

THE DEATH  
OF THE SUN

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## THE DEATH OF THE SUN

Once upon a time a planet in a far distant galaxy put out its sun.

Not on purpose, of course. Here is how it happened.

Once the planet had reached the point of travel within its solar system, it conceived the brilliant idea of tapping its sun as a source of energy for interplanetary travel.

The advantages of such a practice seemed myriad. First, enormous quantities of energy were available at minuscule cost. It was estimated that 40 billion springus of propulsion power could be delivered for less than 1500 kopags. That would be the equivalent of a gallon of gasoline for .00073 cents.

Second, there was no other cost effective way to increase the speed of interplanetary travel enough to make regular trade and intercourse practical. Using conventional fuels it took, for example, over a year for a spaceship to travel to the nearest planetary neighbor. The more distant planets took five to seven years to reach. Using energy mined directly from the sun, the same trips took five days, a month, and six weeks, respectively.

Finally, energy from the sun could be considered, for all practical purposes, inexhaustible. It was estimated that the first fifty years of interplanetary

travel, leveling off at 157 million flights per year, would use no more than .0000659874 of the sun's energy.

Even so, twenty-three years of painstaking testing, debate, and litigation preceded the actual start of commercial mining. The process was studied from every conceivable angle, until all responsible scientists pronounced it safe, insofar as existing instruments could measure it. Computer models showed not the slightest effect on the sun's continued ability to produce energy. Political support for mining grew as the energy requirements of interplanetary travel raised the price of energy to levels which threatened economic stagnation. Enough testing, the public began to say. Enough litigation. Let's get on with it.

To satisfy the timorous, severe restrictions were put on mining for the first fifty years. The sun's energy was to be used for nothing but a limited number of interplanetary flights. And a commission of the planet's most eminent scientists, including those leading the opposition to mining, was set up to monitor the sun's activity. One word from this commission, and all use of the sun's energy was to be suspended.

The ceremony marking the first shipment of energy from the sun's core into vast storage tanks ringing the planet was marred only by a small group of demonstrators, the same cranks who ritually oppose all technological progress, professional naysayers whose ancestors undoubtedly opposed the introduction of candles on the grounds of air

pollution. As the first fifty years of mining passed, experience proved them wrong, as usual. Interplanetary travel became routine. Even the outer planets were rapidly colonized. The population quadrupled. Unemployment, poverty, overcrowding, shortages of raw materials—all these became memories of the elderly. The home planet became a luxurious condo complex inhabited by the best and the brightest. As the populace looked forward to the lifting of all restrictions on the use of the sun's energy, only more peace, prosperity, and happiness seemed to lie ahead.

The commission charged with monitoring the sun's activity grew, understandably, a bit lax in its vigilance as over fifty years went by with no measurable effect on the sun. Its budget was cut several times, and the scientists willing to serve on it were no longer of the first rank. Even so, in the seventy-third year of mining, a junior scientist monitoring isotopes in the sun's radioactive envelope noted a minuscule change in the proportion of  $\text{He}^{423}$ . His report was filed with other reports and nothing more was said about the matter.

Several more decades of monitoring revealed a disturbing trend—a slow but unmistakable decrease in  $\text{He}^{423}$ . The amounts seemed ludicrously tiny to the layman—from 15 parts per billion to 14.8429—but eventually the concerns of a few scientists made their way into scientific journals and the popular press. What was happening? What did it mean? Not one scientist could state definitively why the proportion of  $\text{He}^{423}$  was declining; whether it was related in any way

to the mining, or whether it was a cycle that occurred naturally and would reverse itself in due time.

The mining, meanwhile, continued.

A number of governmental panels came and went, none able to say anything definite about the phenomenon. In the absence of any proof of danger, or even that mining the sun's energy was a contributing cause, it seemed irresponsible to wreak havoc on the lives of the entire populace by halting mining. People were by now scattered over the entire solar system, dependent for their survival on regular trade. Conventional fuels were no longer remotely adequate to the task of servicing this expansion; aside from considerations of cost, they would be depleted in a matter of months. Recalling the population to the home planet would be the equivalent of asking the entire population of the planet Earth to crowd into the state of New Mexico.

In short, there was no way to stop mining the sun without killing off three-fifths of the population and impoverishing the rest.

Even so, at great political cost, a courageous administration cut the rate of growth in use of the sun's energy by ten percent. This was considered a victory for the environmentalists who, never satisfied, demanded fifteen percent cuts. Trillions of kopags were invested in a search for alternative energy sources, and for the first time high taxes were slapped onto the sun's energy to discourage use.

Just in time for the hundred-and-fiftieth anniversary of the start of mining, scientists finally

agreed on what was happening. Mining had a totally unforeseen effect on the fusion process within the sun, one which had not been measurable by instruments available a hundred and fifty years earlier. The removal of each trillion sprinugs of energy resulted in the creation of one atom of a new element called  $Ka^{73}$ , apparently through a complex series of reactions brought about by an almost imperceptibly minuscule decrease in thermal energy in a given region of the sun's core. Scientists estimated that in the first hundred and fifty years of mining about 612 of these atoms had been created.  $Ka^{73}$  had the unfortunate tendency to unite with  $He^{423}$  to form contigunite, a new substance which seemed to act as a damper on fusion reactions.

Not to worry, of course. A hundred and fifty years of mining had produced, at most, .039 of a gram of contigunite, which, in relation to the sun's total energy, was like pouring an eighth of a drop of water onto a burning skyscraper. Still, a certain unease crept in. A few scientists retained by environmental groups pointed out that the effect would progress geometrically, since even minuscule amounts of contigunite would result in local decreases in thermal energy, which would create more atoms of  $Ka^{73}$ , which would unite with more  $He^{423}$  to create more contigunite, and so on. Scientists began to calculate the effects of a .029% drop in temperature in the next century. Some meteorologists claimed that the cooling trend had already set in, but most believed that it was still generations away.

The mining continued.

A blue-ribbon governmental commission was established to perform a cost/benefit analysis of the situation. It decided that even a 3.79% drop in temperature over the next three hundred years (the worst-case scenario given a 20% reduction in energy use) would wreak less havoc than a total suspension of mining. In other words, the consequences of continuing to mine at reduced levels were preferable to the consequences of stopping mining altogether.

The entire solar system slid into recession as 20% cuts in energy use took hold. A crash program was instituted to reach beyond the solar system so as to be able to mine nearby stars. People wondered vaguely what life would be like for their great-great grandchildren. Some were suffused with a discomfiting sense of guilt. Others professed to be unwilling to endure continued privation for the sake of generations unborn. As always, a few cranks boycotted all interplanetary trade and travel, achieving nothing more than an ostentatious stroking of their own egos.

The mining continued.

Two hundred thirty years after the start of mining, a computer model showed that once a certain critical mass of contigunite had been achieved, the process of shutting down the sun's fusion would become irreversible, and the sun would, over the course of centuries, go out. The critical mass projected by the model was alarmingly small, only twelve grams, an amount which some scientists believed had already

been reached through geometric progression. Others scoffed at the model. The mass of the sun was, after all, over  $2 \times 10^{30}$  kgs. How could twelve grams of any substance be a mass critical enough to affect so massive a body?

Even so, there were cries for an immediate cessation of mining. Who knew what day, what hour, what second the critical moment would pass? The government forced through an additional 30% cut in energy use, phased in over five years, over the objections of politicians from the outer planets. Efforts to reach the nearest stars, to remove contigunite from the sun, and to make each planet self-sufficient, consumed much of the solar system's wealth. Society came under military discipline, with everything rationed, and summary execution for theft, profiteering, and waste of resources.

The mining, however, continued.

Some hope stirred over the next few decades as several planets approached self-sufficiency. Eighty billion springus of energy went into an exploratory flight to the nearest star. A process for removing contigunite from the sun was tested successfully in a controlled fusion experiment, and plans were made to put an extraction facility in orbit around the sun. No one actually believed that the ultimate catastrophe, extinction of all life in the solar system, and as far as anyone knew in the universe, would actually come to pass. Technology had, perhaps, gotten them into this mess, but surely the massive and refined application of

technology over the course of several generations would get them out.

To think otherwise would be to go mad.

Meanwhile, the mining continued.

Two hundred and seventy years after the start of mining, a new technique was developed for measuring the total amount of contigunite on the sun. 11.3742 grams.

The entire solar system shuddered with both horror and relief. Horror that now mining would have to be stopped and at the privations that would follow. Relief that the critical mass had not yet been achieved.

The mining stopped.

Nearly all interplanetary trade and travel ended. Scarce resources were directed towards transporting refugees from the outer planets. The mentally ill and retarded, the physically handicapped, the diseased, and the elderly were simply abandoned. People lived heaped up on one another like ants. Only one out of fifty couples was permitted to have a single child. No one had hope anymore for happiness in this or the next generation. Still, the surviving remnant was willing to suffer extreme privation in good spirits. Computer models showed that in the absence of mining contigunite levels would begin to decline. Life was therefore saved. That was the main thing. What had happened to them was a mere historical incident. They had learned their lesson. Never again would they take even the most infinitesimal risk of extinction simply for an increase in material well being.

Never.

Their feeling was much like that of a drunk driver who, after crashing into a tree, is relieved still to be alive and almost grateful for the suffering that will deter him from ever driving drunk again.

Yet the following decades saw no decline in contigunite. In fact, the total mass of contigunite on the sun continued relentlessly to increase. Since there was still no measurable effect on temperature, the danger which so many people were suffering and dying to avert seemed somewhat arcane. There was, in fact, a lunatic fringe that saw the entire contigunite scare as a conspiracy, and talked darkly of clandestine energy use and hidden riches. But most people simply watched in horror as the numbers went up: 11.4 grams, 11.6 grams, 11.7 grams, and so on.

It turned out that the computer model which had predicted 12 grams as the point of self-generation had not taken into account two phenomena which had been recently discovered. Refining the model to reflect the migration of two electrons of  $U1^{792}$  to an inner orbit and the splitting of .00000000069347% of the  $U1^{393}$  atoms into  $Fo^{467}$  and  $Zk^{293}$ , two events which could not even have been guessed at before the invention of the Ergon Medio-Hylometer, resulted in a revised prediction of 11.1349652 grams of contigunite as the point of no return.

In other words, sorry folks! Guess you stopped mining a couple of months too late.

Or, you should have known that science was not an exact science.

In the riots and revolutions that ensued,

civilization was destroyed, and so all chance of finding a method to remove the contigunite, or of mining stars beyond the solar system, was lost.

Over the next hundred years, as temperatures began to drop, the population also began a long decline. There seemed no point in having children, no point in starting or maintaining institutions, no point in anything when the only result in the near term was extinction.

People once again became religious.

Death became a friend.

People realized that the end, ultimately, had always been extinction. The only question had been the relatively trivial one of when.

After several generations of turmoil, they were at peace with themselves and with nature. Despite lives of great privation, they became grateful to the catastrophe for teaching them this truth.

The end came quietly as temperatures dipped below levels tolerable for life. The several hundred thousand survivors on the home planet died of hunger and exposure over the course of three exceptionally severe winters. The last person, of course, had no idea that she was the last person.

The dying sun shone wanly on the dead world.

One thousand four hundred and thirty-seven years, five months, and three days after the start of mining, the sun went out.