Fact or Fiction?



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"The suggestion that petroleum might have arisen from some transformation of squashed fish or biological detritus is surely the silliest notion to have been entertained by substantial numbers of person over an extended period of time."

- Thomas Gold¹

Do you believe that oil is a biogenic fossil fuel and is formed from compression of the remains of photosynthetic organisms over centuries and millennia?²

Not so say some folks, particularly Thomas Gold, a controversial professor at Cornell who died in 2004 at age 84. In 1998, when he was 78, he published *The Deep Hot Biosphere: The Myth of Fossil Fuels*, a book that challenged the conventional wisdom regarding oil.³

Gold's thesis is that oil and natural gas are abiogenic, not a product of fossils and prehistoric forests that were deposited in layers and transformed through heat and pressure over the course of time but rather the bio-product of a continuing biochemical reaction below the earth's surface that is brought to attainable depths by the centrifugal forces of the earth's rotation. He postulates that long before life formed on earth, hydrocarbons developed naturally in the planet's interior, just as they have been discovered on other planetary bodies and moons in the solar system. From the light gas methane to the heavy liquid petroleum, hydrocarbons exist in prodigious quantities and great depths and could sustain our energy needs for many centuries or millennia to come.4

A first reaction is to think that Gold is probably some kind of nut case. However, he has a track record of coming up with a variety of weird ideas, some of which have been shown to be correct after initially being rejected by experts in the field. These include such diverse ideas as a theory of hearing, the nature of pulsars and a theory of the earth's axis of rotation.⁵ Renowned physicist and mathematician Freeman

Unlimited Oil?

Dyson wrote the forward for Gold's book³ and the famous and prolific author and professor at Harvard, Stephen Jay Gould (now deceased) said this about Gold, "My colleague Tom Gold of Cornell may be one of America's most iconoclastic scientists. But no one sells him short or refuses to take him seriously - for he has been right far too often."⁶

Robert Ehrlich reports, "At one time it was believed that the biosphere - the domain of living systems - ended a short distance beneath the surface of the planet. But it now appears that much of the Earth's crust may literally be teeming with life that thrives on extreme conditions of temperature and pressure. These 'extremophile' bacteria have been found to survive at temperatures as high as 169°C in a marine sediment drilling core. At such high temperatures, bacteria could survive at depths up to around 10 kilometers, where the pressure is sufficient to permit water to remain liquid. Gold has estimated that the total mass of subsurface bacterial life may exceed the mass of all life on the surface."7

Ehrlich adds, "Another reason for reopening the debate about the origin of hydrocarbons is that large amounts have been found throughout the solar system on every planet but Venus, Mars and Mercury. They are also found on many planetary moons. Methane has been found most frequently, but ethane, other hydrocarbon gases and tar have also been observed. The absence of hydrocarbons on Mars and Mercury is due to the lack of a sufficiently dense protective atmosphere, and no information exists about surface hydrocarbons on Venus because of its dense, opaque atmosphere. Hydrocarbons have also been found in solid and gaseous form on a number of comets and asteroids. They have even been found in interstellar space. It seems likely that the widespread existence of hydrocarbons throughout the solar system and the universe beyond is a matter of chemistry, not biology. Why, then, do we need to invoke a biological explanation to



explain the existence of hydrocarbons on our particular planet?"⁸

Michael Shermer notes, "Evidence for Gold's theory comes from numerous sources: petroleum from deeper levels in the crust contains fewer signs of biological origin than petroleum from shallower levels; oil from different regions of the planet should show differing chemical signs because of the different forms of life from which it was allegedly formed, yet all oil shows a common chemical signature, which you would expect if it had a common origin deep inside the earth; one would expect to find oil at geological levels of abundant plant life but, in fact, it is found below such layers; the natural gas methane is found in many locations where life most likely did not thrive."4

What this means according to Gold is that most oil fields contain far more reserves than oil companies anticipated because they are refilled from the much larger hydrocarbon supply lying below. The drop in pressure in the oil cavity caused by drilling draws the hydrocarbons from the higher-pressure cavities below.4 An example; in their book Black Gold Stranglehold, Jerome Corsi and Craig Smith ask, "If we are running out of oil, why are worldwide oil reserves today at historically high levels? The truth is that we have never had as much oil and natural gas in proven reserves worldwide than we have right now. According to the Energy Information Administration of the US Department of Energy, worldwide proven reserves of crude oil in 2005 total 1.28 trillion barrels. In 1980, the worldwide proven oil reserves were 645 billion barrels."9

Gold's theory is supported by a considerable mass of evidence. The pattern of petroleum deposits and the mix of elements associated with them around the world, dramatic results of a Swedish drilling project in nonsedimentary rock, and indications that some petroleum reservoirs are refilling, are some of the evidence that supports Gold's thesis and cannot be adequately accounted for by conventional theories. $\!\!^3$

Gold reasoned that we find more oil in the Middle East than Florida or Montana because deep subsurface structures in the Middle East are more fractured there, allowing the oil to flow upward due to its low specific gravity and the rotation of the Earth. He believed the reason we find oil in sedimentary rocks is not because of encased rotting ancient forests and dinosaurs, but because sedimentary rock is porous enough for the oil moving toward the surface of the Earth to pool within it.¹

Gold is not alone in his theory of non-biologic formation of oil. Over the past 50 years Soviet scientists have published hundreds of papers on this topic. The theory is widely accepted in Russia, though largely unheard of in the rest of the world. Jay Lehr notes, "The reason the theory never left Russia is that Stalin had no reason to inform his enemies, especially not Americans or the British. Also, most of the findings of the Soviet scientists were published in Russian, and few American or British scholars of the day read Russian. Besides, we were locked into the mindset that oil is a fossil fuel." The Russians have uncovered vast reserves of oil; as a result of not looking for biological decay and seismic structural traps, but rather just geologic structural traps connected to deep crustal hot spots.1 Shortly after Gold's death in 2004, some chemists at the Carnegie Institution in Washington found that there is a possibility of an inorganic source of hydrocarbons deep within the earth from a simple reaction between water and carbonbearing rock. These experiments point to the possibility of an inorganic source of hydrocarbons more than 100 miles deep where the pressures and temperatures are extremely high.10 More recently, an article in Science seems to also suggest that the abiotic theory is correct.11

Summary

If Gold is right, the stakes for humanity are enormous, which makes it all the more important to examine his hypothesis with an open mind, unburdened by long held beliefs whose basis does not rely on fundamental principles. Currently, the world relies on the so-called fossil fuels for a major portion of its energy. If humanity is to have a long term future, eventually we will need to switch to renewable options. Abundant sources of coal, oil and gas would make the transition much easier.

Throughout the history of science, there have been any number of cases of ideas once thought to be crazy that later turned out to be true. Edward Jenner's smallpox vaccine, described by Paul Ewald as the greatest breakthrough in the history of vaccination, earned Jenner nothing but ridicule for over ten years. Even after it had been effectively used by Napoleon and folks in the United States, part of the medical establishment in England was still working hard to discredit it.12 The germ theory of disease was not accepted until well into the nineteenth century and resisted for decades by leading medical researchers and practitioners. Once the germ theory was embraced however, the search for deadly pathogens raged throughout the twentieth century.⁴ It wasn't until 1923 that Edwin Hubble made us realize that the universe is bigger than anyone imagined - a lot bigger. He noted we are not merely a grain of sand among a hundred billion grains on a single beach. There are in fact hundreds of billions of beaches, each one of which contains hundreds of billions of grains.4

So why hasn't something been done about oil? A tough question to answer. Jay Lehr suggests, "Americans have been deeply invested in the idea that we are running out of oil, and that oil companies are making unconscionable profits while destroying our environment and ignoring renewable energy sources. Any competing idea is so threatening that it has to be ridiculed and left unexamined, lest it be proven true." While Robert Ehrlich adds, "You might imagine that, given the financial stakes involved, some oil companies would have taken advantage of Gold's theory (assuming he were right), and their lack of interest, therefore, would seem to argue against the correctness of his theory. But it is dangerous to make arguments based on the motivations of oil company executives. One could argue, for example, that it is in the interest of the oil companies to keep oil prices high by promoting an image of scarcity, and that currently they would have little interest in finding that oil is far more plentiful than had been thought."13 P&SF

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