedoes in the mid-20th century (late WWII era). The primary reason for this was that through decomposition with another catalyst they could produce oxygen for combustion by liberating the additional oxygen molecule. With this additional fuel combusted to produce superheated steam as an end product you can power a turbine engine and allow it to operate submersed under water.

You can tell just by looking at the chemical formula for Hydrogen

Peroxide that it is a powerful and clean fuel. As you can see from these few examples, there are a few engineers daring to try using it. The main reason that it is not used more widespread is because the only ingredients are air and water. Gosh, where can we possibly find a feedstock?

Big Oily would sure have a hard time describing this as a non-renewable energy source. Their practices of avoiding the use of what is most readily available should be obvious by now.

No. 4, Hydrazine N_2H_4

Hydrazine is like ammonia, in that it is made from ingredients that are readily available, either from petroleum hydrocarbons, biomass, biogas, water and air. The fact is Hydrazine is a promising way to harness hydrogen, without having to pressurize it. The second thing I like is the fact that it contains no carbon atoms, therefore it will not produce any carbon dioxide when it is combusted. The third thing I like about it is the fact that both of the ingredients are available from air and water, therefore the supply is inexhaustible. The bad thing about Hydrazine is that it is toxic to touch, eat or breathe. Yikes!

> There are several ways to produce Hydrazine but the most notable method is by combining Hydrogen Peroxide with Ammonia. From these you get **Hydrazine, N_2H_4.** Hydrazine is synthesized from ammonia and hydrogen peroxide in the Pechiney-Ugine-Kuhlmann process according to the following formula:
> $2NH_3 + H_2O_2 \rightarrow H_2N\text{-}NH_2 + 2H_2O$

Now Hydrazine will need oxygen in order to combust so it could be used in a reciprocating engine that breathes atmospheric air. The only problem is that our typical car engines will blow apart within a short amount of time since they were never meant to handle such extreme gas expansion. Just adding a few ounces to your tank would probably cause your engine to race out of control and destroy the connecting rods. This is seriously powerful fuel!

But for some applications like aircraft propulsion, Hydrazine (or better) should be a mandatory fuel specification, especially for turbine engines which draw in plenty of air for combustion. Thirty thousand feet up mere drops of fuel could replace gallons, resulting in planes no longer having to lift upwards of 500,000 lb. of lost weight.

I no longer believe their figures, but, the industry claims that today's modern air jet consumes about seven times as much weight in fuel as it carries in cargo. Perhaps the closer truth is: we're just being charged for the fuel (why would they really have to burn it?). By no stretch of the imagination does the use of heavy kerosene for lifting airplanes make any sense when compared to Hydrazine, except to those who are legally insane.

And, for extreme power, a way to get unlimited oxygen to combust Hydrazine is by mixing in Hydrogen Peroxide. This was the 1944 fuel formulation German engineers used to power the ME 163 rocket plane known as the Comet.

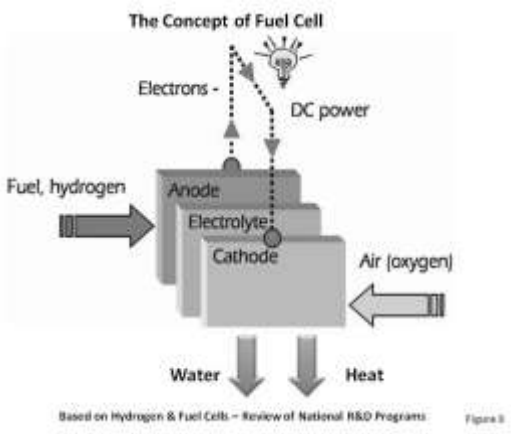
Hydrazine combusted with Hydrogen Peroxide could be diluted with standard H_2O and possibly another catalyst for use within a combustion engine. This would extract some of the energy from water to steam thus harnessing extra heat with the added benefit of super-heated steam being produced to enhance expansion and power.

How about using Hydrazine plus Hydrogen Peroxide in a fine emulsion with about 90% water? Perhaps a hydrazine reaction would create enough energy to split the water molecules into free hydrogen and oxygen? Perhaps this reaction should be helped along by placing a nickel or platinum catalyst specimen in the combustion area.

The Hydrogen Fuel Cell

From Wiki: *In a Hydrogen Fuel Cell hydrogen is fed into a cell alongside oxygen and discharges water and electricity. Sir William Grove developed the first fuel cell in England in 1839. "There are many types of fuel cells. For example, Carbon Dioxide gas can be combined with specially developed algae that break it down into oxygen and plant material. The plant material developed has an unusually high percentage of fatty acids which can thusly be turned into hydrocarbon fuels or alcohol.*

A fuel cell is an **electrochemical energy conversion device**. It converts the chemicals hydrogen and oxygen into water, and as a result produces electrical power efficiently.



The only by-products of an operating fuel cell are heat and water. In principle, a fuel cell operates like a battery, but chemicals constantly flow into the cell so it never goes dead. As long as there is a flow of chemicals into the cell, the electricity flows out of the cell. Most fuel cells in use today use hydrogen and oxygen as the chemicals.

> The drawing demonstrates how a fuel cell consists of two electrodes – a negative electrode (or anode) and a positive electrode (or cathode) – sandwiched around an electrolyte. Hydrogen is fed to the anode and oxygen is fed to the cathode. Activated by a catalyst, hydrogen atoms separate into protons and electrons, which take different paths to the cathode. Electrons go through an external circuit, creating a flow of electricity. Protons migrate through the electrolyte to the cathode, where they reunite with oxygen and the electrons to produce water and heat.

Countries around the world are investing in commercially available technologies which do the following:

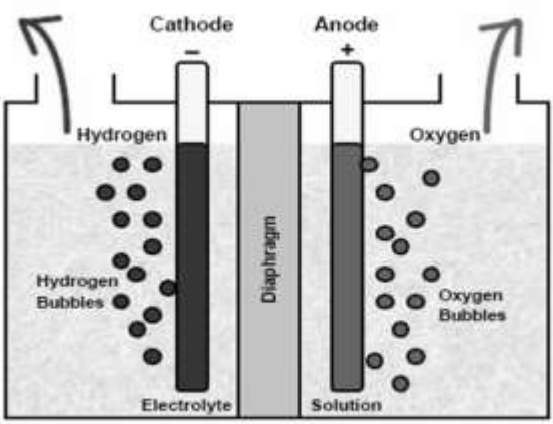
1. Separate and store carbon dioxide (CO_2) from fossil fuels.
2. Produce hydrogen from fossil and renewable energy sources.
3. Develop fuel cells for clean and efficient use of hydrogen.

Fuel cells are used in a wide range of products, ranging from very small fuel cells in portable devices, through mobile applications to heat and power generators in stationary applications in the domestic and industrial sector. Future energy systems will also include improved conventional energy converters running on hydrogen as well as other energy carriers."

Hydrogen Electrolysis:

"Electrolysis is the process of using any energy source capable of generating electricity to split water into hydrogen and oxygen." Wind, hydro or solar energy are sources of energy for the electrolysis. In the process water is split into hydrogen and oxygen.

Electrolysis is most often employed using electric current and metal electrodes. It requires substantial amounts of electricity, unless you know what you're doing that is. If you use the right pulse modulation and catalytic elements it can provide a source for unlimited amounts of hydrogen. Big Oily hates electrolysis.



Standard Electrolysis

Green Car Congress

Figure 2

Stanley Meyer discovered a way to conduct electrolysis of water that was so efficient his car could totally run off of water. Here are just a few of the catalysts that have been tried over the years but are not limited to: Silver, Nickel, Galium, Boron, Platinum and others as well as alloys of these and ones yet unknown."

CHAPTER 19

Revolutionary Engines; Engineers RIP

Even More Revolutionary Forms of Propulsion

You have seen solid examples of superior engine designs that have been held back for sake of company profits and monopolization. Now it is time to learn that many of these scientific and engineering breakthroughs harnessed forms of energy other than petroleum. This is a brief overview; much more is included in Chapter 18.

Now let's cut to the chase and discuss hydrogen technology. Water exists as two combustible gasses that are able to somehow combine in a 2 to1 ratio, such that they form a liquid. The fact that this liquid will not ignite

when exposed to fire is a bit hard to explain. Never-the-less, 99 % of the scientists and universities out there are more than willing to lecture us about energy from water, as if they understand everything about it. In truth they can't even explain why it doesn't burn as a liquid.

All good scientists think they know the truth. Actually they know the "best" truth; the one that fits the university's dogmas. Along with petroleum being a fossil fuel, they sponsor and dutifully blather such following statements:

"*Water can be broken into hydrogen and oxygen using electricity, but when you re-use the hydrogen and oxygen gas to generate electricity, you end up with less electricity than that which you used to split the water into gasses.*" **Wrong!**

For most industrial reactions involving electrolysis the above statement applies, and you can more than bet Big Oily wants it to! But this is not the final answer; it simply fails to recognize the many ways that water molecules can be "tricked" into breaking apart with very little input energy required. One of the best examples of a "low energy" method to break water into combustible hydrogen and water was the water powered car designed by the late Stanley Meyer. His car proved we are currently living in an era where mankind could and should be using water to power vehicles.

The method in which Stanley Meyer was able to split water molecules utilized electric wave pulse frequencies to break water into hydrogen and oxygen, and it consumed only a small amount of energy input. And there have been many others who have accomplished the same thing. Since this is a rapidly changing topic, with articles and YouTube videos being censured whenever they reveal a solid example, the best research is the latest research you can get doing a search for: "Suppression of Water Energy Technologies". Cars in the Phillipines are currently running on water. Check out www.Burn-Water.net

Easy Hydrogen Technology

Now that we are on the subject of Hydrogen; just how could we most easily use it to power a mini-turbine, Wankel or Stirling engine? Well if you use hydrogen gas, H_2, by itself in gaseous form you will not be able to carry much of it. That is because it is almost impossible to compress it down into a liquid. This makes hydrogen as a gas very cumbersome fuel to utilize as it requires several 6,000 psi pressure tanks to be installed in the vehicle. This takes up all the cargo space, rendering it a no-win design.

When Arnold Swarzeneggar was governor of California he traveled around in a conspicuously marked "Hydrogen-Powered" Hum Vee vehicle to make the public think he was really interested in hydrogen as a fuel. His "vehicle of the future" used hydrogen gas that had been stripped from petroleum feedstocks, meaning from the get-go the program would never threaten the oil industry, even if it did somehow succeed.

The vehicle's H_2 gas was stored in six long high pressure tanks which took up most of the cargo space within the truck. What kind of foolish engineers would ever put together such a monstrosity that has no cargo capacity thus could never be called efficient technology? Thus the Hum Vee hydrogen vehicle did not display hydrogen technology! It only proved that using hydrogen gas produced from petroleum makes no sense.

Engineers need to wake up. The easiest way to use Hydrogen is not from its gaseous state but from a liquid state. It has been known since 1905 via the Haber process that combining Hydrogen with Nitrogen produces Ammonia gas, a gas that is similar to propane gas when combusted in air.

Therefore, in reality, it is as easy to utilize Hydrogen power in all of our vehicles as it is to burn propane. To burn ammonia in your vehicle you use virtually the same pressure regulator and nozzle as a propane-adapted system. Seriously, do you think that none of the best engineers in California's State Energy program do not know that NH_3, Ammonia, can be used to fuel gasoline and diesel powered piston engines, provide the same power as propane and eliminate carbon dioxide and carbon monoxide at the same time?

You might be surprised to learn that several countries, including Germany, actually used ammonia to power vehicles during WWII. Therefore isn't it obvious that the Hum Vee "hydrogen" vehicle was built to simply ignore this obvious technology? Thus the project was never meant to explore a viable method of applying hydrogen technology to a vehicle. They could have just used the exact same material that is sprayed into the soil of every non-organic farm in the United States. It's called anhydrous ammonia. They could have called it "liquid hydrogen" instead. Imagine how that concept would have grabbed the public's attention!

Now here's the part that is maddening; the fact that when NH_3 is burned along with air it does not produce smog. When it is combusted with oxygen, O_2, it produces $N_2 + NO + H_2O$. Notice, there are no CO's.

Of course they have told us that these are hazardous exhaust gasses, even though neither of them equal the negative effects of the VOC's present in Carbon Dioxide and Carbon Monoxide, the constituent components of gasoline exhaust. They tout ammonia as being poisonous. Which fuel would you rather use; one that is used on our croplands for fertilizer (ammonia), or one that will kill the soil for ten years if you apply it (gasoline)?

The oil-produced gaseous-powered Hum Vee vehicle thus served to steer the public down a blind alley.

What does carbon do for a hydrocarbon fuel?

As long as we are on the subject of fuel for engines and discussing the fact that NH_3, Ammonia, combusts with air to produce the same power

as petroleum gas even though it contains absolutely no carbon atoms in its chemical makeup, now is the time to expose the myth regarding the infamous carbon atom. Vehicle fuels do not need carbon at all.

This application of ammonia proves beyond a shadow of doubt that the world never needed hydrocarbon fuel in the first place. Where does that leave petroleum? In the ground, permanently, that's where!

The necessity of hydrocarbon fuels for powering the world's cars, ships, trains and planes has been a cornerstone statement in the oil producer's pack of lies to get us to believe we need them. Now you know there is nothing spectacular gained from using a fuel that contains carbon or does not. The combustion engines currently used in our vehicles get their power from Hydrogen reacting with Oxygen, not from long chain "Octane" molecules breaking down into CO and CO_2.

Ammonia: the easiest Hydrogen Fuel Technology

Ammonia as fuel for vehicles has already been fully developed since World War II. Since it is easy to combine hydrogen with nitrogen; both of which can be taken right from the air via the Haber process, Ammonia represents a cheap way to convert our existing cars, trains and planes to hydrogen energy.

Right now we could be running our existing cars on a fuel that is about the same cost as water, and not only this, but as I have stated, **it would stop the production of Carbon Monoxide along with harmful VOC's from all of the combustion engines in the transportation sector.** Imagine what that would do for the air quality in our cities, airports and factories?

This is decades-old technology that has been denied us every year in preference for petroleum-burning smog-producing cars. Again, something is very wrong with the lack of concern for public health within the transportation systems we have built and paid for. If we were allowed to put into the public domain what we have in the way of current technology, we would have revolutionary forms of propulsion. And if we had been

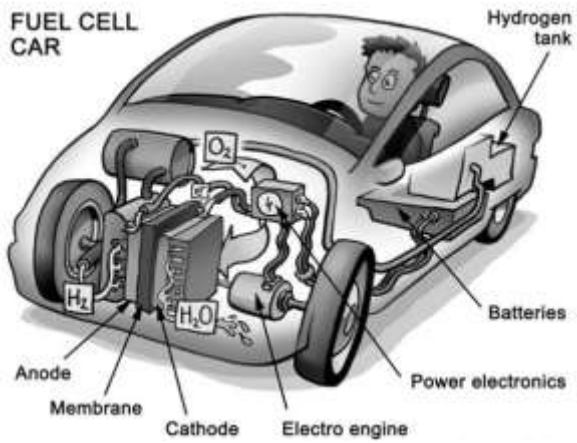
allowed to steadily progress up the ladder of rational progress in the field of hydrogen technology, we would have arrived at a design that uses hydrogen-electrolysis technology.

In the meantime the use of ammonia provides a bridge from gasoline technology to hydrogen technology by allowing us to utilize the engines we have already built. We would then be burning hydrogen in them instead of hydrocarbon (polluted gasoline).

Here's the next step in water technology. This one provides even higher levels of efficiency:

The Hydrogen Fuel Cell

Another discovery made during the 1800's was that electricity is produced when Hydrogen gas is reacted with Oxygen gas to produce water. This knowledge paved the way for us to create electric power without the need for a mechanical generator.



In this concept, instead of relying on heat and combustion, the fuel cell produces electricity and water from the simple re-combination of hydrogen and oxygen.

A hydrogen fuel cell is thusly set up just like a battery; hydrogen is the anode and oxygen is the cathode. In this case we are going to produce hydrogen and oxygen from a catalytic reaction with water, separate them, then recombine them in the fuel cell. This then produces a steady controlled electrical output which is fed to a battery which supplies electricity to the drive motor.

Since there is no mechanical engine to eat up power from friction and heat losses, it only takes about 35% of the same amount of hydrogen

using a fuel cell to produce the same amount of electricity using an internal combustion engine. This is why the hydrogen fuel cell is so much more efficient than any type of mechanical power we have today.

For this application hydrogen and oxygen must be continually added to the fuel cell and therefore we need a continuous on-board supply of it. In the car schematic drawing, note that hydrogen is being continuously made on board before it is supplied to the fuel cell. In this manner there is no requirement for accumulation and pressurization.

As earlier discussed, hydrogen can be obtained by electrolysis of water utilizing catalysts that initiate the breaking of water into two separate gasses. Boron and Silver have been used but there are even more referenced in the 1951 Secrecy Act. The combination of this technology with fuel cell technology makes it entirely possible to power a car on straight water. This is the true level of human expertize that we engineers and inventors have achieved and these should be on the road today!

The 1951 Secrecy Act

As you will soon learn there are even more advanced forms of energy that have been suppressed. Water technology is highly substantiated due to the many electrolysis reactions using classified elements as catalysts that have been patented. On the following pages you will note they have been confiscated under a congressional act that has been in force since 1951. Oh really? Yep.

The following is a 1971 list of classified technologies to be declassified. They never were. And even this list does not include the best and superior ones. Still, it provides a reasonable glimpse of what is under the secrecy act itself. Below are just a few of the excerpts from the list of classified technology. Note: items most relevant are bolded.

ARMED SERVICES PATENT ADVISORY BOARD , "ASPAB"
PATENT SECURITY CATEGORY REVIEW LIST.
PREPARED BY ASPAB SUB-COMMl1TEE
CHAIRMAN: H.L. MOURNING, AMC J.C. MORRIS, AF BERT CONVEY, NAVY
JANUARY 1971 [Originally classified Confidential, 1951 -Now Unclassified)

GROUP X -Propulsion Systems, Propellants, & Fuels Item 6A. Propellants (fuels and Oxidizers), producing any of the following characteristics:
a. Specific impulse greater than 350 pounds per second of thrust per pound of propellant at an operating pressure of a thousand pounds per square inch at sea level (NASA) (AF)
b. High temperature coefficient of burning rate (NASA) (AF)
c. Extremely high density (NASA) (AF)
d. Very low pressure exponents (NASA) (AF)
e. Temperature resistant (NASA) (AF)
Item 7. Additives for lubricants (AF)
Item 7 A. Additives for thickened hydrocarbon fuels and contaminants for hydrocarbon fuels (AF)

Item 8. Propulsion means for submarines, surface craft (including nuclear power plants and hydrofoils, and high energy per volume batteries) (NAVY)

Item 13. Gas turbines, special cycles and unusual design (AF)(AMC)
Item 16. Hydrogen peroxides, use of in propulsion systems (AMC) (NAVY) (AF)
Item 19. Borohydrides, use of in propulsion systems (AF) (Navy
Item 21. Improvements in gas turbines, components: compressors, turbines, combustion chambers, afterburners,
Item 24. Nuclear, ionic, free radical, plasma, MHD and related propulsion methods and devices (AF) (NAvy)
Item 27. Pollution control with relation to airborne gas turbine engines (AP)
Item 2S. Noise suppression related to gas turbine engines (AP)(AMC)
Item 29. Gas turbine engine components, bearings, seals and accessories (AMC)
Item 3 I. Fuel stabilizing additives (AMC) (AP)
Item 32. Fire safe fuel concepts (AMC) (AF) (NAVY)
Item 3. Fuel Cells: Electro-Chemical devices in which part of the energy derived from the chemical reaction maintained by the continuous supply of chemical reactants, is converted to electrical energy (AP) (NAVY) (AMC
Item 3a. Electro-Chemical devices: other unusual and efficient energy conversion devices such as thermoelectric, thermionic generators (including installation procedures), biochemical sensors, and biological electrical power generation

devices (AMC)-military applications only (NAvy) (AP) (ABC)

Item 4. Thermionic convertor: a device which will convert heat energy directly (statically) to electric energy by means of emission of electrons from a hot cathode and collection of these electrons on a cold anode within a vacuum or gas-filled tube. (AP) (NAVY) (NASA)(AMC)

Item 5. A device which will convert heat energy directly (statically) into electrical energy by means of two dissimilar metals or semi-conductors formed into closed circuit and maintained at different temperatures (AP)(AMC)S17S(NA VY)

Item 6. Biochemical fuel cells and biochemical electric generators (NAVY) (AF)

Item 7. MHD generators (NAVY) (NASA) (AP).(AMC)

Item 8. Solar photovoltaic generators (AMC)-if > 20% efficient (NASA) (AP)

Item 9. Energy conversion systems with conversion efficiencies in excess of 70-S0% (AP) (NA

Item 10. Novel energy sources and storage devices for fuses (AMC) (AP) (NAVY)
Item 11. Pulsed energy source for high powered lasers (AMC) (AP) (NAVY)

Items 3 through 9 are applicable to water technology. According to this list, the reasons we do not utilize this technology or hydrogen fuel cell technology are made perfectly clear; it is against Federal Law. Now what do all the scientists who claim water can't be efficiently split, say about this?

As mentioned, this is just a partial listing from the original 53 pages document and so is far from being a complete list of all the energy means they have suppressed since 1951. This list only contains items that were recommended for release to the public. I hope this helps answer the question as to whether or not superior forms of energy exist or not. I hope you now can clearly see that by having access to specific technologies and/or alloys we could produce hydrogen from water for free.

This begs the question: Is it possible that mankind, in his hurried quest for energy and power, has constructed huge oil platforms on top of

oceans of energy missed by shear ignorance? Yes it is possible that we are so ignorant, but that doesn't mean we are stupid. We are simply guilty of placing too much trust Big Oily and Big News. That doesn't make the people bad; trust is normally a very good attribute of any people.

The splitting of water to form Hydrogen and Oxygen, then combusting them together to produce power is just one of many revolutionary and alternate sources of energy that have been found to exist. If American ingenuity and knowledge had been allowed to develop unimpeded by corrupt energy monopolizers, we would be utilizing types of energy that are formerly unknown.

You have seen several examples of better transportation devices that have been built and tested to serve as prototypes. They featured unique forms of propulsion energy so efficient and powerful they would revolutionize the world's transportation vehicles into ones that would require only a fraction of the energy consumed today. One thing in common: all of them demonstrate a form of energy that is far superior to petroleum energy.

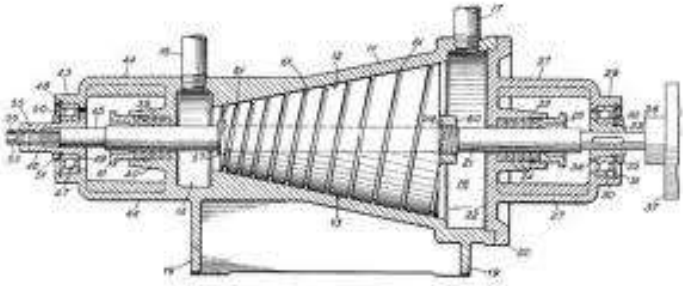
Three Unique Engines

In this chapter there are three unique "engines" discussed that were both revolutionary in their day and actually constructed into prototypes that were operated in vehicles and observed by other people. The first is the Clem Engine with information taken from **keeleynet.com**

The Clem Engine

> "Back in the mid-1970s', gifted inventor Richard Clem was working for the city of Dallas operating heavy equipment when he noticed that a heated asphalt sprayer for paving streets would continue running for many

minutes after the gas engine was turned off. Exploring the design as a possible engine prototype led to the design of a closed system engine. From this design he built an engine that was purported to generate 350 HP. The engine weighed about 200 pounds and ran on cooking oil at temperatures of 300 F. It put out more power than it consumed from the vegetable oil it consumed.



Truncated Conical Drag Pump

Richard installed the engine in a modified automobile chassis and drove the car up and down Central Expressway in Dallas, around the area and even took a trip to El Paso and back. This sensational discovery was in the news at the time and even on local Dallas television.

The engine consisted of a cone mounted on a horizontal axis (we later were told it was vertical). The shaft which supported the cone was hollow and the cone had spiraling channels cut into it. These spiraling pathways wound around the cone terminating at the cone base in the form of nozzles (rim jets). Construction of the engine was from off the shelf components except for the hollow shaft and the custom cone with the enclosed spiral channels.

When fluid was pumped into the hollow shaft at pressures ranging from 300-500 PSI (pounds per square inch), it moved into the closed spiraling channels of the cone and exited from the nozzles. This action added to the spin of the cone. As the velocity of the fluid increased, so did the rotational speed of the cone.

As the speed continued to increase, the fluid heated up, requiring a heat exchange and filtering process. At a certain velocity, the rotating cone became independent of the drive system and began to operate of itself. The engine ran at speeds of 1800 to 2300 RPM and was described as literally capturing a 'tornado in a box'.

Shortly thereafter Richard Clem died from a heart attack and his papers and models were removed. The son of the inventor is said to have taken the only working model of the machine to a farm near Dallas. There it was buried under 10 feet of concrete and has supposedly been running at that depth for several years.

The engine had been tested by Bendix Corporation. The test involved attaching the engine to a dynamometer to measure the amount of horsepower generated by the engine in its self-running mode. It generated a consistent 325 HP for 9 consecutive days which astounded the engineers at Bendix. They concluded the only source of energy which could generate this much power in a CLOSED SYSTEM over an extended period must be of an atomic nature.

As the years have passed, we have accumulated slightly more information, such as the fact that he first tried engine oil but found it would break down too soon due to the high heat produced by the engine, so Clem used Mazola cooking oil which would operate over many months at the requisite +300 degrees F..

From the Social Security Death Index;

Richard Clem
Born Oct. 30th, 1928
Died May 1978
Last known address Lewisville, Denton, Texas

Today there is an attempt by a designer named Jim Ray and his company (Micro-Combustion, Inc.) with what he knew of the Clem engine

and how he had taken it much further, building several working models, which were tested and validated by NASA and by the Oak Ridge National Laboratory.

Jim is President of Micro-Combustion, Inc. He has gotten all of the documents posted and is now in the processing of tweaking it for a bit of additional information and cosmetic improvements. If you want to learn more about this rebirth of the Clem motor, please visit Micro-Combustion.com and read the various documents.

The Rory Johnson Cold Fusion Motor

"Rory Johnson's Magnetron Motor, as he named it, was a revolutionary new source of power derived from the chemical reaction / Fusion of Deuterium and Gallium.

Johnson in the early '50s worked for the Department of Defense. He said he spent most of that time flying to different Defense installations around the country, but would NOT say what his work entailed. He later worked in research and development at several companies, including Motorola, which brought him to Elgin, Illinois.

The Magnatron Motor discovery occurred by accident about 40 years ago, Johnson said. He was developing a new type of electronic circuit using

Deuterium Oxide and Gallium when he noticed the two materials were producing energy on their own. He said he could not figure out what was triggering the energy production for quite a while. He finally discovered it was being caused by the overhead lights. This "Controlled Reaction" had resulted in the fusion of two atoms forming a new atom, he said. In the process electricity was released. This is what powered the engine.

In his Magnatron motor the two elements were fused together by using a diffraction prism ("Not a laser"), Johnson said. The Magnatron was sealed, however, so 'light' is provided from photon energy produced from coils tied directly to the motor, Johnson said. "It's more or less a pulse-generated system", he added.

Johnson would not say how the energy is converted to electricity to power the motor. He said that was his secret discovery and he feared that if he lets the knowledge out it could be used for a weapon. "The Defense Department is working on producing a missile that generates and emits its own electrical power. I don't want to produce another weapon", he said. End of article. Here's another article:

Rory Johnson Gallium-Deuterium Fusion Magnetic Motor

Gerald Orlowski Posted on Saturday, July 01, 2006

"I believe Rory Johnson was one of the greatest visionaries of this century, and his operating Magnatron Fuel Cell motor was showing us the principle of attract-attract in motion - the nature of all physical substance. This subject is covered in greater depth later, but for now let us review my involvement with Rory Johnson and his 525 HP from Laser (Defraction Prism) Activated Motor that had a range of 100,000 miles and operated on 2 lbs of deuterium and gallium.

While on a business trip in Arizona I saw this motor running in the showroom at the Magnetron Co. Located in Elgin. IL. After I saw the Magnatron motor running, my life changed. I was no longer a happy camper working by myself in a wonderful fully equipped research machine

shop for the Greyhound/Armour Corp. During my 15 years of electric motor repair, among the hundreds of motors I repaired, I rewound a 500 HP electric motor. That motor had wires exiting it that were the size of a garden hose. The Johnson motor being shown had NO wires. Surely this motor was unreal, a con-job to get money for dealerships. Yet there was Rory Johnson standing next to his sealed self-contained Electric motor.

Upon returning to the Greyhound Towers and telling them what I had seen, they instructed me to call Mr. Johnson. Greyhound wanted Johnson to put forth a plan to install a motor in one of their buses for testing purposes. I called Johnson. He was delighted that a Greyhound employee had seen the motor running and replied that the testing idea was acceptable. He would set a time frame for just when a bus should be delivered to him.

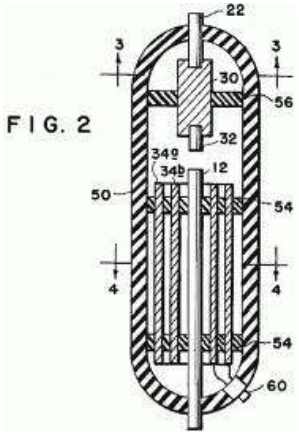
Two years went by, with no business proposal from Johnson. Then, his former business partner, Mike Marzicola, called to say Johnson had passed away. He wanted me to work with him to get one of the motors running. I flew to Orange Co., CA, saw the motor, took pictures, and put forth a plan to Greyhound. Subject to a contract with Marzicola, one of the old worn motors would be brought to the research shop. I would then very carefully reconnect the generator wires that Johnson had cut off prior to moving from Elgin, IL to CA.

Discussions with Marzicola brought out that the US government (given the authority by the Congress of `52) had issued a GRAB order to take Johnson's motors. Because of this grab order Johnson had cut the generator wires then put his `total shop', with motors and all, on several U-Haul trucks and left Illinois in the middle of the night and went to Calif. to re-establish his business. Before he could get a motor running, he passed away.

Surely, greyhound would agree to let me re-start one of Johnson's motors, but the wonderful proposal put forth to greyhound was rejected by mail. Very agitated, I went to the top office at Greyhound demanding an explanation but I was met at the door with the comment, "We know why you are here." Knowing the potential savings to the bus company, surely they could have only one reason for rejecting the proposal. They must have believed I was not qualified to start up the motor.

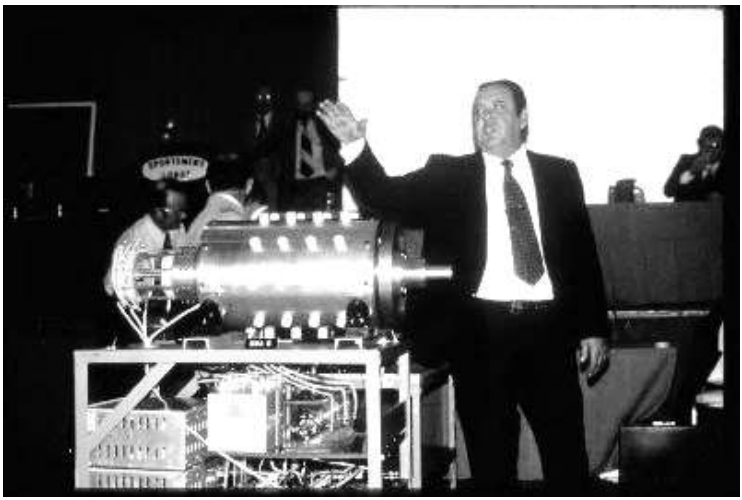
The top legal advisor stated he was present when the Greyhound board met and discussed my written proposal. He stated the following, "At NO time was the thought put forth that you would not succeed. In fact, we discussed all of the hardware designed and constructed by you, and started the conversation from what happens when Greyhound has a running motor". We contacted a State Rep. and he felt this motor should not be allowed to be used in 4,000 + buses, and that the loss in tax dollars for fuel alone would be a very huge sum. He then asked me to leave, stating he was sorry that he had to tell me the reason the plan was rejected.

The Edwin Gray Pulse Engine



This book couldn't be complete without mention of Edwin Gray and his brilliant invention of the magnetron pulse engine. What it got him was similar to what it got for cancer-curing discoverer Royal Raymond Rife back in the 1930's. When Rife took his Atomic Microscope to the AMA, thinking they would be happy to applaud his discovery and thus share it with the medical world, they destroyed him instead.

During the developmental period of this revolutionary magnet motor from 1961 to 1971, Edwin Gray was to find himself up against the same bullies, but in this case they were trained to squash ideas thus to maintain our dependence on oil, whereas in Rife's case, it was to maintain



our dependence on pharmaceutical drugs. Unfortunately for Gray, the bullies played their game to an extreme beyond any he imagined. I'll leave this part of the story for now and turn you over to a reprinted summary via Keely net.

> "Perhaps the reason Edwin Gray was able to create such an unconventional engine was because of his unconventional education. One of 14 children, he began tinkering with magnets and electricity as a boy. He left home when he was 15 and served a year in the U.S. Army before it was discovered he was under age and he was given an honorable discharge. During that year, he attended an Army school for advanced engineering. After the attack on Pearl Harbor, he reenlisted, this time entering the Navy. After serving three years of combat duty in the Pacific zone, he returned to civilian life and found work in the field of mechanics. Resuming his experiments with electro-magnetic power, he seriously examined the theory of *energy used is energy spent.*
>
> After years of research and experimentation, Gray conducted his first test of the EMA motor in 1961. The engine ran briefly and then broke down. Discouraged but not defeated, he constructed a second electro-magnetic motor, which ran for an hour and a half before failing.

A third prototype ran for 32 days attached to various automotive transmissions and test equipment. It was then dismantled for analysis, and detailed reports were prepared. After rejection by large corporations and money promoters, Gray formed a limited partnership in 1971 and constructed the fourth EMA prototype.

With assistance from nearly 200 private citizens, EvGray Enterprises spent $1.1-million in the attempt to recycle present lost energy and redirect magnetic forces with the EMA motor. It's called the EMA (electro-magnetic association) motor and, in technical jargon, is described as;

"digital-pulsed," "time-phased" and "servo-controlled."

Developed by EvGray Enterprises, the unique engine ran on the principle of electro-magnetic transformation. In terms more meaningful to the layman, the EMA motor required no fuel, recycled its own energy, created no waste and was extremely quiet. Its size, weight and horsepower ratios were comparable to motors and turbines then in use.

The EMA's only external power source consisted of four 6-volt batteries which never needed recharging. EvGray claimed the motor duplicated the power and torque characteristics of internal combustion engines of similar size and weight. The Federal and State Air Resources Board granted the inventor a permit to further prove this claim by installing the EMA in test vehicles.

Edwin Gray, Sr., president of EvGray, predicted that production costs of the EMA would be comparable to present motors and maintenance costs would be far less. "The EMA motor promises to make the world a cleaner place in which to live," said Gray, who spent 12 years developing the engine. "Perfection of the EMA motor as a generating source could mean the availability of inexpensive power to underdeveloped nations."

Lightening and Energy Strikes

Gray describes the operation of his EMA motor as "similar to re-creating lightning." He says the engineering and scientific world has known this re-creation is possible but hasn't known how to do it. "When lightning hits the

ground, causing a 10-million- volt buildup, where does energy come from to make it from a static charge to a lethal charge? Nobody really knows."

Richard B. Hackenberger, Sr., vice-president in engineering for EvGray, explained how the EMA motor system operated this way. "Power from the high-voltage section is put through a system of electrical circuitry to produce a series of high-voltage `energy spikes.' The spikes are transferred to a small control unit, which in turn operates the major motor unit."

The control unit, acting in a manner similar to that of a distributor in an internal combustion engine, regulated the spikes, determined their polarity (whether north or south) and directed their power to selected electro-magnets in the main unit.

While this occurred the recycle/regeneration system recharged the batteries with 60 to 120-amp pulses. The electro-magnets were located on both the rotor and stator of the large motor. Attraction and repulsion between the two sets of magnets caused the motor to operate and generate horsepower.

In short, the principle of the engine was to create electricity and recycle energy by the fact that every time magnets are energized off the peak of transients, a charge goes back into the battery. It's not a constant charge, but a pulse charge of 60 amps or better; thus, the battery must be of high quality. The batteries for the EMA motor were furnished by McCulloch Electronic Corporation of Los Angeles.

Long Range and Powerful

Electric-powered vehicles have a poor energy-storage factor and their heavy, large batteries have thus far made them impractical for use in vehicles requiring a long-range capacity. The maximum range of these vehicles when driven at 40 miles per hour has been approximately 150 miles. Range is affected by the number of stops and starts, grades traversed, and acceleration demands. The EMA motor needs only to run at 500 rpm for the normal recharging system to work.

"The idea of a self-sustaining electric motor," said Gray, "at first appears to go against much of the theory of electricity and conservation of energy. The EMA motor does not, however, violate the basic laws of physics, but rather

utilizes them in a unique integration in a system in order to maximize upon the characteristics and interrelationships between electrical, magnetic, and physical components. The EMA prototype motor has had considerable operating test time and has been adapted to standard and automatic automobile transmissions."

Dynamometer tests recorded the rpm's of EvGray's motor at 2550 constant, the torque at 66 pounds constant yielding brake horsepower of 32.5. After a test run of 21 minutes, the battery voltage reading was 25.7Volts.

The electro-magnetic motor attracted attention from important government agencies, including the Environmental Protection Agency, the Air Resources Board, and the Department of Transportation. Governor Ronald Reagan of California presented Gray and his wife, Evelyn, with a certificate of merit. Others indicating interest in the project were congressmen Barry Goldwater, Jr., Edward R. Roybal, Del Clawson and James C. Corman, U.S. Senator Alan Cranston, and state senators Alfred E. Alquist and Nicholas C. Petris.

According to EvGray, "Only those in the scientific world who understand the theories of physics are able to comprehend how our motor works. There's only a handful of such persons. "The programmer directs which magnets are to be energized for what length of time and in what polarity. There are several attractions and repulsions taking place at the same time."

After 12 years of research and development Edwin Gray believed he had found the answer after spending a meager $1.1-million in research. He was found dead at the age of 48, was healthy at the time and did not have any known illnesses. His girlfriend testified that there was a bloodstain underneath where his body had lain after he supposedly had suffered a heart attack.

CHAPTER 20

The Atomic Car and Our Atomic Future

THIS CHAPTER CONTAINS information on the Atomic Car that was researched by Ford during the 1950's. Since that time the concept of any and all nuclear powered devices has become synonymous with harmful radiation that persists for hundreds of thousands of years. Unfortunately this attitude does not fit with current quantum leap discoveries in energy production through the use different types of atomic elements combining within their own nuclei.

Combustion and oxidation is the combination of atoms exchanging electrons. This is mild compared to the amounts of energy released during the breaking of an atom's nucleus. Mankind's current skill and knowledge have brought us to the harnessing of nuclear reactions.

The energy potential locked within the nucleus of metals like nickel and thorium exceeds our current chemical reactions, like the oxidation of hydrogen with oxygen, beyond the potential of what most people can begin to fathom. On top of this is the fact that nickel and thorium are so much more abundant than uranium.

All that comes to most people's minds now, however, is radiation and the reason this comes to mind is because the Nuclear Industry as a whole took the worst possible path when they entered the nuclear reaction era. They chose Uranium as the fuel source. If they had just chosen a different element, like Thorium, which is right next to Uranium on the atomic chart, we would not be facing a nuclear waste nightmare like the one we are facing today.

Thorium is an element that can be used in a controlled atomic reaction just like Uranium to power electric steam driven turbines just like Uranium does but is a much better choice for electric generation because it does not produce harmful radioactive waste.

Shortly after the Fukushima disaster began to unfold the Chinese announced they were building all of their future reactors with Thorium as the fuel source. So this is not some dream. There is an entire country embarking on the use of Thorium. So with this in mind, now let's take an honest look at the Ford Atomic Car.

Ford's Atomic Car

As opposed to the chemical reactions we have been discussing so far with the combusting of hydrogen fuels and such, the next quantum jump in energy liberation is the initiation and control of small nuclear reactions that are safe and can be adapted to small sizes for vehicles. Example: the electrified bombardment of a metal with Hydrogen in concert with a catalyst such as Boron can be utilized to get the host material, Nickel, to undergo a nuclear reaction in which it loses a proton in the process and turns into copper. In the process an amount of energy is released in the form of heat that is thousands of times more powerful than anything we have looked at so far.

Such a powerful reaction requires that we remove a proton or neutron and thus create another element. But that doesn't mean that we have to create harmful isotopes in the process as they are produced when

Uranium is used. So at first the idea of an atomic car may look like the craziest idea for a car that you have ever heard of, then again perhaps this is the direction we should have proceeded in since the discovery of the atom.

That is why I like the concept these engineers were investigating. They dared to dream that perhaps someday in the future, after all of our inventing and toiling with ways to get ourselves from point A to point B, that we would finally be able to go farther than 300 miles without stopping for fuel. OK.

Personally, knowing what I know about gasoline and fuel technology, I find the experiencing of routinely having to stop and pay exorbitant fees to the oil industry appalling. Let's consider the Ford concept car:

> Posted by Alan Bellows on 27 August 2006
> The Ford Nucleon concept car
>
> "During the 1950s, much of the world was quivering with anticipation over the exciting prospects of nuclear power. Atomic energy promised to churn out clean, safe electricity that would be "too cheap to meter." It seemed that there was no energy problem too large or too small for the mighty atom to tackle during the glorious and modern Atomic Age.
>
> It was during this honeymoon with nuclear energy– in 1957– that the Ford Motor Company unveiled the most ambitious project in their history: a concept vehicle which had a sleek futuristic look, emitted no harmful vapors, and offered incredible fuel mileage far beyond that of the most efficient cars ever built. This automobile-of-the-future was called the *Ford Nucleon*, named for its highly unique design feature… a pint-size atomic fission reactor in the trunk.
>
> Ford's engineers imagined a world in which full-service recharging stations would one day supplant petroleum fuel stations, where depleted reactors could be swapped out for fresh ones lickety-split. The car's reactor setup was essentially the same as a nuclear submarine's, but miniaturized for automobile use. It was designed to use uranium fission

to heat a steam generator, rapidly converting stored water into high-pressure steam which could then be used to drive a set of turbines.

One steam turbine would provide the torque to propel the car while another would drive an electrical generator. Steam would then be condensed back into water in a cooling loop, and sent back to the steam generator to be reused. Such a closed system would allow the reactor to produce power as long as fissile material remained.

At right: William Ford alongside a 3/8 scale Nucleon model and without the noisy internal combustion and exhaust of conventional cars, the Nucleon would be relatively quiet, emitting little more than a turbine whine.

Using this system, designers anticipated that a typical Nucleon would travel about 5,000 miles per charge. Because the powerplant was an interchangeable component, owners would have the freedom to select a reactor configuration based on their personal needs, ranging anywhere from a souped-up uranium guzzler to a low-torque, high-mileage version.

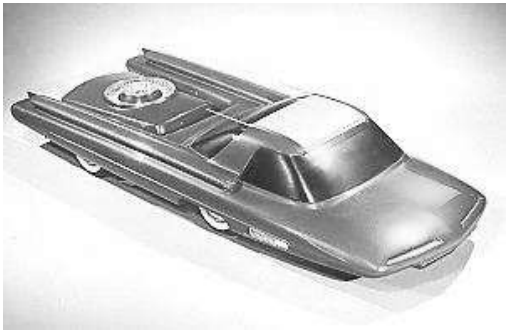
The vehicle's aerodynamic styling, one-piece windshield, and dual tail fins (which are absent in some photographs) are reminiscent of spacecraft from 1950s-era science fiction but some aspects of the Nucleon's unique design were more utilitarian. For instance its passenger area was situated quite close to the front of the chassis, extending beyond the front axle. This arrangement was meant to distance the passengers from the atomic plant in the rear and to provide maximum axle support to the heavy equipment and shielding.

Another design aspect was the addition of air intakes at the leading edge of the roof and at the base of the roof supports apparently to be used as part of the reactor's cooling system.

The Nucleon concept was often received with great enthusiasm. The Nucleon's silent, sleek and efficient design was poised to secure its place in the American lifestyle of the future. It seemed inevitable that the internal combustion engine would of course eventually fade into obscurity, becoming a quaint relic of a pre-atomic past.

Sources claim that the US government sponsored Ford's atomic car research program but the Nucleon's design hinged on the assumption that smaller nuclear reactors would soon be developed, as well as lighter shielding materials. When those innovations failed to appear the project was scrapped.

As the general public became increasingly aware of the dangers of atomic energy and the problem of nuclear waste, the thought of radioactive "atomobiles" zipping around town lost its appeal. Scientists and engineers soon revealed the dangers of uranium fueled reactors. Later, the fact that the NRC, through mismanagement and faulty regulations had let nuclear accidents occur all too often, took center stage. The promise of a clean nuclear energy was broken at that point.



The Nucleon remains an icon of the Atomic Age. In spite of the Nucleon's flaws, its designers deserve a nod for their slapdash ingenuity. Their reckless optimism demonstrates that one shouldn't consider a task impossible just because nobody has tried it yet– some ideas need to be debunked on their own merit.

Ford's nuclear automobile could have embodied much more than the naive optimism of the era. Thorium reactors had already been built and tested at this time, so uranium technology was forced upon us, not selected by us. Most people were ignorant of the dangers of the atomic contraption, then again they could have been built safely using different elements to

bombard and react together. A safe nuclear powered vehicle is actually within our reach.

We will now look at a new atomic-powered heater/electrical generator known as the E-Cat Converter. This revolutionary "cold fusion" device utilizes nickel in a temporary nucleic switch with copper which produces heat 100's of thousands of times beyond petroleum on a lb. for lb. basis. Since it uses nickel instead of uranium the reaction produces no radio-active byproducts.

Nuclear Reactions vs. Chemical Reactions

In a class by itself, the E-Cat Converter

This E-Cat converter device has been built and tested in Italy at a plant founded by an Italian inventor who has received a patent from the Italian government for his invention. There are several prototypes being built at the time this book is being written but they have yet to make it to market. Whether is sees the light in public remains to be seen.

The E-Cat Converter has nothing to do with uranium and produces no atomic radiation. Never-the-less, it is a true nuclear powered device. By converting nickel into copper the reaction taps the energy of an atom's nucleus, therefore producing a nuclear reaction. It produces an atomic reaction, not a chemical one like all of these other fuel and energy sources described. For this reason it puts out approximately one million times the amount of energy on a per pound basis than conventional chemical reactions like gasoline combustion.

By using certain catalysts of boron and nickel to enable the transformation of nickel into copper, there is a subsequent release of energy in the form of heat. How much heat? <u>One ounce of nickel will produce as much thermal heat as 300 tons of coal.</u> The technology is capable of producing over 4 kilowatts of thermal power from a reactor vessel only fifty cubic centimeters in volume (about the size of your fist).

Cold fusion research has been ongoing for two decades, and there have been thousands of successful experiments. However, Andrea Rossi's technology is the most promising cold fusion technology yet to emerge. His company, Leonardo Corporation, has licensed the technology to the Greek company Defkalion Green Technologies Inc., with sole purpose to sell, license, and manufacture industrialized commercially applicable products using the Andrea Rossi Energy Catalyzer with global exclusivity rights; except the Americas.

The E-cat converter makes an atomic reaction possible at temperatures in the range of temperatures man can control and with materials man can produce and construct. It would revolutionize energy mechanisms as we currently know them. It is totally clean and green. The energy can easily be harnessed by using conventional, readily available third-party equipment such as steam power plants to produce electricity.

One country that could benefit in particular is Greece which possesses 83% of Europe's nickel deposits. This should be key strategic consideration since at this time much of the world is experiencing a global financial crisis. Greece now has a golden opportunity to become energy self-sufficient as well as a technological leader in this new scientific field.

As of November 2017 attempts to get the units produced in Italy have been delayed. As an alternative, Rossi made the decision to attempt to produce them in the United States. This is believed to have been a mistake as they are at this moment still trying to obtain a patent in the United States. The governments of the world are stonewalling the invention. The current plan is for Rossi's group to sell heat, not units. What a mess!

Thorium and the Nuclear Industry

Much needs to be done to remedy the current nuclear crisis caused by a slew of nuclear operational mistakes. By getting a handle on its potential, you can get a proper handle on the world's energy situation today. To name a few: Fukushima, the New Mexico nuclear repository, the San

Onofre power plant, the Hanford waste dump, the Indian Point nuclear plant and a host of other locations located around the globe. They must be dealt with immediately.

The only way to begin dealing with the crisis is to make people aware of the crisis itself. If you want to be a valuable part of the world's energy picture for the future then you need to read up on Thorium. US physicists in the late 1940s explored thorium fuel for power. It has a higher neutron yield than uranium, a better fission rating, longer fuel cycles, and does not require the extra cost of isotope separation.

Thorium could be utilized in nuclear reactors. Thorium's advantages start from the moment it is mined and purified. All but a trace of naturally occurring thorium is Th232, and this is the isotope that is useful in nuclear reactors. That's a heck of a lot better than the 3-5% uranium ratio typically achieved from every ton of the mineral mined.

Then there's the safety side of thorium reactions. Unlike U235, thorium is not fissile. That means no matter how many thorium nuclei you pack together they will not on their own start splitting apart and exploding. If you want to make thorium nuclei split apart you simply start throwing neutrons at them. When you need the reaction to stop simply turn off the source of neutrons and the whole process shuts down. Simple as pie.

Here's how the Thorium reaction works: Thorium is bombarded with neutrons. When Th232 absorbs a neutron it becomes Th233. Th233 is unstable and decays into protactinium-233 and then into U233, the same uranium isotope we use in reactors now as fuel. This one will fissile on its own but thankfully it is relatively long lived. So at this point in the cycle the irradiated fuel can be unloaded from the reactor and the U233 separated from the remaining thorium. This recovered uranium is then fed into another reactor, all on its own, to generate energy.

The U233 does its thing, splitting apart and releasing high-energy neutrons. But there isn't a pile of U238 sitting by. With uranium reactors it's the U238 turned into U239 by absorbing some of those high-flying neutrons that produces all the highly radioactive waste products. With thorium, the U233 is isolated and the result is far fewer highly radioactive,

long-lived byproducts are left behind.

Thorium reactors produce only a fraction of the nuclear waste from uranium reactors, and this byproduct only stays radioactive for 500 years instead of 10,000 years for uranium. There is 1,000 to 10,000 times more thorium on the planet than uranium.

We should have started with Thorium in the first place.

The Thorium Leaders Today

Although researchers have studied thorium-based fuel cycles for 50 years, India leads the pack when it comes to commercialization. As a home to a quarter of the world's known thorium reserves, and, notably lacking in uranium resources, their country's long range planners envision India meeting 30% of its electricity demand through thorium-based reactors by 2050. Yes, I know that is a long way off, but read on.

In 2002, India's nuclear regulatory agency issued approval to start construction of a 500-megawatt electric prototype fast breeder reactor, which should be completed in 2014. Within the next decade, construction is planned for six more of these reactors, which "breed" U233 and plutonium from thorium and uranium.

Design work is also largely complete for India's first Advanced Heavy Water Reactor (AHWR), which will involve a reactor fueled primarily by thorium that has gone through a series of tests in full-scale replica. The biggest holdup at present is finding a suitable location for the plant, which will generate 300 MW of electricity. India officials say they are aiming to have the plant operational by 2020. That's what's going on in India. Yes, lowly, overpopulated India.

China is the other nation with a firm commitment to develop thorium power. In early 2011, China's Academy of Sciences launched a major research and development program on Liquid Fluoride Thorium Reactor (LFTR) technology, which utilizes U233 that has been bred in a liquid thorium salt blanket. This molten salt blanket becomes less dense as temperatures rise, slowing the reaction down in a with a built-in safety catch.

It is thus this kind of thorium reactor that is getting the most attention in the thorium world.

There are currently seven types of reactors that can use thorium as a nuclear fuel. Five of these have been constructed and tested during the years since the development of atomic power. It is important to note, that while the designs were mostly abandoned, it had nothing to do with technical reasons, but was because research and funding was cut off. Today we know this funding cut-off as the kill shot in an energy program that would not have produced plutonium material for bombs.

Once the world develops thorium power we will know that we never should have used uranium power in the first place. Soon after this many people who were part of the buildup will be questioned and even later they will be held accountable for knowingly supporting such a hideous practice as the use of uranium for fuel.

Proven designs for thorium-based reactors exist but need college and industry support. One of the biggest challenges in developing a thorium reactor is finding a way to fabricate the fuel economically. Making thorium dioxide is expensive, in part because its melting point is the highest of all oxides, at 3,300° C.

The options for generating a barrage of neutrons needed to kick-start the reaction regularly come down to uranium or plutonium. This brings part of the problem full circle.

China's research program is in a race with similar though smaller programs in Japan, Russia, France, and the US. And while India is certainly working on thorium, not all of its eggs are in that basket. India has 20 uranium-based nuclear reactors producing 4,385 MW of electricity already in operation and has another six under construction, 17 planned, and 40 proposed.

The country gets props for its interest in thorium as a homegrown energy solution, but the majority of its nuclear money is still going toward traditional uranium. China is in the same situation. While it promotes its efforts in the LFTR race, its big bucks are behind uranium reactors. China

has only 15 reactors in operation but has 26 under construction, 51 planned and 120 proposed.

The Bottom Line

Thorium is three times more abundant in nature than uranium, but the heavy players in the world's energy picture are all heavily invested in uranium. We can expect this current investment group to dog and hinder the development of thorium reactors for many years to come.

All but a trace of the world's thorium exists as the useful isotope, which means it does not require enrichment. Thorium-based reactors are safer because the reaction can easily be stopped. In addition the operation does not have to take place under extreme pressures. Compared to uranium reactors, thorium reactors produce far less waste and the waste that is generated is much less radioactive and much shorter-lived. So the world should already be running on thorium.

The use of thorium would be the ideal solution for allowing countries like Iran or North Korea to have nuclear power without worrying whether their nuclear programs are a cover for developing weapons. Isn't this the main worry in the world right now? So why don't we begin disbanding uranium reactors? Haven't these reactors only resulted in the production of plutonium in virtually every country?

Most thorium research and development is conducted by national research groups. There is one publicly traded company working to develop thorium-based fuels, called Lightbridge Corp. (Nasdaq: LTBR). Lightbridge has the advantage of being a first mover in the area, but on the flip side there is a scarcity of competitors. This is not a good sign that LTBR is working in the public domain for us citizens.

The earth's crust holds 80 years of uranium at expected usage rates, whereas thorium is as common as lead. Almost all the mineral is usable as fuel, compared to 0.7pc of uranium. There is enough to power civilization for thousands of years.

America has buried massive tons of thorium as a by-product of rare

earth metals mining. Norway has so much thorium that Oslo is planning a post-oil era where thorium will drive the country's next great phase of wealth. Even Britain has seams in Wales and in the granite cliffs of Cornwall.

The International Atomic Energy Agency states that the world currently has 442 nuclear reactors, generating 372 gigawatts of power that provide 14% of the electricity generated on the planet. The IAEA states that the world must increase its nuclear energy capacity by 100% over the next 20 years in order to meet the electrical needs of emerging nations like China and India.

We can see today from Fukushima that these plants need to be shut down, not increased! We can see that all of the uranium fuel rods they have stacked up along coastlines and pristine lakes all over the world must now be collected up and bombarded down to lead. The last thing the world should do is EXPAND the use of uranium! The IAEA is crazy. Crazy people shelved thorium solely on the grounds that it does not produce plutonium for bombs, and now look where that decision got us?

CHAPTER 21

Suppression of Energy Technologies

There have been many inventions that would have dramatically increased the range and safety of the automobiles we currently drive. Many of these are simple Fuel-Increasing devices that are easy to fabricate and install, but they have simply been kept from the public. The complete list of them is in the hundreds of thousands.

Even before we designed and tested petroleum piston engines we explored better types of fuels. We have seen how oxygenation would greatly enhance the efficiency of engines. We have learned that one of the ways to put this oxygen into gasoline is to oxygenate it into alcohol.

We have learned how to emulsify gasoline with water and how the water-vapor-steam pressure developed helps to reduce fuel consumption and carbon monoxide.

Going up the knowledge ladder, the next phase is to use water as the oxidation provider, in which case we have to crack the water into oxygen and hydrogen during the combustion process such that the gasoline can be converted into methane as it is being combusted. In these cases nickel and platinum catalysts have shown themselves to be effective in processing the expansion of water into super-heated steam one step farther. This is what

we referred to earlier as the catalytic cracking of hydrocarbons into methane and methanol. This would be some wonderful technology for mankind if we could just have access to it.

Another device that we have developed but they won't let us have is the hydrogen fuel cell which converts hydrogen and oxygen into electricity and heat directly. A good source of fuel for the hydrogen fuel cell is either alcohol or ammonia. It is thus another example of a proven idea that should be a part of mainstream technology today.

Perhaps you still believe the idea is years away from bringing to the public. Consider that the hydrogen fuel cell was actually invented in 1867. The world knew in 1867 that when Hydrogen and Oxygen are combined into water in the presence of catalyst electricity is produced. The invention featured a diagram of a box with an inlet for Hydrogen and one for Oxygen. Electricity comes out of the anode (hydrogen) and heat is produced out of the cathode (oxygen).

A hydrogen fuel cell was once used in the public arena. In 1969 NASA sent fuel-cell batteries to the moon to supply the electrical demands of the Apollo orbiter. They were brash in telling us they had developed a revolutionary electric storage cell, but then afterwards nothing came of it. I ask you, where is that invention today after nearly fifty years have gone by?

Shortly after the missions to the moon came to a supposed close, the hydrogen fuel cell patent rights somehow ended up in the hands of Exxon Mobil. For some unexplained reason, they can't even seem to get it to work the same way NASA did. I wonder why they went so far out of their way to buy up the patents when they didn't even know how to use it?

Hydrogen and hydrogen energy is the people's choice for a bright future. Why we never got the hydrogen fuel cell is just a continuation of why we never got to use hydrogen gas as a lifting mechanism ever since the fire-bombing of the Hindenburg. It's all about covering up hydrogen by making it look risky, difficult to use, etc. The oil industry knows that hydrogen can be made from water. That's why it scares them to the core.

By now you know that the easiest way to run your car on hydrogen is by using ammonia from a tank just like propane. If you decide to operate

a hydrogen fuel cell on a car equipped with a piston engine you are going to need a continuous supply of hydrogen and oxygen to supply that engine, are you not? So think about this, if you are going to have an onboard supply of hydrogen and oxygen, rather than feed it into an engine, it would be much better to feed it into a fuel cell and run wires to electric motors at the wheels. This is what we need to be working on in our garages. In this way, we can dump the large engines, which no matter what we do, are going to require a lot of hydrogen to operate.

The easiest way to make a dent in your petroleum requirements is to buy a cheap diesel car and begin making bio diesel from used vegetable oil. You can even equip it to run on heated waste vegetable oil. The point is this gets you off the petroleum grid completely, and that is very difficult to do with anything but a diesel. And in a way, you are still running off of hydrogen, but in this case the hydrogen was provided by a plant process of photosynthesis of Carbon Dioxide and Water and is thus toxic free.

Hydrogen Technology Summary

The standard method of electrolysis for water into hydrogen and oxygen is typically provided by an electrical reaction that requires a lot of electricity.

Under-unity electrolysis of water to produce hydrogen and oxygen:

This process of using electrical current to excite electrodes in water to generate hydrogen gas has been known since the times of the ancient Egyptians. You can make a simple hydrogen generator at home with 12 volts of DC current. This process will give you free hydrogen and oxygen to burn. But, <u>you will not get more energy from the hydrogen and oxygen you produced when you turn around and combust it to produce electrical or mechanical power.</u> Standard electrolysis of water is an under-unity reaction, meaning you won't get back what you put in. It is thus not a way to create

nor multiply energy.

Standard electrolysis is a worthwhile endeavor however, in cases where there is a free supply of electricity, such as a hydro-generator, wind-turbine, etc. In these situations, the process can be utilized as a storage medium. For example, currently all of the wind turbines that normally operate in the northwest are shut down because right now there is an abundance of hydroelectric power from the dams. This is due to the heavy rains and winds the region has been experiencing for several months which led to an over-supply of electricity. For this reason the wind turbines are often shut down and just sitting there.

Let's say we kept these wind turbines running and diverted the electrical power to an electrolysis machine that produced hydrogen and oxygen gasses for us. These two gasses could be collected and stored then re-combined into a fuel cell for electrical power generation when needed. The gasses could also be turned into liquefied products like ammonia, NH_3, Hydrogen Peroxide, H_2O_2, etc. This would represent energy that was technically produced free of charge.

For example, in the desert, sunlight energy is available from every square inch of ground surface. This could be used to hydrolyze water, taken from the atmosphere or from ground water. This stored hydrogen and oxygen could be hooked up to a fuel cell and then plugged into the grid.

This is not free energy, but energy free of charge. We should definitely being using this "free of charge energy" whenever we can. And, next comes a slightly different term called "free energy" which takes this discussion one step further.

Over-unity electrolysis of water to produce hydrogen and oxygen

Using the proper filter and concentrating ultra violet light from the sun you can produce Hydrogen Peroxide H_2O_2 directly from water. As previously discussed, this is great fuel because it has so much oxidizer as well as hydrogen. Now, we're getting into the realm of a reaction that taps a free energy, in this case sunlight, and in the process "grows" a liquid that is now extremely volatile.

You can see, how in this case, we tapped into an energy that was free. This energy is sunlight and it is provided free of charge. In this case, our free-energy device, is a specially-coated panel that helps water combine with an extra oxygen atom. Now, instead of having common water we have a powerful fuel, which can be used in a power plant to produce electricity. And it all came from the sun.

Sunlight energy can be seen and felt. And there are other free energies that exist on earth that we cannot see or feel. Nevertheless, just like sunlight, gravity and magnetism, they exist. And just like sunlight, gravity and magnetism, once we construct a proper mechanism and/or achieve a balanced reaction, we can generate all the electricity we need without being limited by fuel costs or availability.

Since we have discovered them, we ought to at least have the use of them. And yet still today scientists and teachers at universities will emphatically state that it takes more energy to separate the hydrogen-oxygen molecule than you get in re-using them for combustion energy. This is absolutely correct in 99% of the methods currently employed in manufacturing processes that produce hydrogen. But there are ways to stimulate the reaction, such that you get more out than you put in, by using energies that are free, be they visible or invisible. In other cases, the presence of certain elements acting as catalysts, also allow over-unity reactions to occur.

Most of these formulas and catalysts end up classified as "international proprietary substances" under the United States Secrecy Act of 1951, which is still in effect. But what it means is these reactions aren't coming to light soon. Remember, the oil industry and the military are inseparable. Big Oily feeds the military and the military advances and

conquers for Big Oily. Therefore, chances are you are not going to find one source of such material via a publication or statement to the fact that they have a catalytic substance that will promote the over-unity of a chemical reaction. Such a reaction would change the world.

Metal catalysts that have been patented in the past include Iron, Copper, Boron, Nickel, Silver, Platinum, Gallium and others. One promising reaction combines silver with hydrogen peroxide. This reaction will ignite and produce super-heated steam if it is poured through a silver screen.

The consideration and use of hydrogen peroxide gives the public a way to proceed with the breaking of the water molecules from information that we already have. Further attempts at harnessing the energy of pure water could thus be achieved simply by attaching an extra oxygen atom into the water molecule, then combust it as above to power a steam generator, etc. Instead most people are focused on splitting a water molecule first in order to get combustion with oxygen later. But we could simplify a difficult process just by figuring out a way to make Hydrogen peroxide, H_2O_2, cheaply. After all, the only ingredients are water and air.

Another way to achieve over unity is with electrolysis performed using electric pulses from a pulse-width modulator that is set at the frequency that water molecules vibrate at. For example, the natural resonance of crystal stones is 28 mega Hz. This frequency has been tried, and I am not saying that this is necessarily a solution to the low-energy-splitting of water. I am saying that this is the concept we should embrace if we want to use electricity to split water molecules most efficiently. What is the "frequency" of water? This is a question we should be able to answer.

The late Stanley Meyer successfully used pulse frequency combined with a square wave of just the right length and discovered hydrogen atoms would come lose from oxygen molecules readily, with little power necessary. How? What is the frequency of water? I believe Meyer's process capitalized on this frequency, or, possibly another type of "frequency", that itself taps into energy of the kind that Nicola Tesla had proposed at Wardenclyffe, where his tower was half constructed. Think of it as the potential energy

that exists between the earth's negative charge and the atmosphere's positive charge.

Without-a-doubt, the most famous inventor to harness this free form of otherwise-unknown-energy was Nicola Tesla between 1910 and 1924. Since Tesla's times there have been many rediscoveries of this energy potential, such as the three engineers who were discussed in chapter 23. Their inventions were able to tap into and harness this energy as well.

Once we know the method to unlock the hydrogen-oxygen molecule, such that we get more energy back than it took to break it apart, we have in-fact tapped into this energy that Tesla understood and proposed that mankind adopt in 1910.

As previously discussed, the most efficient way to use hydrogen and oxygen products as fuel is to combine it back together in a fuel-cell process. This would be the ultimate way to construct a car to run on water. The electricity produced is sent to a storage battery to both stabilize and multiply the current, then is supplied to a motor in the vehicle's wheels. This is the most efficient way to use hydrogen and oxygen to power a vehicle.

There have been many discoveries made that utilized a process that cracked water molecules with little or no input energy. An engineer I got to know in Fiji told me of an invention that he had personally seen demonstrated at the company where he worked in aerospace. It consisted of a tube made of iron about two feet in length, which was impregnated with Boron on the inside surface. As water vapor was fed in one end it reacted with the iron and boron such that what came out the other end was a combustible vapor that would burn if ignited with a match.

Imagine producing heat from water vapor just because you have the right catalyst. Such a catalyst would change the world. Unfortunately, the person who invented this device has not been heard from for 30 years.

In 2007 a Florida a man found that salt water produced hydrogen and oxygen while he was experimenting with radio waves. His discovery was in several small newspapers but was mysteriously never followed up. He claimed that certain radio frequencies act as a catalyst, and that with the added conductance of salt, hydrogen was readily released from salt water.

Why wouldn't such an exciting discover be announced on every single television station worldwide to herald in a new era of cheap energy that is pollution free? You already know the answer.

Another procedure to produce hydrogen is aluminum in contact with caustic water. There are plenty of aluminum cans around which could be shredded up and tossed into a vat of caustic water (which could be produced by burning up plastic garbage and mixing with water). It just takes the right catalyst to keep the aluminum from forming an oxide coating which stops the electrolysis reaction. Gallium is an element that does this. Check it out on the internet.

Another process to produce hydrogen chemically is to combine Hydrochloric acid with Zinc oxide. This produces Hydrogen and Oxygen. Hydrochloric acid is relatively cheap to produce. So you can begin to see that there are innumerable methods that have been invented that produced hydrogen with little or no electrical input. More importantly, there are ways to store hydrogen cheaply, in the liquid phase. These liquids include Alcohol, Hydrochloric acid, Hydrogen Peroxide, Ammonia and many others.

Now at this point, if you're a proud scientist, you are probably falling back on what you've been taught and perhaps you believe there is no way to separate water into hydrogen and oxygen without using more energy than the combustion reaction will produce. And I'll I can say is that I'm sorry that I haven't been able to reach that level of credibility necessary to convince you with just one reading of this document. But do consider this: there is absolutely no scientific, mathematic, nor philosophical reasoning that predicts that combining two combustible gasses (Hydrogen and Oxygen) will produce a liquid. Nor is there any scientific reasoning that explains why a liquid made from two combustible gasses will smother the fire rather than ignite the fire further.

Since neither science nor mathematics can explain these extraordinary properties of water in the first place, it's high time that we drop the attitude of being any kind of authority regarding the ultimate potentials of water and/or hydrogen-oxygen chemistry.

Types of alternate energies

Here are types of alternate energies in addition to the ones noted beforehand. Each of these at one time or another has been a tangible invention built by man. Each was capable of successfully harnessing energies that are in a form you probably have never heard of. Here is a very brief list of all of the various forms of energies that have been discovered.

Zero Point (Tesla) Energy
Magnet Energy
Tidal energy
Water Energy
Implosion (instead of explosion)
Orgone Energy

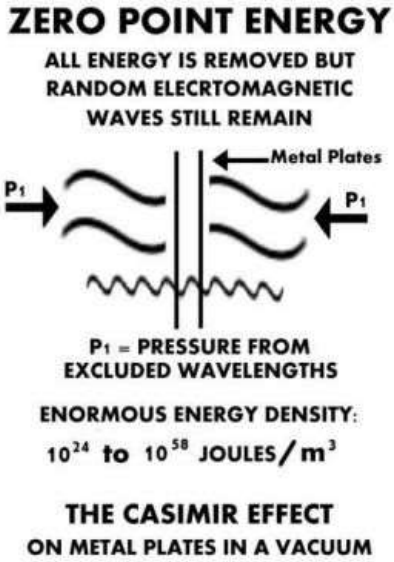
Regarding zero point energy: Are you ready to dispel the notion that energy in space does not exist? Can you see a magnetic field? How could you know everything about space, matter and energy when you know our eyes are blind to only that which falls into the range of the human spectrum, which is narrow? How could you know there is no energy in space even though you can measure the electric potential between the ground and the air?

Scientists throughout the world have shown that space energy or aether does exist, and that traditional laws of physics are not correct. You have already seen several examples that demonstrate the fact that free energy technology is here and available now.

Key inventors of free energy machines:

Nikola Tesla:

1856 – 1943. Originally from Serbia, Tesla came to the United States with a letter of recommendation and applied for a job with Thomas Edison. He went on to become one of the most famous electrical engineer/physicist/scientist in history. Tesla was a world-renowned inventor in groundbreaking technology and understood the concepts of vibration, frequency, magnetism, gravity, and radiant energy.



It was Nikola Tesla who invented AC power and saved us from the DC electrical system Edison had planned for New York and the rest of the United States. Tesla designed the world's first hydro generating power plant in Niagara Falls. By the time of his death he was the holder of 1200 patents.

In addition, Tesla invented the first radiant energy receiver that stored static electricity obtained from the air and converted to a usable form. He began construction of a working system that included the Wardenclyffe Tower near Long Island Sound to capture the free energy from the air. In addition he designed a machine to convert the free energy into usable electricity.

The tower was meant to be the start of a national, and later global, system of towers broadcasting power to users in a form similar to radio waves. With Tesla's system, instead of supplying electricity through wires connected to a grid, users would "receive" electrical power through antennas on their roofs.

Tesla's tower was shut down by the bankster, J. P. Morgan, destroying Tesla's commercial reputation and interests in the process. The tower was later dismantled, but before it was, it demonstrated its ability to store and conduct energy, even though it was only half completed. Today there is a similar tower being constructed in Europe that will use his same principles.

Tesla provided numerous public exhibits and demonstrations to validate that vacuum energy could be harnessed to do work. A classic example of this was Tesla's second electronic car in 1931 that ran on electricity provided by a "black box." In place of the internal combustion engine in the **1930 Pierce Arrow touring car** was an AC motor. The motor measured 3 feet long and was a little more than 2 feet in diameter. The motor was rated at 80 horsepower. Maximum rotor speed was stated to be 30 turns per second. A 6-foot antenna rod was fitted into the rear section of the car. Two very thick cables connected it with the dashboard. In addition, there was an ordinary 12-volt storage battery.

Tesla and his nephew, Savo, drove a distance of 50 miles through the city of Buffalo and out to the surrounding countryside. The car was tested to speeds of 90 mph. The black box appears to have been the unlimited source of "free electricity" that was the power for the AC motor. Tesla never disclosed the magic of his black box.

Patrick Keely

1872 – 1892. Patrick Keely was probably the earliest scientist to explore basic principles of resonance or Sympathetic Vibratory Physics [SVP] between objects and earth. He was a student of music and vibration phenomena and believed that everything on earth is in resonant harmony. He lived in Philadelphia from 1872 until his death in 1898.

During that time, he was written up in the local newspapers and in various national magazines as well as funded by many wealthy philanthropists. Keely was often targeted by Scientific American and others who could never disprove or duplicate any of his demonstrations or experiments

during his lifetime. Upon his death, they pounced on his lab, claiming to find massive evidence of fraud in the form of hidden tubes and such in the walls and floor of his lab.

Keely basically took advantage of the natural properties of waves which, when rectified or conjugated take the form of PUSH, BALANCE and PULL. Using resonance and phase conjugation Keely demonstrated a wealth of phenomena which included a compound motor that ran from many frequencies (later stolen by Tesla as his 'polyphase motor'),

HenryMoray,

1892-1974 Along with Tesla Henry Moray was an early pioneer in attempting to harness radiant/aether energy from the air. Over a 30 year period, he invented several prototypes of radiant energy machines. The photo on the left is an example of his energy machine lighting up light bulbs.

In the early 1900's, T. Henry Moray of Salt Lake City produced his first device to tap energy from empty space itself. Later he designed and built a free energy device weighing sixty pounds that produced 50,000 watts of electricity for several hours. He demonstrated his device repeatedly to scientists and engineers but was never granted a patent for his radiant energy [R.E.] invention.

Moray later, in 1934, re-designed his earlier energy device, called Radiant Energy. This R.E. machine weighed less than fifty pounds and generated

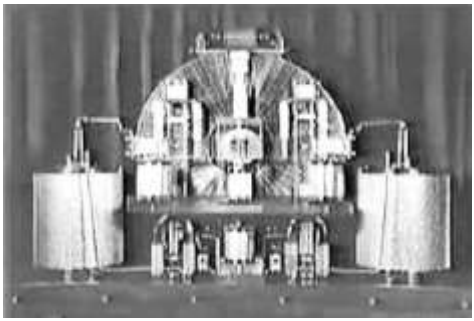
the same amount of power as his earlier model. It was enough to light a dozen homes at one time.

Gabriel Kron 1932:

Gabriel Kron's Network Analyzer was completely self-powered by negative resistors. The U.S. Navy, General Electric and Stanford University used this free energy system in the 1930s.

Kron's machine provides hard evidence that President Roosevelt and the United States government knew about free energy, and, had financed it in the early stages. Somehow the harnessing of free energy was voted out by those with power greater than the president of United States.

In the 1930s Russian scientists at the University of Moscow and supporting agencies developed and tested parametric oscillator generators exhibiting COP > 1.0. The theory, results, pictures, etc. are in both the Russian and French literature, with many references cited in this particular translation. Apparently the work was never resurrected after WW II.



Methernitha Testatika, Switzerland 1960's:

The running "free energy" machine, referred to as Testatika comes from Switzerland. It was developed over a period of 20 years of research by a religious group living in the Methernitha community of Linden, Switzerland. The inventor of this superb machine, Paul Baumann, claimed that its running principle was found by studying natural lightning.

Researcher Paul Lindemann claims the Testatika is actually based

on the Wimshurst machine, a unique machine which generates 3 KWatts of free power.

Gritskevitch Oleg Russia-Armenia dynamo 1992:

The first time Oleg made the public aware of his work was in 1991 on a symposium in Volgodonsk city. The report received the positive replies and reviews of the experts of a nuclear industry in USSR. The same year he was accepted in international Nuclear Society and later offered development of this technology to different state bodies and private enterprises. But there was the only answer: 'It is very interesting and perspective project, but there is no money for it'.

A commercial prototype hydro-magnetic dynamo had been working in Armenia from 1992 to 1997. It was working and was producing energy until January 1997 when it was destroyed during the war. At the end of 8 years he tried to transfer this technology in US through the embassy in Moscow but was blocked, including all of his 70 patents.

The dynamo's production cost was estimated at $500 per kilowatt compared to nuclear power's capital cost of $5000/KW and a windmill's capital costs of $4000/KW. A well-run plant can generate power for 1.8 cents using coal, 3.4 cents using natural gas, 4.1 cents using oil and using the dynamo would be approximately 0.1 cent/KW-hour with no external fuel needed and without creating pollution.

Thomas Bearden 2002:

Researcher Bearden stated that there is no doubt over-unity engines exist. Bearden's MEG, Motionless Electromagnetic Generator, with no moving parts, is claimed to provide a steady flow of 2.5 Kilowatts forever without the input of any fuel whatsoever.

Jean-Louis Naudin 2003:

Jean-Louis, a French scientist, successfully replicated Bearden's Motionless Electromagnetic Generator (MEG) in France in 2003. Check out the Naudin: MEG engine France

Nakamats Yoshiro 2005:

Nakamats Yoshiro is a Japanese inventor who claims to have harnessed cosmic energy to power his home in 2005. With its distinctive floppy-disk-shaped front door, his four-story concrete building is powered by 'cosmic energy whose source is charged particles arriving from outer space in rays at roughly the speed of light. A black 'antenna' that covers most of one exterior wall collects this energy and distributes it to a converter that then produces enough electricity to power the entire facility and its roughly 30 guest rooms. Nakamats says the rooms are used by scientific luminaries from around the world who congregate to share new ideas.

Chinese scientists, in 2007:

Calling their breakthrough **Cosmic Energy Machines**, this innovation uses the corrected theory of the pendulum to extract energy from gravitational fields. Energy can be changed into electrical energy and, in turn, used to drive electrical and electromagnetic engines, including anti-gravity space flight systems. The Cosmic Energy Machine has been used by inventor Dr. Liang to create a 188 horsepower auto in 2003 that did not require a fuel source and is non-polluting. The details can be seen in the video AVSEQ01.DAT. "Chinese no fuel car"

Joe Bedini, 2010:

Joe Bedini debuted his new 14 foot high modified Bedini Cole Monopole motor at the 2010 Renaissance Charge Conference in Coeur d'Alene.

Some of his words, "We are actually immersed in gravitational energy. If we know how to use it, we would not violate the Law of Conservation of Energy. The Lee-Tseung patent states that we can "lead out" such energy via oscillation, vibration or rotation with Pulse Force at the suitable time (at resonance).

The same theory can be extended to electron motion energy. Electron motion energy covers magnetic, electric and electromagnetic. It is present so long as there are electrons rotating around nuclei. The field can be many times the gravitational field. The field can be attraction or repulsion. It can also be turned on and off. Many Over Unity Inventors use this particular energy without realizing it."

Is it not amazing that as early as 1867 science had found that it was not necessary to combust gasses to produce steam for a steam turbine or combustion pressure for a gas turbine? Now they knew that such a process could be so simplified by bringing two elements together in the presence of the right catalytic metal and you get a continuous output of electricity. No boiler, no turbine, no condenser; nothing mechanical required to produce rotational power (like an electric motor) thus to produce electricity. Can you imagine the efficiency! **This is the direction that energy research should have gone.**

The Geet Reactor

This book would not be complete without a discussion of this amazing fuel vaporizing device by the inventor Paul Pantone. There are two things about this energy device that make it unique above virtually every other innovative fuel device and these are:

One: the GEET reactor can be built by a reasonable mechanic using parts from the hardware store.

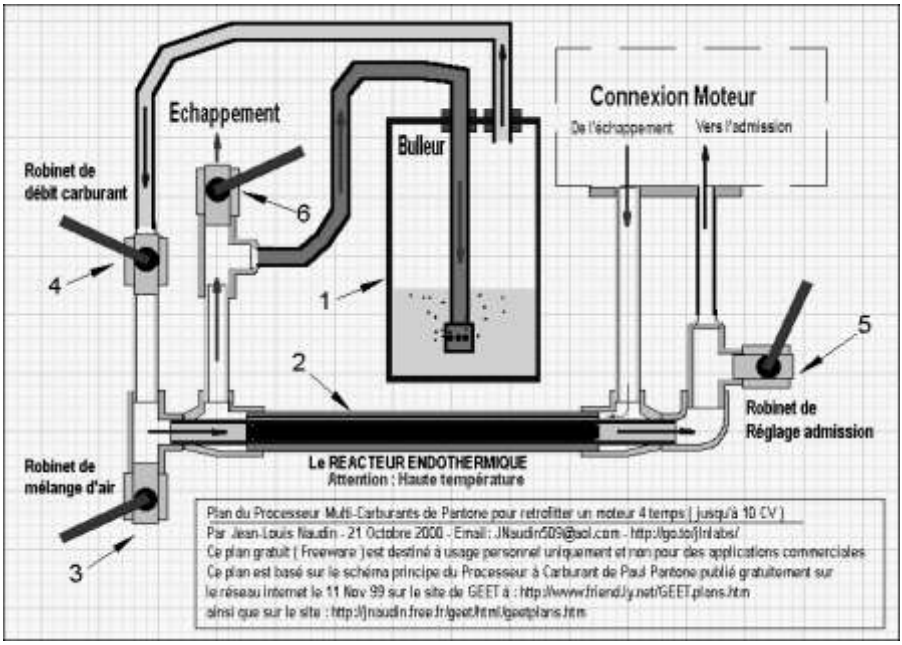
Two: it is adaptable to combustion engines in gasoline powered equipment and automobiles.

The GEET Reactor is a simple device for any internal combustion engine and it packs the potential to dramatically increase fuel efficiency, but its main advantage is its ability to run an existing engine on junk fuels. Try to find a more simple design for running existing engines without gasoline!

You can obtain detailed drawings and instructions from Paul Pantone for a small fee, with the understanding that you will only build a unit for yourself, and to not copy and give away these drawings. Since I am not planning publication of this book for profit of any kind, I am including them as a way to help preserve Pantone's brilliant fuel vaporizer design.

The Geet Reactor has been developed for an 85 Kw generator package. I am currently experimenting with the device. The inventor, Paul Pantone, stated to me during a telephone call that the reactor magnetic-rod taps into Tesla energy via a simple, but crucial, knowledge of magnetism and how it can interact with earth's own magnetic field. He stated that it amplifies the chemical processes of water and hydrocarbon dissolution.

I advise you to check this device out if you are looking for a buildable free-energy device that can power a generator.



Inventor Paul Pantone, survived 18 months in a mental hospital because he could get his engines to run on just about any liquid. Note the three different lengthed rods that go inside the tube inside the outer exhaust tube. They are rounded at one end and dimpled in on the other. You have to make sure that you get the rod's natural magnetic pole N at the rounded end or it won't work.

CHAPTER 22

Epilogue

THE WRITING OF this book began more than ten years ago when my disgust for our existing transportation mechanisms finally got the best of my engineering skills. I started thinking about the feasibility of some kind of "new principle" people could get behind in the way of a grass roots movement that would demand a positive change. And I came to the conclusion that we could make significant progress in this regard by simply refusing to purchase new cars unless they are electrically powered or better.

It's pretty hard to bring about any kind of change when we can't even get people to protest the fact that the entire Pacific Ocean has been under a nuclear attack for over 7 years from the American built and designed Fukushima Nuclear Plant. Today, as I type, all of the radiation, from three failed reactors, is being let out to sea two times per day with each falling tide. If this isn't garnishing much public outcry, then the replacement of the petroleum-powered piston engine is not going to come about as a result of public outcry.

Just what does it take to get people's attention today? A large flat screen TV, that's what. Thus, in order for anything to begin to happen in regard to dumping our existing gasoline-engine-powered smog and transportation system, people will need a darn good reason. Few people can get motivated to fight smog, for example, when they are already worrying about dying from a plague disease, bombings, shootings, floodings, wars, immigration, tax laws, health care expenses and bankruptcy, can they?

Now that you know what has actually happened to our transportation system overall, and the environmental degradation we must endure in the future, are you really ready to do something about it? Then how could we get some kind of movement started to get rid of these smog producing money robbing piston-powered vehicles? How about a public referendum? Here's it is. It just needs the proper timing or event to set it in motion.

Public Referendum for the Repeal of the Petroleum Piston Engine

WE, THE SPIRITUALLY UNITED PEOPLE OF EARTH, in order to avert and arrest the continued destruction of the planet earth, its peoples and animals, call for a referendum on the continued use of petroleum powered engines.

Because of the environmental disasters we have created it has become obvious that a change from the world-wide use of toxic petroleum to an environmentally harmonious fuel, like methanol alcohol, is needed. Furthermore, its use has led to the corruption of our national defense system, being vitally dependent on petroleum products in order to function, and thus placing the security of our nation at the mercy of an industry which is not controlled by the national defense system itself.

In that this relationship compromises normal human defense instincts, which would be to insure every key ingredient of our national defense is in the hands of our national defense itself, and it being recognized that every time our country engages in any

peacekeeping or defense military operation, virtually every piece of military equipment employed will require petroleum in order to operate we call for an immediate end to the existence of corporations that produce and sell petroleum.

In that the United States Military is primarily made up of ships, jet fighters, jet bombers, helicopters, fuelers, tanks and trucks that all use petroleum it is a fact that the oil industry benefits in terms of increased sales every time our military is called into action. This is anything but an incentive for the oil industry to stay out of international politics thus to not foment wars for profit. It is made worse by the fact they are able to supply both sides of the enemy.

The use of war for profit cannot be tolerated. In that the oil industry influences our politicians, and that many of them own stock in oil companies themselves, and that many have been elected with the contributions provided by oil companies, it is imperative that the oil industry be dissolved and shut down. Whereas, if the oil industry cannot be shut down, then the only possible solution is a total dissolution of the existing Congressional members, as they have demonstrated that they are beholden only to oil industry practices and standards.

We call for an end to the use of petroleum accept in instances where it has been produced by the United States Military and the price controlled by the Department of Health, Education and Welfare. We call for an immediate end to the existence of corporations that control transportation commodities such as fuel that dramatically impact our country's economy and the people's welfare. In so structuring our transportation in this manner, we seek to end the practice of wars being fought in the name of profit for oil sales.

In addition, the following points about our existing transportation system and vehicles need to be addressed:

1). After over 100 years of manufacture, the current standard transportation vehicle should be less complicated not more complicated.

2). Every car design should be standardized such that every mechanic and car owner can and will have the best repair and maintenance knowledge for virtually every mechanical problem.

3). All spare parts should be universally available thus eliminating ordering and freight charges.

4). Vehicle mechanics should be equipped with knowledge for diagnosing, repairing and extending the life of all transportation vehicles.

5). There should only be one set of standardized tools required to conduct repairs.

6). Electrical parts such as light bulbs, sensors, fuses, gauges, spark plugs, etc. should be universal and made to the highest quality standards.

7). Car bodies should last for a minimum of five decades of use. Quality new and rebuilt motors, and major parts, should be available at a reasonable price.

8). The purchase of a new car every five to ten years should not be necessary.

Furthermore, we call for an end to these environmentally irresponsible methods of transporting the citizens of the United States and call for the implementation of the actions necessary to accomplish the following goals in the least amount of time:

1). The provision and maintenance of a healthier environment for our children that is free of highway-related toxins which are known to degrade and reduce our lifespans.

2). A reduction of media, government and corporate influencing of citizens through the vigorous promotion of petroleum products, when numerous and superior forms of energy, fuel sources and engine designs are available,

3). The promotion of a safer and up-to-date method of transportation for our citizens (such as electro-motive non-polluting power sources which do not waste fuel while at a stop),

4). The acquisition of freedom from health risks due to lengthy commutes to and from work during which time we breathe harmful exhaust vapors,

5). A reduction of the necessary family wage earnings going toward the purchase and maintenance of costly vehicles that are nearly impossible to repair or when involved in a collision, and, are so cheaply made fail to provide protection for the human body at any speed over 40 mph,

6). Relief from routine exorbitant fuel costs to motor fuel suppliers who have done nothing to extend vehicle range on one full tank of fuel for the past 50 years, and

7). Reduction of all transportation-related costs, such as high rates of depreciation, costly insurance, excessive taxes and short vehicle lifespan (requiring vehicle replacement after just a few years of operation).

Citizens for the Repeal of the Petroleum Piston Engine are peacemakers, not advocates for rapid or traumatic change. We do not wish to put any working person out of a job nor bring economic hardship to any family. We are spiritual thinking citizens who want our sons and daughters to be born into a less hectic and financially draining system of getting from home to school and work.

It has become painfully obvious that a change from toxic petroleum is not only needed but way over-do. And this is not just because of the environmental disaster we have created.

As of today we steadfastly refuse to buy into the petroleum powered system any longer. We call for a ten year elimination of petroleum piston powered automobiles and trucks. Furthermore, we are in support of the methods and proposals outlined in this paper to get this accomplished as quickly as possible and with as few economic hurdles as possible.

Certified as having been created in good faith and for the positive future of planet Earth,

Kenneth M. Price, Jr.

The Establishment of a Planetary Gardner

Something else is missing on this beautiful planet earth. Recall that every city has a manager, every state has a department of agriculture, every nation has departments of agriculture, human welfare, etc. It should be obvious that our planet has an agriculture manager as well. Doesn't it make sense that every planet needs somebody who will skillfully watch over the crucial agricultural processes such to aid and manage proper soil irrigation and maintenance, air composition (CO2, CO, O2, Nitrogen, etc.), salinity of the oceans, amount of open space for forests, amount of space for animal habitats, etc.

After a few hundred years it can safely be said that corporations are not doing this. They should be stepped down as stewards over something so vital as our earth's eco systems as they have only demonstrated the inability to act in a manner which befits the beauty and natural wonders of the planet.

What to Begin Doing Now

In the meantime, there are actions that we can take that will have a positive effect on our planet's future and our personal, and we offer the following recommendations: Consider not buying that new car you might have had your sights on. Buy a used car.

Eventually, we might start to run short of used cars for everybody to buy one, but that could take years and the panic will be worse on the auto makers than the auto buyers. Meantime, you will save on taxes, insurance, depreciation and exorbitant car payments, so it's not costing you, but in fact saving you a ton of money.

You can still express yourself creatively buying a used car; there are so many choices and good deals. How about a used Mercedes or

Honda Acura? If you have a lengthy commute, I understand your need for reliability, so before you replace your existing car, talk to a good mechanic. A good shop may be able to keep your existing car running reliably much longer than you think.

Keep on the lookout for a friend or neighbor who likes to trade up to a new one often so as to get one with fewer miles. Don't be picky, just be wise and enjoy the huge savings.

Consider not buying a hybrid car. They are a poor example of what is possible with today's technology, being overpriced and still sporting a full size engine. They are a little better than standard cars, but if we buy them we endorse them.

Electric cars were being used successfully as early as 1896. Today's hybrid design is overly complex and costly, while fuel economy is not that much better. This is outrageous! The hydrogen fuel cell went up with the Apollo moon rocket in 1969. We know the technology works and is available, we should therefore demand it instead of these hybrid engineering abominations. The fact that Exxon today holds all patent rights to this human invention yet won't give it to the people is morally reprehensible.

By not purchasing a new or hybrid car we will gradually be sending a message to the automakers that their products are massively overpriced and there is no reasonable alternative to current piston-powered vehicles.

Consider reducing your commute. I know this is a tough one for many people who live many miles from their jobs because the only way to find affordable housing is to locate into the suburbs. You have two choices, move closer to your job or quit your job and find one closer to your home. I recommend trying to find a new job closer to your home.

If you subtract out the cost of gasoline, insurance, depreciation and maintenance for a new vehicle you might find that a lower paying job will easily fulfill your monetary needs. I found this to be the case myself. The added benefit is the amount of extra time you can spend at home with your family.

Consider not buying newspapers or magazines. These supposedly informative publications have done little to nothing to expose the truths behind the money-gobbling oil/auto industry. It's time we dumped them. The amount of time you will save in reading the plethora of worthless trivia and commentary will only result in an enriched life. The amount of advertising contained within these related to the oil/auto industry is staggering. None of them have the courage nor motivation to expose the very hand that feeds them.

Consider not subscribing to television cable services. These stations give us little informative news. They do provide programs that degrade our culture, commercials that encourage petroleum use and movies that glorify the auto and oil industries. Flipping channels only exposes us to more commercials and raunchy programing.

Use the internet for information. Consider a small handheld radio tuned to the local radio station for sports or a marine channel radio if the weather is your most important concern.

Consider not supporting Hollywood movies. Occasionally we get a movie that exposes some needed truths, but for the most part we get non-realistic, overly violent, horribly immoral, nightmarish grossness, and further glorification of fast cars with disregard for the law and disrespect of elderly citizens. Hollywood has done nothing to help expose the hypocrisy of our energy dilemma and seems bent on destroying years of proper parental guidance of millions of our nation's children. Let Hollywood flounder in its own arrogance and disregard

for our precious kids.

Consider not purchasing furniture, building materials, clothing, food containers and miscellaneous things made of plastic unless absolutely necessary.

Consider selling whatever stock you may currently own in oil and auto industries.

Consider building an electric (or other) car on your own.

Reject Self-drive cars! This will only give them a reason to continue the existing unsafe transportation system as if it has been made safe. In addition, it will give them a reason to continue the use of petroleum powered piston engines beneath the guise of self-drive technology.

Eventually the petroleum energy scam will be exposed and our transportation system will be completely redesigned. Don't be tempted to covet it, lest you be tempted by a new flashy car. Hesitate on your new purchase. Stay free of the illusion. Think about saving oodles on basic transportation. Think about how good it feels better to have some money available verses having to be working to pay off debt.

This seems like a reasonable place to end this book, so I thank you for reading it. Many things I have stated may be too much to comprehend right now, but don't despair. Give it some time while you further observe the current situation that we face. In the meantime you can begin exploring all of the different ways to increase fuel mileage or simplify your commute/travel situation. There is no hurry to act in a major way, as time is on our side. A first step begins as easily as airing your tires up to maximum pressure. Put 3 oz. per 10 gallons of pure acetone in your gas tank.

Just go to the next page and jump onboard! I wish you a long life and much success.

Petty Deception: Acetone as a Fuel Additive

I'm inserting this information as it is the simplest and most effective way to begin putting a dent in your gasoline purchases. It stems from another oil-industry secret that you can use to improve their gas mileage. Simply add **pure acetone** to your car's gas tank in the amount of 3 oz. for every 10 gallons of fuel and you will get up to 20% better fuel mileage!

The amount of research that has been done by the oil industry, the military and the auto-racers associations on fuel blends during the past 100 years for the purpose of getting more horsepower out of piston engines is near-endless. Adding acetone to gasoline was found to enhance fuel vaporization as far back as the 1950's and is just one of thousands of ways to improve fuel and fuel mileage. Acetone is just one example, but best of all, it is one that we can get our hands on.

This is not some joke. I have been methodically adding 4.5 ounces to 15 gallons of regular gasoline in the same Ford Explorer vehicle for over six years with every tank of gasoline I have purchased.

The addition of pure acetone has a dramatic effect on the fuel-vaporization of gasoline molecules. It has the effect of breaking them into a much finer mist approaching vapor. Just by adding .2-.3% pure acetone into your gasoline you can travel 75 extra miles on each tank of gasoline and it is simple technology that every human can do. I have driven over 80,000 miles using pure acetone and saved an estimated $4,000 dollars in fuel costs.

The only thing holding us back from gaining this improvement is the fact that it's been kept a secret. Why would the oil/auto conglomerate keep it a secret when our nation is going broke from buying oil overseas? Because the engines on the road today have been designed for a specific purpose, thus they don't want them performing any better than what they were designed for. Remember, it's a giant petroleum drain-field composed

of 100 million vehicles getting 15 miles per gallon, and it has to be kept flowing in order to maintain the continuous process of crude extraction.

If we all began mixing our fuel with acetone causing gasoline fuel consumption to drop 20% in the United States, the oil industry would be bulging at the seams within months. They definitely don't want us to use acetone.

The public's use of acetone is made complicated by a tricky industrial maneuver: all industrial acetone sold in stores contains additives that have been put there purposefully to negate the vaporization enhancements of pure acetone when added to gasoline. You are reading this correctly; just like lead in gasoline, the public has already been headed off at the pass.

But Hark! If you use **"pure" acetone** the mixture will work. Pure acetone is available through a beauty supply store or the internet. **Sally's Beauty Supply** has nail polish remover in one gallon containers for $24.00. This is pure acetone and is the acetone you want to use. One gallon will treat 384 gallons at a 20% savings would be 77 gallons or $300.00.

Is it worth it to you to see an increase in gasoline mileage as much as 25%? If you answered no then you have become programmed by the oil industry to accept their system. Consider that if you're not willing to acquire some acetone and add it to your tank, there's hardly an ounce of resistance to the oil industry in you. Wake up! Act!

How to Begin Using Acetone in Your Gasoline

First, test your car's gasoline mileage by topping it off before you drive 100 miles or more for a test. Top it off again, divide the miles traveled by the amount of fuel consumed and make an accurate calculation of your current miles-per-gallon. If you don't do this first, no matter what you tell people afterwards, you won't have a leg to stand on. The only way to get an accurate starting gas mileage base line is by filling up 1st and topping off again 2nd.

Then get some pure acetone from a beauty supply store. Add 3 ounces per 10 gallons of gasoline. Estimate as good as you can how many gallons it will take to fill your tank, then add the necessary acetone into the tank and put your fuel in on top.

You will not see much of a difference until the second tank of acetone/gasoline. It also helps to pre-mix the acetone in a one liter container of gasoline shaken up with the acetone in it before pouring into your car's tank. This is the way I do it.

Then try to tell me it doesn't work. I find it more than amusing when know-it-alls tell me it won't work: they're programmed to defend the oil industry and don't know it.

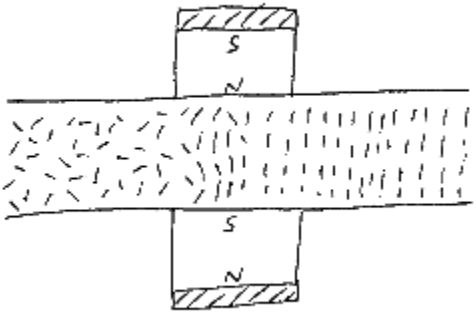
A word about Fuel magnets

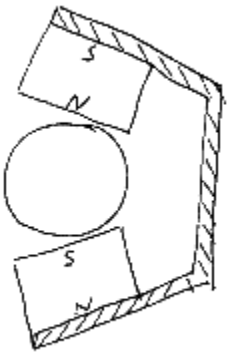
A fuel magnet is a device that is strapped to the fuel line in your vehicle (or each injector line on a diesel engine) and makes the fuel more receptive to oxygen, thus producing a leaner more efficient combustion with less exhaust waste. This is another simple thing you can do to help your gasoline or diesel powered car get 5 to 15% better fuel mileage.

The magnetic forces applied by a strong magnetic field re-orientates the fuel molecules into a polarized state. This tiny molecular charge makes the molecules rotate into alignment with the applied field, and they then hold that position for a short time due to the matching alignment of their neighboring molecules. This alignment is disrupted by turbulence in the liquid causing the molecules to return to their formerly dis-organized state. Therefore you need to place the magnets as close to the fuel injectors, or carburetor, as possible.

In the case of water, the alignment traps minerals and contaminants thus helping to prevent furring and scaling of water pipes. For fuel it helps hydrocarbon molecules combust more completely. Research reveals that a strong magnetic field causes a lowering of fuel viscosity, resulting in finer droplet size in the combustion chamber.

You can purchase fuel magnet kits or purchase super magnets and attach them with cable ties on either side of your fuel line. They all perform in fundamentally the same way.





Above Drawing: This is the most common arrangement for applying a strong field in commercial fuel magnets. Each magnet can either have its

own steel plate at the back, or a common piece of folded steel can be used to create a closed magnetic loop. The right hand image shows a steel field concentrator that has been angled to allow a bit of tolerance for placing the assembly as close to the pipe as possible whilst allowing slight variation in pipe diameter.

Magnetic power can be increased even further by stacking magnets or seeking out the more powerful types. Be careful with very powerful magnets, since they can attract together with such force that the ceramic magnets can shatter or they can trap your fingers and nip the skin. Large Neodymium magnets can break fingers.

The combination of fuel magnets and the addition of acetone in the fuel will improve the fuel efficiency of virtually every gasoline-powered car or truck by 25%. It's an easy place to start.

A word about "routine" oil changes

Will it come as any surprise that the recommendations given us by our friendly oil/car companies regarding oil change frequencies are as bogus as is the gasoline engine itself? The fact is, unless you are operating in a dusty environment, you can easily run your engine oil three times as long as specified by the manufacturers. This is another blatant example of an industry that wants us to waste oil rather than conserve it.

If you are operating in a dusty environment, get a serious industrial air filter and plan on replacing it every couple of months. Instead of changing your oil out at the scheduled drain, take a 4 ounce sample of it and send it to Analysts, Inc. in your area. For about $15 dollars they will run a spectrographic analysis that will tell you if you have a lot of dirt or excessive iron wear. Then you can decide if you need to change oil or not. Chances

are you will not.

Cheap laboratory services for petroleum testing are readily available. It is indeed strange that such a concept is never recommended by the auto industry. We could all just take a sample instead of dumping six quarts of good oil. Truckers do it for 40 quarts of oil, why can't we do it for 6 quarts of oil? It seems like this would be a great way to help put those wicked Arabs in their place. Just joking of course; the Arabs have nothing to do with it.

The facts are coming in. The oil industry, just like the filter industry, just like the battery industry, just like the vinyl interior industry, just like the epoxy paint industry, just like the rubber tire industry and just like the asphalt industry have all done one thing; increase the use of petroleum. We could and should dump them all.

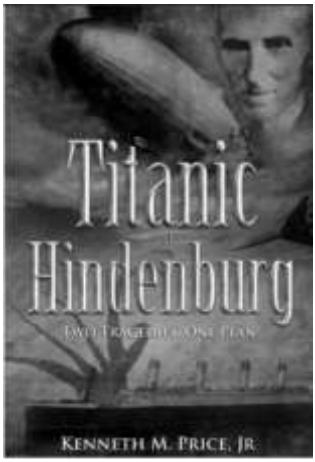
NEXT:

Visit the Appendix on-line at:

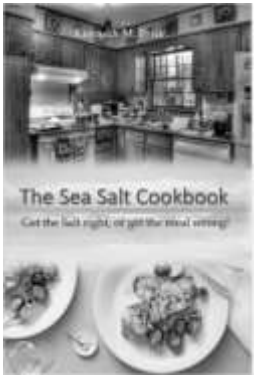
the-rise-and-stall-of-the-piston-engine.weebly.com

BOOK II:
Read it on-line here:

titanic-and-hindenburg.weebly.com



BOOK II by Kenneth M. Price, Jr



Other books by Kenneth M. Price, Jr

kenneth-m-price-jr.weebly.com

"Was always fascinated by that old Chrysler Turbine concept ever since I saw an old picture of one in an intro to auto mechanics book from the seventies that implied it was just around the corner..."

Alex, United States

"As a former navy type I always thought any hybrid that didn't use a small diesel running at the sweet spot was a stupid, expensive, overcomplicated status symbol. In fact it was in your book that I learned they are still mechanically coupling the engines to the wheels. That was too stupid for me to even consider possible."

Sean, Scotland

"Tires, asphalt, oil filters, brake pads, you did a real good job pointing out these cons that are so ubiquitous nobody notices. I always have but everyone rolls their eyes when I bring it up."

Jonan, Netherlands

"I look forward to a day in the near future when I can take a cheap, comfortable and scenic airship ride across the pond, like back in the 1920's...."

Barbara, United States