Between Stone Ages

Assertive Version

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Herein, “Stone Age” does not mean “ancient cave man with a stone club in one hand and dragging a female by the hair with the other.” It means “a time and place where humans used only renewable resources. “They relied totally on wood, vegetables, fruits, nuts, fish, and prey animals. They used fire. Farming and animal domestication may have existed. The people lead happy, meaningful lives, but relied totally on nature’s bounty. A very recent example is the indigenous North Americans before Europeans arrived, and that was only a few hundred years ago. The Eskimo of the Arctic also qualify. These illustrate a civilization without fossil fuel.

Nonrenewable Resources

The nonrenewable resources are fossil fuels and metals. When fossil fuels are consumed, they are gone forever. Metals are extracted from ores or recycled.

Redefine “Fossil Fuel”

The term “fossil fuel” is a misnomer. Transformed organic matter is a better name. Notwithstanding, this paper will continue using the term “fossil fuel.”

Metals

The difference between life 10,000 years ago and life 500 years ago is the discovery and use of metals. For thousands of years, iron and bronze (copper and arsenic or tin alloy) facilitated tools. Metallurgy enabled manufacturing and shaping metal. Metal tools shaped wood and other materials with lathes and saws. Metals are nonrenewable. Someday, the metals will be gone with no way to recover them!

Fossil Fuels as the Lifeline

Our present-day lifestyle cannot exist without fossil fuel. Oil is second only to water as our most valuable resource. Oil has many uses other than an energy source. These include plastics, foods, medicines, contact lenses and even cell phones. Alternative energy sources do not have these advantages! Will other materials be available to replace them?

Energy Content

Fossil fuels contain far more energy, pound-for-pound, than any other energy source, except nuclear. Uranium is also nonrenewable. A typical automobile carries about 120 pounds of fuel (20 gallons times 6 pounds per gallon). By comparison, a 120-pound battery will not take a car very far. Currently, car batteries weigh over 1,000 pounds.

The gasoline used in an automobile is only 20 to 40 percent efficient. The radiator dissipates most of the lost energy. Improving efficiency is imperative. Think of driving a gasoline powered automobile with no radiator needed because most of the energy drives the wheels. This technology is over a hundred years old. Come on, scientists! Find a new way! Do not let cost be the driver!

The Decline

Consuming fossil fuels begins the gradual decline into the next Stone Age. Coal is under attack in the United States. Coal exists in abundance worldwide, and some countries have resumed using it. Coal will be the last available fossil fuel, and because it is convertible into many forms, it will delay the next Stone Age. Let us embrace coal and invent ways to use it cleanly. This can and must be done!

But still: eventually, all the nonrenewable resources (fossil fuels and metals) will no longer exist. Wind turbines, solar panels, and any other type of energy generator cannot be constructed because building materials will be unavailable. This marks the beginning of the second Stone Age

Climate Change (Global Warming)

Instead of emphasizing the elimination of fossil fuels to mitigate climate change, the emphasis should be on conserving them for as long as possible. Give civilization a little more time to prepare before the second Stone Age.

Our environment is warming, but to what degree is manmade pollution a factor? No one knows. Predictions come from computer modeling, and computer models are only as good as the source data and the accuracy of the assumptions of the environmental effects. Both are subject to intentional or unintentional bias and thus are inherently questionable. Absolute acceptance may lead to unwarranted or unwise actions.

This world is no stranger to climate change. Mankind survived the age of glaciers when the oceans rose and fell by 400 feet. If the oceans rise, people must relocate. It isn't desirable, but it also isn't a civilization killer.

During the ice ages, the mean temperature of the atmosphere may have changed by 10 degrees Fahrenheit. Humans and plants acclimated. If the future brings higher global temperature, humans and plants will probably acclimate. Predictions of an immediate massive kill-off is an unwarranted hysteria. The Earth is a huge place, and inertia prevents rapid change. There will be time to adapt.

Earth Miracles

The existence of fossil fuels is a miracle. The even greater miracle is that there is so much of it. Fossil fuels came from a specific evolutionary process. How likely is it that other planets followed a similar evolution, i.e., growing a huge amount of vegetation, then rolling it underground and compressing it into fossil fuel?

"Earthlike" also requires that the planet be in a "Goldilocks" zone where everything is "just right" for human habitation. The planet needs to spin on a tilted axis to produce the seasons, and it needs a moon to exert certain gravitational forces.

These factors greatly reduce the number of likely "earthlike" planets in the universe.

Our Place in History

Humans like us lived about 35,000 years ago. (Jean Auel describes this period in her series, *Clan of the Cave Bear*. The first stirrings of intellectual advancement occurred about 5,000 years ago. Our present lifestyle is less than 200 years old with the advent of trains, plains, automobiles, and radio. The nineteenth century produced many geniuses who advanced the understanding of our physical world. We stand on their shoulders. Since then, many great scientists have placed us on the pinnacle on which we now live in. Smartphones, GPS, and computers are less than 50 years old. Compare 50 to 35,000. We are but a tiny blip in the age of humankind on our way back to the next Stone Age. Recently, a television personality stated, "Isn't this a wonderful time to be alive." I wonder; did she really comprehend how prophetic she was?

Caveat

Scientific advances have not yet peaked. Wonderful things are yet to come. But only stupendous inventions can overcome the loss of fossil fuels and metals, thus delaying the next Stone Age.

Colonization of Mars (or any other planet)

It is not going to happen. The challenges are too great. The volume of the raw material required to support a large population is enormous. The infrastructure to transport material and personnel is huge, requiring too much energy (fossil fuel?). If the destination planet does not have fossil fuel, the best that can be achieved is the same as Earth after fossil fuel is depleted. On Earth trees convert the CO_2 exhaled from our breath into oxygen. Oops.

People breathe oxygen. If the new planet has none, how do you provide it to millions of colonists? Putting a few dozen people under a dome on another planet is not colonization. Adams and Eves on another planet to save the species does not do much for the billions left behind on Earth. Like it or not, Earth is our forever home.

Author's Editorials

These editorials are opinion, whereas the preceding section is fact.

Fossil fuels, you evil things, be gone!

Some politicians assert that, unless we stop using fossil fuels, our civilization cannot survive another 20 years. Ridiculous! It is not that easy to kill us off. The volume of the Earth's atmosphere is enormous. Oceans cover 75 percent of the Earth's surface, so no pollution is generated there (planes and ships in the ocean space are too small to make an impact). Nature has other ways to kill us off. Think about volcanoes, meteors, and viruses. The first two are random likelihood events, but the main objective of many viruses is to kill us. The survivors are those who become immune.

Get rid of fossil fuel

Do people really mean this? Ask them to visualize living 10,000 years ago, without fossil fuels available. What would life be like without the discovery and utilization of fossil fuel? There is no need to speculate; just look back 500 years. Would our present population be happy to regress 500 years?

Even if it were possible (it is not) to immediately eliminate all use of fossil fuel, it would be a huge step into the next Stone Age. People will not stand for that and will continue to use fossil fuel until it is gone. Afterward, a lower standard of living may exist until the metals are gone. Then? Stone Age.

Remember the *Beverly Hillbillies,* "up from the ground came a bubbling crude." Even 500 years ago, people had limited use of fossil fuel, especially coal. Coal has been used for thousands of years. Jean Auel mentions it in her *Clan of the Cave Bear* series.

The Declining Population

The next Stone Age cannot support the number of people as now populate Earth. Hopefully, the population decline will be gradual enough for normal attrition to adjust. It does not have to be catastrophic. It is likely that areas separated by waters will enter the next Stone Age at various times. Each area must survive on its own. They will not communicate with each other.

Conservation and Innovation

Use the greatest gift from nature wisely. Convert mass into energy more efficiently. Supplement fossil fuel with alternative energy sources: nuclear, wind, solar, and others yet unknown. This author acknowledges nuclear, hydroelectric, and geothermal as sources of alternative energy. Hopefully, our scientists can utilize some or all of these to great advantage.

When? Who knows?

When it happens depends on how well we manage the future. A recent statement from a television program stated, “We have enough oil to last 500 years.” Maybe. But that is not delaying the second Stone Age very much.

The following is an addendum, not part of “Between Stone Ages”

The terms “man” and “mankind” used in context have been gender-neutral for centuries. It has always meant “human”. It never meant “male only”. This author will not be browbeaten into submission to the ultra-sensitivity of the present generation. Other factors, primarily religion, have suppressed women unjustly. They have the right to rebel.

A Special Word about Coal

It is amazing that the first thing that could outrun a horse was the huge locomotive. Coal to smelt iron made this massive piece of metal possible. Likewise, huge iron ships like the Titanic were constructed. Throughout the 1800s and into the 1900s, coal was, by far, the most prominent fossil fuel. Later, the abundance of oil and gas diminished the need for coal. Now, coal mainly fuels electricity generating power plants. The by-products of burning coal are particularly nocuous. The challenge is to contain or convert them.

A Very Disturbing Vignette

Recently, a young woman splashed a can of soup on a valuable painting. The words “no oil” were printed on her shirt. Does she realize that, if she got her wish tomorrow, the world would go dark? That buildings would be without light or heat. That automobiles would be stranded. That aircraft would be grounded. That ships at sea would be foundered. That there would be no food or medical supplies delivered. Millions would die in darkness. These kids were not born stupid. Who is teaching and motivating these values?

A Failure to Understand Basic Physics

It is essential to understand physics to appreciate the complexity of eliminating fossil fuels in favor of wind or solar. Energy is a measure of how much work a substance can provide. Remarkably, all the fossil fuels contain a huge amount of energy to power our infrastructure. Wind and solar can never compete. The only other viable source is nuclear.

Understanding the Reality of Large Numbers

Most people do not understand the effect of small changes on large numbers. There are hundreds of millions of automobiles in use in the United States, and over a billion worldwide. The idea that these can be totally replaced by electrically powered vehicles is ridiculous. The raw

materials for battery construction will be depleted. The manufacturing capability cannot be attained. Without fossil fuels, what is the energy source for the battery chargers? How many battery chargers will be needed? How do you get that much energy delivered to that many battery chargers? Think of the gasoline tanker truck and the energy contained therein. How can that much electrical energy be delivered to the "battery service stations"?

There are about 60,000 drops in one gallon of water. What is the impact of one drop of something else in that gallon? How many "drops" of EVs will it take to impact the mega millions of cars in the world? And what about the continuing production of newer vehicles?

Total replacement of gasoline powered cars with EV is doomed to fail. Yet our politicians continue to mandate EV only production by a certain date. They are not bad people; they just do not understand the "law of large numbers". EVs have a place in our society, but as a valuable supplement, not a replacement.

Characteristics of Batteries (opinion based on experience, no supporting data)

Batteries wear out. A battery cannot be recharged to 100 percent of the previous charge. It must eventually be replaced at great cost to the consumer.

Batteries are a fire hazard. Fast charging a battery increases the likelihood of fire; not necessarily while charging, but later down the road. Let it be hoped that they simply catch fire and not explode.

My Inconvenient Truth

Civilization as we know it will end with the depletion of fossil fuels unless our leaders can bring nuclear on-line in time. But even that will only delay the next Stone Age.

A Mild Deception

Many celebrities appear on television and say, "I did my part! I bought an EV!" But they did not tell you that you must invest in an expensive charging system at home. They did not tell you that the advertised driving distance per charge may be inflated. What is the range on a 100-degrees day at 70 MPH with the air conditioning running at full blast? Driving 70 MPH requires much more energy than driving 50 MPH. Remember when the national speed limit was 55 MPH? People rebelled.

Consider driving on the Indian National Turnpike in the middle of Oklahoma and the charge meter is running low. Where are you going to find a charger? You cannot call roadside assistance

for a five gallon can of gas. “OK,” you say, “this is a short-term inconvenience.” But the time from “short-term” to an effective infrastructure is decades, not years.

Life gets tee-jus, don’t it?

Stupidity Defined

A presidential hopeful wants to satisfy a certain constituency to end production of fossil fuel. He promises that he will. The first day in office, he hamstrings domestic production of oil, then goes to other countries to buy back the short fall!

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