2028 “A Burning Torch Fell from Heaven”

In the first week of January 2028, Cap sat at her dining room table with her books scattered across the table and her computer in front of her. She was reviewing her notes in preparing for her 2028 forecast. She looked across to the Cathedral. The last light of the setting sun illuminated the western face of the dome. The grey stone was bathed in a soft red glow.

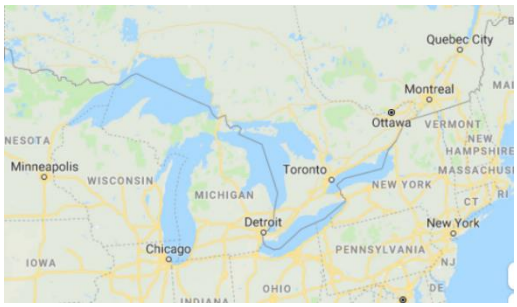
She thought about what was going to happen next. The next big event ought to be the Third Trumpet of Revelation. It would be a Flaming Star which would fall to earth and poison a third of the waters.

A friend called from around the corner. Cap called down to the security desk to allow her in. The friend had come by to be a sounding board for Cap’s presentation. The friend was familiar with the routine. While Cap organized her notes, the friend made herself a cup a tea and settled in. The friend was Cathy Jones. She held a number of part time positions at the University. One of them was as a proof reader. Cap respected Cathy for her ability to appreciate nuances in the English language

Orion Arm of the Our Galaxy

Over the last few years, Cap had read up on the sun. Our sun sits on the inner edge of the Orion Arm of the Milky Way. The sun orbits the center of the galaxy at about 560,000 miles per hour. Inside our sun, deep beneath the dense sea of super-hot hydrogen, a process goes on under unimaginable temperatures in which hydrogen nuclei are compressed almost to the point of exploding. Gravitational pressures crush the core of the sun. The hydrogen is 150 times the density of water. Hot plasma is interwoven SEP with magnetic fields. Their nuclei are ripped apart and fused into helium. Energy is released to fuel the conversion of more hydrogen. Hundreds of millions of tons of hydrogen are converted each second. And for every helium atom formed, roughly a trillion photons are emitted from the sun’s surface.

As Cathy took a sip of tea, Cap spoke. “Every atom of water contains two atoms of hydrogen. Do you realize that every atom of hydrogen in your body was created in the Big Bang? Every one of your hydrogen atoms can trace its history back to the first moment of creation, about 13.7 billion years ago. A significant part of you is as old as the universe. Maybe half of you is 13 billion years old. The rest of you came a little later. Several hundred million years later, the hydrogen and Helium began to coalesce into stars. When they were large enough or when they turned into Red Giants, their internal temperatures allowed the fusion of Hydrogen or Helium into atoms as heavy as carbon or oxygen. Heavier stars produced heavier atoms, all the way up to Iron. The elements which are heavier than Iron were produced in Supernovas. When all the lesser elements are fused and the star is left with an iron core, it collapses to a density a billion times the density of earth. Then, it explodes. In a few seconds, it grows to be as bright as a galaxy and gives off as much light as our sun in its whole 10-billion-year life.”



Cathy was impressed. She didn’t hear such things very often. “That is interesting. And, how does it relate with what will happen this year?” Cap answered that it was good to have a healthy respect for solar dynamics in order to appreciate what is about to happen on the sun.

Cap explained her line of thinking. She read Revelation Chapter Eight aloud. ” And the third angel sounded the trumpet, and a great star fell from heaven, burning as it were a torch, and it fell on the third part of the rivers, and upon the fountains of waters. And the name of the star is called Wormwood. And the third part of the waters became wormwood; and many men died of the waters, because they were made bitter.”

“This describes an event in which something like a part of the sun falls onto the earth. Let’s suppose for the sake of discussion that an interstellar cloud passes through the solar system. It energizes the sun. At some point, the sun explodes like a blown circuit. A boiling mass of hydrogen is ejected. Astronomers have seen this happen. They have seen balls shooting out from the Sun. But this time, it shoots out in the direction of the earth. In three hours’ time, it strikes earth.

The Great Lakes

So, then the question arises, where does it strike the earth? Where do you think? Where would be the third part of the rivers and the fountain of waters? Cathy supposed that the reference to many rivers would indicate the Amazon. Cap answered "It happens that 20% of the fresh water in the world is held in the Great Lakes. More than anywhere else."

To the north, the lakes of Canada speckle the landscape. There is one after another. There are approximately 250,000 lakes in Ontario and although it is hard to imagine, there are a million in Quebec. When the many lakes in Ontario and Quebec and the surrounding areas are added together, the amount of fresh water approximates one third of the fresh water in the world. By way of comparison, Minnesota is known as the 'Land of 10,000 Lakes'. 10,000 lakes is big compared to the average in America but small compared to the 1,250,000 lakes in Ontario and Quebec.

Here again 'the third part of the waters' is the name of a place. If you wanted to name this place so that 2000 years from now someone would know what place you were speaking about, what would you name it? You could not say Ontario or Canada. Both names are only three hundred years old. In two thousand years, those names will have been forgotten for hundreds of years. The languages will have passed away. Cathy agreed that "the third part of the waters" was an enduring name for the place.

Then there is the name "The third part of the rivers". The same reasoning applies. There are rivers connecting all those 1,250,000 lakes. There are at least 1,250,000 rivers. The number is hard to imagine. There are rivers and creeks everywhere.

Cathy nodded in agreement and asked. "Then, what about the word 'Wormwood'? Cap answered that "Wormwood is the translation of the Ukrainian word Chernobyl."

Chernobyl is the site of the broken nuclear reactor which poisoned millions of acres with radiation. Chernobyl will be uninhabitable for 10,000 years. Wormwood is a clue that we are talking about nuclear radiation."

One can easily deduce that the star will poison the Great Lakes region, but let's look again at the question, where will it fall? It will not fall on the Great Lakes, but on the 'source of the waters', which is the region of Quebec and Ontario. All the little lakes of the region are the

source of the waters. The waters flow through hundreds of thousands of rivers toward the Hudson Bay, in the north and toward the Great Lakes and St Lawrence River in the south.

Cathy said “I am from Chicago. What will happen to Chicago?” Cap answered that Lake Michigan will likely be struck with fallout. Depending on which way the winds are blowing, Chicago could be under the fallout cloud too.

Chicago draws it water from Lake Michigan. Some of the contaminated rivers will drain into Lake Michigan and the poisoned water will sooner or later reach Chicago.

Verse 11 says “…and many men died of the waters”. You would think that people would know better than to drink the water. But it could be more than a matter of drinking the waters. It could be that flaming star vaporizes the lakes and rivers over a large area, and the vaporized waters then create a large bubble which poisons the area. It could fall like rain. People could be soaked in the water. They might be stranded in the radioactive zone for days. In this case, ‘made bitter’ means the waters were made radioactive.

2028 Usselo Horizon

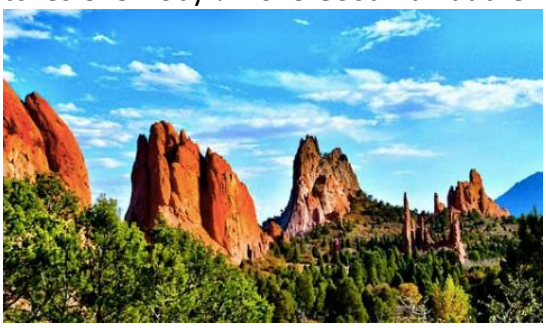
Cap looked off, like she was remembering something. Then, she looked at Cathy. “This wouldn’t be the first time that the Great Lakes were struck with disaster. While I was researching, I found that buried in the sediments of the Great Lakes region is a thin layer of charcoal, which resulted from a fire which struck North America and Europe about 12,000 years ago. At first it was thought that it might have been the result of a series of volcanos. But, as more information came in, a consensus grew that it was the likely result of a asteroid impact. It ended the Clovis Culture, wiped out the Wooly Mammoths and ended the Cave painting culture in Europe.

The Usselo Horizon is the name of the layer of charcoal which was first discovered in a sand pit in Usselo, Netherlands. It was the evidence of a worldwide conflagration. There was a time when everything had burned. Nearly the whole earth was covered by a layer of black soot. Then the first plants to recover were ferns.

Cap took out a small envelope and carefully poured its contents onto the table. She used her hand to keep a dozen little round balls from rolling away. ‘These are impact spherules. I signed them out from the Geology Department. When an asteroid strikes the earth, it vaporizes rock. The vaporized rock expands into a giant vapor plume. The little droplets of molten rock then condense and solidify and fall back to earth. They found these in the Usselo Horizon.

Alternate Theory

Cap told Cathy, “there is an alternate theory. Wormwood might not be radioactive. It could be bitter. A flaming star would burn the nitrogen in our atmosphere and create nitrous acid. Wormwood, the herb, is bitter. Nitrous acid in water is bitter. The lakes and rivers might turn acidic.” Cathy asked ‘then why call it a name which matches Chernobyl?’ *2028 Goodman at the Fort Carson Conference*



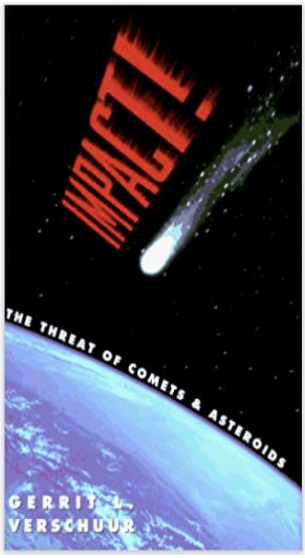
Months later, Colonel Goodman was scheduled to make a presentation at Fort Carson, Colorado. The subject of the conference was Geophysical Challenges and Military Implications.
As a senior officer with a strong background in the Earth Sciences and Astronomy, Hap had been booked to share his insights into the current state of affairs.

The Colonel arrived early to allow himself a couple days to get some fresh air. Fort Carson was the second most requested duty station in the continental United States. The first day, Hap took a tour of the Garden of Gods. He enjoyed seeing the amazing rock formations. One had the sense that something momentous had happened here. Long ago, sedimentary beds of deep red sandstone had been thrust up vertically. Native Americans considered the place sacred. The rocks spoke to Hap as they had to the Native Americans. Here is an ancient seabed. Here is an ancient sandy beach. There is a sand dune and there, the remains of a delta of some river which long ago disappeared.

In the afternoon, Hap took a ride on a cog railroad to the top of Pikes Peak. From the top, on a clear day, one could see all the way to New Mexico or Kansas. This view inspired Katherine Bates to write “America the Beautiful” in 1893. It inspired Hap, too. It made him think about how close we lived to the edge of extinction. He stood atop a massive mountain, which the Indians called “the long mountain.” The wind whistled about him. He had the strongest sense that the stunning vista before him might vanish at any moment.

Hap was scheduled to speak on the second day. He sat in on a couple conferences the first day. He enjoyed one conference titled Tour of the Asteroid Challenge. Hap had recently read *Impact* by Gerrit Verschuur. Verschuur calmly laid out the Asteroid Threat and closed by concluding that we are doomed. “An impact will, sooner or later, wipe out civilization”.

Hap came away from the conference with three statistics. One, that a half kilometer asteroid could do major damage to a society. Two, a 10-kilometer asteroid had killed the dinosaurs. Researchers at Purdue said that earlier in the life of earth, our planet had been bombarded with asteroids from the asteroid belt which normally lies between Mars and Jupiter. Some of the asteroids were 20 miles wide, much larger than the dinosaur killer. They were big enough not only to kill most of the animal life on the planet, they could also destroy the mountains and the plains.



Wilkes Land Crater of Antarctica

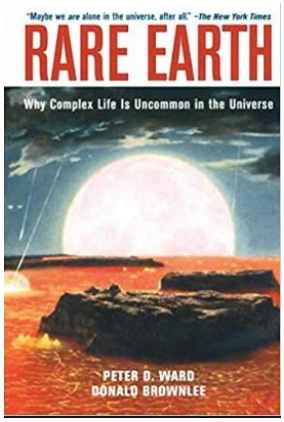
The third statistic was 300 miles. That was the size of the Wilkes Land Crater of Antarctica. The Crater is hidden beneath ice and was only recently discovered. 250 million year ago, a 30-mile-wide asteroid struck Antarctica and punched into the center of the earth. It was only recently discovered beneath the ice cap. It is believed that the effects may have caused the Permian Extinction, in which ninety percent of the species died.

Siberian Traps

The Wilkes Land Meteor drove deep into the earth. Lava burst out the opposite side. Called the Siberian Traps, the volcanic eruption covered an area the size of Europe and went on erupting for a million years. It is believed that water temperatures in the oceans rose to 105 Fahrenheit.

A couple weeks later, Hap entered the auditorium of the Cheyenne Mountain complex to give a report on the Challenges conference. He reported that one of the most interesting of the conferences was titled, “Where Are They”. The story started with a cartoon. In 1950, the New Yorker published a cartoon which showed aliens taking away the trash cans of New York. On the way to lunch at Los Alamos, Enrico Fermi, Edward Teller and a couple others discussed the cartoon and the subject of UFOs. Then, the conversation drifted on to other topics, like traveling faster than the speed of light. At some point later during lunch, out of the blue, Fermi mused out loud “Where are they?”. Everybody laughed because they understood what he was talking about.

Fermi was well known for his ability to make a good estimate based on limited data. He guessed that we ought to have been visited long ago by aliens and many times since. There are about 300 billion stars in the galaxy. Many of them are a billion years older than the earth. Even at slow speeds, it ought to take only about 5 to 50 million years to colonize the galaxy. Hence, the paradox.



The Fermi Paradox

The Fermi Paradox says that given the age and size of the galaxy, many civilizations ought to exist. However, this is inconsistent with the lack of solid evidence of extraterrestrial life.

Hap went on to talk about three closely related subjects, The Principle of Mediocrity, The Great Filter and The Rare Earth Theory.

The Mediocrity Theory.

The Mediocrity Theory was popularized by Carl Sagan. Sagan thought that there might be a billion civilizations out there. “The principle of mediocrity states that the Earth is a typical rocky planet in a typical planetary system, located in a non-exceptional region of a common barred-spiral galaxy. Hence, it is probable that the universe teems with complex life.”

The Great Filter

We expect that if intelligent life were abundant in the galaxy and universe, colonization and visitation ought to have brought us in contact with extraterrestrial life long ago. Self-replicating spacecraft, exponential growth of technology, availability of resources in our solar system and large time horizons would have made visitation an easy task, but colonization has not occurred. It follows that one of the steps leading up to a colonization explosion must be improbable. If the ordinary evolutionary process is not the problem, then the improbable step lies ahead of us. It may be that many civilizations have advanced to the point where we are now, but have failed to achieve colonial expansion.

Rare Earth Hypothesis

In 2000, a book was published which took the opposite view. *Rare Earth: Why Complex Life Is Uncommon in the Universe*, by Peter Ward, a geologist and paleontologist, and

Donald E. Brownlee, an astronomer and astrobiologist. They theorized that friendly environments such as we have on earth are rare for several reasons.

Goldilocks Principle

Complex life requires water. Too close to the sun will evaporate water. Too far, and water will freeze. Earth like environments require earth like temperatures.

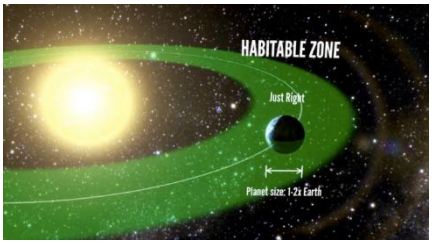
A Gas Giant

A Gas Giant like Jupiter acts like a vacuum cleaner in sucking up wayward asteroids. “Without the long, peaceful periods offered by Jupiter’s shield, intelligent life on Earth would never have been able to take hold.”[i]

A large Moon

A large moon has affected the rotational tilt and speed in an orderly way that supported tidal pools and photosynthesis.

A planet of the right size, with plate tectonics and a stable orbit. “Once you realize that most of the known extrasolar planets have highly eccentric orbits (like the planets in Upsilon Andromeda), you begin to wonder if there might be something special about our solar system.” said Eric Ford, a fellow at UC Berkeley. [ii]



An evolutionary trigger for complex life

Half the life of the planet had passed by and evolution was stuck at the stage of single cells. Hundreds of millions of years passed by without change. And it might have gone on like that indefinitely. But for some unknown reason, the first single cell evolved with mitochondria. It was a stepping stone on the way to more complex life forms. It almost didn’t happen.

Galactic Dead Zone

Most of the galaxy is a dead zone as far as life is concerned. Too close to the center of the galaxy would entail too much radiation. Too far, would involve too little metal. The Galactic Habitable Zone is a small ring in the right place in the galaxy.

Orange Sky

Following the advent of mitochondria came the Great Oxidation Event. Prior to two billion years ago, oxygen was present in only trace amounts. The atmosphere was rich in methane which gave the sky an orange color. Dominic Papineau of the Carnegie Institution for Science, theorized that geologic changes caused higher levels of phosphorus to wash into the oceans, which in turn "caused vast algal blooms, pumping extra oxygen into the environment which allowed larger, more complex types of organisms to thrive." The extra oxygen caused the sky to change from orange to blue.

"Phosphate rocks formed only sporadically during geologic history," says Papineau, a researcher at Carnegie's Geophysical Laboratory, "Single- celled organisms grew larger during this time and acquired cell structures called mitochondria, the so-called powerhouses of cells, which burn oxygen to yield energy. The second phase of oxygen rise occurred between about one billion and 540 million years ago, and brought oxygen levels to near present levels. This time interval is marked by the earliest fossils of multi-celled organisms and climaxed with the spectacular increase of fossil diversity known as the Cambrian Explosion." [iii]

Cambrian Explosion

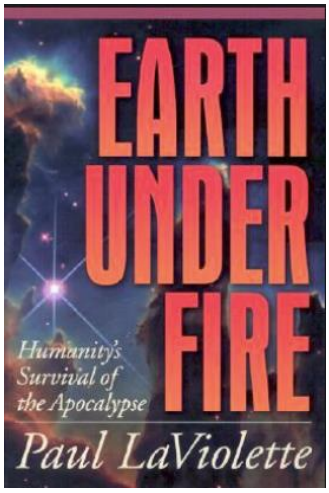
For some unknown reason, a host of new species of early animal life exploded about 542

million years ago. [iv] Prior to that, there were just simple cells. Trilobites and many others came from nowhere. Charles Darwin considered it one of the main objections to his theory of evolution.

Rare Earth Equation

The Rare Earth equation calculates the number of Earth-like planets in the Milky Way having complex life forms. The equation begins with N, the number of stars in the galaxy, and then divides by the fraction of those which occupy the habitable zone, have planets, which are rocky, where microbial life arises, where complex life arises, has time available before the Red Giant phase, a large moon and gas giant, and low extinction events. The answer to the equation, depending on input, is thought to be more than zero and less than one.

Hap turned to his audience and said “If you accept what these people have to say, then we could be the only ones in the galaxy. If fact, by some counts, we should not even be here. Only by the slimmest chance did events develop that made our life possible. By all likelihood, this planet should be the domain of bacteria at most. If we were visited by aliens, they ought to find barren rock and bacteria.



2028 La Violette

A few weeks later, there was an uptick in solar activity and unprecedented aurora borealis in the mid latitudes. Staff members of Cheyenne Mountain were being given passes to go outside at night to look at the unusual display. Some had never seen the aurora borealis before.

Hap sensed that trouble was on the way. He laid out his thinking at the officers club one night. He reviewed the basics. Polar lights are the interactions between the solar winds and the earth magnetic field. With the air of a man talking about trouble which he sees coming, he said that solar outbursts were to be expected.

Earth was fried

Hap then began to talk about Paul La Violette, an astrophysicist who had concluded from trace evidence around the world that the earth suffered a Super Proton Event at

the end of the last ice age.[vi] In an SPE, solar particles and protons invaded the atmosphere in volume. There would have been intense solar flares and Coronal Mass Ejections on an enormous scale. At that time, there was an abrupt change in climate and major faunal extinctions. [vii]

Three Day Lethal Radiation Dose

LaViolette said that a massive solar proton invasion would have greatly reduced, or even eliminated, the ozone layer. The ozone layer serves as a protection against harmful radiation, but could be overwhelmed by a sufficiently large barrage of protons. According to his calculations, humans and large animals would have accumulated lethal doses of radiation in three days. The best means of protection would have been to seek protection in caves and underground.

Galactic super waves

LaViolette was the first to suggest a "Galactic super wave." He proposed that from time to time, earth and our solar system have been inundated with a tide of Galactic Cosmic Rays, GCR's. He concluded that the center of our galaxy, a black hole, explodes every 10,000 years or so and washes the whole of the galaxy in cosmic rays. In such an event, the earth would be bathed in a cascade of harmful radiations including radio waves, visible light, UV, X and gamma rays.

EMP

A GCR will induce a high intensity electromagnetic shock, an EMP. Transformers will

melt. Electric grids will go down. Some electronics will melt. LaViolette theorized that some of the super wave pulses could arrive in spikes which approximate the signal of a[viii]

high altitude nuclear explosion.

Dust and the Sun.

LaViolette maintained that a great cloud of dust and other materials crashing into the sun could energize it. Causing it to become brighter and to increase its cosmic ray output. In his dissertation, LaViolette proposed that a large cloud of cosmic dust could energize and destabilize the sun. Massive solar eruptions and continuing flares would result. A Super flare could send a fireball capable of scorching the earth.

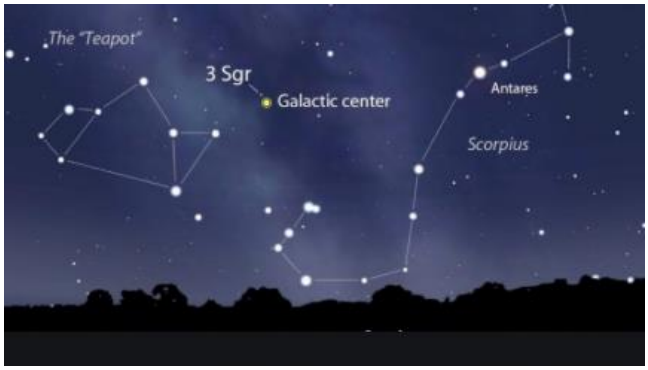
Distant Star causes Earthquake

In 2004, a star fifty thousand light years away gave off a giant flare. In one tenth of a second, it gave off more energy than has our Sun in the last 100,000 years. LaViolette theorizes that the EMP of a galactic super wave would also be accompanied by a gravitational wave. It would be a ripple in time space. The day before the gamma rays hit the earth, an earthquake hit the west coast of Sumatra. Gravitational waves travel a little faster than gamma waves.

Dust

Hap respected La Violette because he had predicted that the solar system was surrounded by dust. At the time of this prediction, astronomers believed that outside the solar system there resided in a relatively dust free region of space. The significance of the large amounts of dust is

that it would amplify the effects of a super wave. Later research by the IRAS satellite team showed that the solar system is surrounded by cirrus like clouds of dust.



LaViolette proposed that the Galactic center could produce outbursts every 500 years and that we were overdue. Ancient records and lore correctly associated the constellation Scorpius with the center of the galaxy.

Extinction

Hap looked at the group. “Ten thousand years ago, it was the Mammoths which faced extinction. This time it is us.”

2028 Sun explodes

A month later, back at Cheyenne Mountain, Hap read reports that the dust cloud continued to drive deeper towards the sun. Flares grew larger and more frequent. Multiple fireballs shot out from the surface. The aurora borealis were spectacular. Then, the sun ejected a fireball straight at Earth. It struck the border between Quebec and Ontario about half way between Lake Ontario and the Hudson Bay. It scattered nuclear debris in every direction for three hundred miles.

Its immediate fallout area included the Great Lakes, Ontario and a large part of Quebec. The explosion vaporized a half million lakes. The lakes blew up into a toxic mixture of radiation and water. Rivers of rain fell from the sky. Houses were blown apart for a hundred miles. Streets were flooded. More than one million fresh water lakes were contaminated.

The fallout cloud slowly drifted toward New York and the eastern seaboard, fanning out to embrace the whole of New England. The fallout area would reach from Nova Scotia in the north and to Maryland in the south.

The grid went down. The surge played havoc with communications. Even as the radioactive cloud moved across western New York, the people in its path were only aware that the electricity went out.

Finally, a couple hours after the strike, the military announced that they believed that a solar plume had struck east central Canada. Wind was carrying the debris eastward. They avoided

the using the word nuclear. They warned that as the solar material may contain some natural radiation, citizens are advised to stay indoors for the next 24 hours. Roads were immediately clogged as people tried to drive south, out of the path of the nuclear cloud.

[i] http://news.nationalgeographic.com/news/2007/08/070827-jupiter-comets_2.html

[ii] UC Berkley News http://www.berkeley.edu/news/media/releases/2005/04/13_planet.shtml

[iii] https://carnegiescience.edu/news/
did_phosphorus_trigger_complex_evolution−and_ blue_skies [iv]

http://evolution.berkeley.edu/evosite/evo101/VIIB1cCambrian.shtml

[v]

13 Wiki Rare Earth Hypothesis [vi] http://starburstfound.org/predictions-part-1/ [vii] Forgotten Civilization: The Role of Solar Outbursts in Our Past and Future, Robert M.

[viii]

http://www.bibliotecapleyades.net/esp_galacticsuperwave04b.htm