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Precision fermentation: catastrophe lifeline

by GWYNNE DYER

On Saturday Asteroid 2023 DZ2 flew by our planet at 27,000 km per hour, closer to us than it was to the Moon. It was less than one-hundredth of the diameter of the gigantic asteroid that took down the dinosaurs and most other animals 66 million years ago (75% of land species extinct), but it would still have killed a large city with a direct hit.

?While close approaches are a regular occurrence, one by an asteroid of this size (50-100 metres in diameter) happens only about once per decade, providing a unique opportunity for science,? said officials with NASA's Planetary Defense Coordination Office. But even the scientists would not welcome an asteroid ten times as big as 2023 DZ2.

Most scientists used to believe that such big rocks hit Earth on average only once every 600,000-700,000 years. That figure has to be based on studies of how big and how fresh craters are on the Moon and Mars, however, because wind and water quickly erode the evidence of most asteroid strikes on Earth.

Now there's a new study out that suggests strikes in the one-km. range happen much more often. James Garvin, chief scientist of NASA's Goddard Space Flight Center, recently led a research team that says the big hits may happen up to a dozen times per million years. Bad news, he explained: ?It would be in the range of serious crap happening.?

A one-km-wide asteroid would boost megatons of vapourised rock into the stratosphere, where it would stay for years and block some of the incoming sunlight.

It wouldn't be complete darkness at noon like the dinosaur-killer of 66 million years ago (10-15 km.), but it would be dark and cold enough to kill most plants ? which would cause mass die-backs in the animals that eat them, too. Not enough to cause mass extinctions, probably, but really hard times for most living things, including people.

The one-km-range strikes don't usually leave any record in the rocks, because enough breeding pairs survive to build populations back up to normal levels in a few centuries. We certainly wouldn't want such a strike to happen on our watch, but even an average of once every 80,000 years gives us a decent chance of avoiding it.

Some of the biggest volcanoes, alas, cause much the same problem, and they explode much more often. Mount Pinatubo in 1991 drove immense amounts of gas and pulverised rock into the stratosphere, including 17 million tonnes of sulfur dioxide, and gave us a half a degree Celsius of global cooling for two years.

The ?Year Without a Summer' of 1816, after Mount Tambora in Indonesia exploded, saw average global temperature drop temporarily by3°C, crops fail everywhere, food prices soar, and millions starve. Lord Byron wrote the poem ?Darkness', which begins, ?I had a dream, which was not all a dream. The bright sun was extinguish'd.?

There are about a dozen known supervolcanoes in the world, mostly around the Pacific ?ring of fire' or in the Mediterranean region. They can produce worldwide climatic effects similar to a major asteroid strike, but possibly much longer-lasting. Such eruptions are unpredictable, but tend to happen at intervals of tens or hundreds of thousands of years.

And finally, the likeliest kind of ?darkness at noon': simultaneous firestorms that push smoke and soot up into the stratosphere in a hundred cities struck by nuclear weapons. It's called a ?nuclear winter', and even a relatively small nuclear war like India vs. Pakistan could cause global famine for a number of years, depending on how many cities burned.

The common denominator, the kill mechanism in all of these catastrophes, is the loss of sunlight, killing crops and causing mass starvation. The new technology that could protect the human race, or at least most of it, from death by starvation and related horrors

is ?precision fermentation': food that can be mass-produced without land or even sunshine.

It's bacteria that contain the right kinds of nutrition, fed on hydrogen produced by electrolysis of water, fermented in bioreactors and needing only light (which could be artificial) to double in volume every few hours. If necessary, the food they provide could feed the world.

The first pilot plants are being built right now, and in a few years ?food from the sky' will be cheaper than soya and the various grains that are currently grown to feed the world's domesticated animals. Indeed, within a decade much of the land that animal fodder used to be grown on may be returned to nature.

?Farm-free' food for people will come later, but the basic elements can be combined to suit human tastes too. In the future, if one of these catastrophes should strike, we can just switch from feeding the animals to feeding ourselves. We weren't even looking for it, and we're getting free survival insurance.