

OPUNTIA 455



Opuntia is published by Dale Speirs, Calgary, Alberta. It is posted on www.efanzines.com and www.fanac.org. My e-mail address is: opuntia57@hotmail.com When sending me an emailed letter of comment, please include your name and town in the message.

ROCKY MOUNTAIN WAY: GAP LAKE AND GROTTO MOUNTAIN
photos by Dale Speirs

Carrying on with photos from my trip out to the mountains on August 21, I present herewith Gap Lake, at the main entrance into the mountains. The cover photo was an extreme telephoto shot from a distance. I was trying to get the woman paddleboarder (lower left of photo) into the same frame as the mountains.



I was on the north shore where there is a picnic area. This page looks to the southwest.

The access to Gap Lake is from the old Trans-Canada Highway, now called Highway 1A, which tourists don't know about.

As a result, only locals and regular visitors like me go there. Quiet and peaceful, with parking right beside the north shore.

Looking south across the lake at the transcontinental railroad and Mount McGillivray. The Trans-Canada Highway is on the far side of the tracks, hidden by the spruce trees.

I find the greatest difficulty in mountain photography is getting the sense of scale. The mountains are so vast and high that trying to convey their immensity is difficult. Anything on the human scale tends to be lost against their backdrop.

Mount McGillivray is about 1 km high from the floor of the valley, which in turn is about 1.4 km above sea level. The peak is 2.4 km above sea level according to the topographical map I was using. The horizontal distance from where I was standing to the peak was 8 km.



The north side of the lake is bounded by Grotto Mountain. Without moving from the spot where I took the previous photo, I turned around and took these photos. The Grotto Mountain peak is 2.6 km altitude.



Two more telephoto shots along the shoreline.



BEAKERHEAD 2019
photos by Dale Speirs

[2015 to 2018 Beakerhead reports appeared in OPUNTIA's #322, 353, 391, and 424.]

The fifth annual Beakerhead Festival was held in Calgary from September 13 to 20 at various locations throughout central Calgary. Free events for the general public, and for the snootier crowd, assorted art gallery soirees and fancy parties at a price, none of which I attended.

At right: The polar bear was 10 metres tall, made out of car hoods. Some sort of statement on climate change according to the artist's blurb.



At left: Not even a blurb to explain what this was about.



Not a stargate unfortunately, but titled “Mayan Portal”. The kids loved it for some reason.



Officially titled “It Came From The Bow”, this installation was in the Marda Loop district up on the plateau far from the Bow River. Might be Cthulhu though. Guess who the sponsor was.



But on the whole, I'd rather be at Gap Lake.

MATTHEW 24:6: PART 6

by Dale Speirs

[Parts 1 to 5 appeared in OPUNTIA's #389, 391, 392, 412, and 426.]

Doom By Ice.

Of the numerous pulp magazine scans being posted on www.archive.org, I have been slowly working my way through the science fiction pulps of the late 1920s and 1930s. These are available as free pdfs. Lots of stories for my thematic reviews, which brings me to “The Sixth Glacier” by Marius (pseudonym of Steve Benedict), serialized in AMAZING STORIES 1929, January and February issues.



The mad scientist of the hour had been poking around in Mayan ruins and had translated a gold tablet buried inside a pyramid. It prophesied another ice age which would arrive in the next few pages, pardon me, the next few years. Since there wouldn't be any story if it hadn't, the ice did indeed come roaring out of the poles.

Not in generations, but in weeks. The ice sheets quickly overran the circumpolar countries including, alas, Canada. They pushed their way over mountain ranges, and sent hundreds of millions of people fleeing. The author correctly pointed out that a sudden disaster triggering waves of refugees would be just as bad for the receiving countries in the tropics as it was for the sources.

Tropical countries could not feed the refugees arriving in the millions. Most fleeing the ice would never make it in any event, what with no transportation or food en route. Not quite the end of civilization, since the planet wasn't going to ice over completely. Humans had evolved during previous ice ages, although granted they were still basically wild animals, not civilized beings.

The second part of the story, in the February issue, brought in palaeontology and climatology that was dodgy even for the 1920s. Notwithstanding that, someone had a plan. Build jetties to divert ocean currents to warm up polar waters with tropical waters, and give them a boost by sticking in giant heaters.

To fill out the pages, the story documented the trouble and strife created by humans, over and above what the ice sheets did. Many warlords squabbled for power in the tropics or even out on the ice. Humans can survive where glaciers meet the ocean, viz the Inuit, so new cultures arose.

They died out just as fast when superscience electric heaters helped melt the ice sheets. The survivors streaming back to the uncovered lands fought battles between those who wanted to set political boundaries back to what they were, and those who saw a new world aborning free from the burden of history.

“The White Dwarf” by J. Lewis Burtt (1934 May, AMAZING STORIES) posited the world would end in ice after the Sun began condensing into a white dwarf star. That kind of star is much hotter than the Sun but since it only has a fraction of the surface area, the absolute amount of heat radiated is much smaller, less than 1% of the Sun.

Earth was doomed. In an early application of the “If in doubt, reverse the polarity or nuke it” philosophy that became standard in later science fiction, the heroes decided to use the cutting-edge technology of nuclear fission. In 1934 atomic energy was still pulp superscience. It would take the next war to make it a mundane science. A giant beam of atomic energy would be used to push Earth into a new orbit.

Various objections to the superscience were overcome. The pusher beam would be located on a mountaintop to reduce atmospheric heating. The mountain would be on a thick part of Earth’s crust to prevent breakup of the continents from the stress.

The beam could only be used for short bursts to avoid leaving the atmosphere and oceans behind. The Moon would be left behind but the scientists said it wouldn’t be missed. Even a flatlander like myself knows the tides are an essential part of our ecosystems, to keep the temperature and nutrients mixed.

That’s not to say the citizens of Earth didn’t get their hair mussed. Damage and destruction followed, and millions of non-speaking extras died. Earth was pushed past the orbit of Venus. As it went by that planet, the Venusians came out by rocketship and made contact.

They needed help, so they were given the secret of the projection beam so they could follow. Eventually it was agreed that both planets would be established in the same orbit as a binary system, which would also give them both tides. On that note, all ended well as a new world was born, a utopia where everyone wore togas and lived in peace and harmony. This was, after all, fantasy.

Doom By Gravity.

“The Passing Star” by Isaac R. Nathanson (1930 September, AMAZING) pretty much sums up the story in the title. Bern Daily, an astronomer, discovered a small runaway star was going to pass through the Solar System in sixteen years. First the impending doom was ignored, then the dawning realization, then the panic and building of backyard underground shelters.

Daily talked with his girlfriend Ellen Wakefield: *“Somehow, it doesn’t seem right,” she said. “This beautiful world, life, civilization, the ages-old efforts of mankind, that everything could come to nothing. Surely, there must be something ”*

“But the universe does not work that way, Ellen. The forces of existence are blind and purposeless. Purpose, feeling and thinking are but animal attributes, human if you prefer. Any other concept is inevitably human and has no basis in fact. If man has existed thus far on this good old Earth, it has just been his good fortune. The immensities of the Cosmos do not consult him as to his destiny.”

The rogue star yanked Earth into a new orbit slightly further away from the Sun and straightened its axis of spin. That charbroiled the planet but only for a few days, no worse than an asteroid strike. Many humans survived but the land had changed. Every valley was filled, and every mountain brought low. The crooked were made straight, and the rough ways made smooth.

Things We Were Not Meant To Know.

In the 1929 April issue of AMAZING, there was the story “The Revolt Of The Atoms” by V. Orlovsky. It was about several mad scientists dabbling with the idea of creating atomic chain reactions. Bear in mind that back then even real physicists weren’t certain about controlled fission. It would take a world war to bootstrap the technology into existence.

In any event, one of the mad scientists succeeded in initiating a chain reaction but found that he couldn’t stop it once it began. The initial fission was self-sustaining because it spread to adjacent atoms or molecules, which in turn chain reacted to more molecules.

The good news was that it grew slowly. The bad news was that the ball of fission kept growing. It was a couple of metres in diameter after a fortnight, then burst through the laboratory walls and began burning its way across Europe. Nothing worked to stop it.

Eventually, after much of Europe was laid waste, it drifted over an Italian volcano and triggered an eruption that blew the giant ball of fission out into space. It orbited Earth as a new sun, but in the near-vacuum could not feed itself, and slowly dissipated.

The story was not a bad guess, more than a decade before the atomic bomb became a reality. Its main failing was estimating how fast the neutron capture of the chain reaction worked, but to be fair no one knew in the real laboratories what a fission reaction would do.

Take a deep breath. No matter how clean the air is in your town or inside your building, you have breathed in thousands of microscopic dust particles, pollen grains, and spores. The human body has adapted for that, which is why your lungs don't clog up.

Those particles are essential for weather, since rain droplets or snowflakes need a tiny speck to condense around. If the air was absolutely pure, there would be no rain.

That fact forms the basis of "Written In The Year 2100" by Charles Ward (1930 October, AMAZING STORIES). A scientist lost his wife and children to an airborne disease and wanted to ensure such deaths could never again happen. After the usual laboratory work and handwaving, he invented a gas that purified the air 100%. He arranged for the gas to be released around the world in secret, and the thing was done.

He hadn't thought it through. The stars were much brighter, and the Sun came up or down over the horizon abruptly without moisture in the air. The droughts could be imagined but there was one mitigating effect. Although rain or snow never fell again, condensation on solid surfaces was not affected.

The moisture simply coated everything with a thin layer of water. Umbrellas were useless, and standing under an overhang brought no surcease. The water infiltrated everywhere.

To me the fallacy was that the gas seemed to have unlimited range and duration. It must have been diluted enough at some point that freshly-generated dust and pollen would restart the cycle of rain and snow.

"Wrath Of The Purple" by Howard Melvin Fast (1932 October, AMAZING STORIES) was about Dr Richard Carter, who did something he ought not to have done. While studying cellular biology in his laboratory, he created a purple jelly that began spreading. It dissolved all organic matter it came into contact with, and seemed invincible.

You don't have to watch a lot of 1950s B-movies to guess what happened. First the unawareness, as the purple jelly spread, slowly at first, then geometrically. Alarums and excursions everywhere. Thousands upon thousands of supporting characters and bit players died.

Fire, acids, and poisons had no effect. Carter worked feverishly to stop his monster. New York State was sterilized by it, then adjacent states, then up into Canada. He finally invented a disintegration ray to halt it, which seemed odd for a biologist, but he must have been a polymath.

The Sun Will Come Out Tomorrow.

48 HOURS (2018) by William R. Forstchen is a near-future and reasonably plausible account of how the modern world would handle a giant solar flare at the level of the Carrington event of 1859. That flare shut down the newly developing telegraph and railroad networks. It burned countless transformers and transmission lines, and melted iron rails along the tracks. Since most of the world was not yet electrified, it was not an End Times scenario.

Today is different of course. A Carrington-level solar flare would cripple the world. Broadcast and cellphone towers would become useless slag, and power lines would burn like birthday cake sparklers. Motor vehicles would not run, and all electronic devices would become paperweights. The supply of food to cities would cease for lack of transportation, and a week later desperate mobs would ravage the countryside pillaging farms.

The premise of this novel, not at all far-fetched, was that astronomers had detected a coronal mass ejection from the Sun, a giant flare that was going to hit Earth. It would cause a Carrington-level event, far more powerful than the regular solar flares that constantly pepper Earth.

The panic was not long in coming after the announcement. Governments tried to reassure the people that the event would only be a brief interruption, but for some reason there were many doubters. The planet descended into chaos. No superheroes in bright Spandex came to rescue them.

The lead protagonist was Richard Carrington the Fifth, a descendent of the original Carrington who first explained the event in 1859. Like his illustrious ancestor, he was a solar astronomer. A bit too cutesy I thought.

Only a few were to be saved in underground shelters. Many sacrificed themselves to make space for children, while others went mad from fear and tried to fight their way in. There was no happy ending with a last-minute plan that might work and did with five seconds to spare.

Doom By Flood.

“The Second Deluge” by Garrett P. Serviss (1933 Winter, AMAZING STORIES QUARTERLY) began with an astronomer, Cosmo Versal, detecting a nebula made of water (which can exist in space) heading for a collision with Earth. No one else had spotted it because it was coming edge on, and was too faint to make out. Versal knew Earth would be flooded as it passed through, and was determined to build a giant ark. It worked once before.



He decided to warn the people of Earth that doom was near. They laughed at Noah, and they laughed at Versal. He built his ark, naively supposing that he could staff it without an angry mob storming it as the waters rose. He managed to get his ark launched, partly by diverting the mob by telling them they could seek safety on the mountain tops.

The flood came by, and Noah, pardon me, Versal, rode it out. Along the way he met a French submersible that saved a few more people. The two ships traveled together to rubberneck at the flooded planet. Eventually Earth passed through the watery nebula and the flood stopped.

Over many long years the water vapour was disassociated by sunlight at high altitudes into hydrogen and oxygen. The hydrogen floated away into space and we all know oxygen is a good thing. The water level slowly came down and the ark was eventually stranded on the Colorado Rockies. New world in the morning. The story could probably be made into a movie today much like ‘2012’ (remember the Mayans?).

WHEN WORDS COLLIDE

The tenth annual When Words Collide will return to the Delta South Marriott Hotel on the weekend of August 14 to 16, 2020. It will incorporate the Aurora Awards and Canvention 40 which is the Canadian national science fiction convention. WWC always sells out by June, as do the banquet and hotel. Details from www.whenwordscollide.org

STATELY PILES: PART 4

by Dale Speirs

[Parts 1 to 3 appeared in OPUNTIA #386, 395, and 415.]

Murder In The Big House.

FAULKNER'S FOLLY (1917) by Carolyn Wells is available as a free download from www.gutenberg.org. It was a classic manor house murder mystery of the style that later became overdone and obsolete. It was set in Long Island, New York State.

Faulkner's Folly was the realised dream of the architect who had been its original owner. It was a perfect example of the type known in England as Georgian and in our own country as Colonial, a style inspired by the Italian disciples of Palladio, and as developed by Inigo Jones and Christopher Wren, it had seemed to James Faulkner to possess the joint qualities of comfort and dignity that made it ideal for a home.

The house was enormous, the rooms perfectly proportioned, and the staircase had been the architect's joy and delight. It showed the wooden wainscoting, which was handed down from the Jacobean; broad, deep steps with low risers, large, square landings, newels with mitred tops and rather plain balusters.

But the carved wood necessary to carry out the plans, the great problems of lighting, the necessity for columned galleries and long, arched and recessed windows, together with the stupendous outlay for appropriate grounds and gardens, overtaxed the available funds and Faulkner's Folly, in little more than two years after its completion, was sold for less than its intrinsic value.

The new owner was Eric Stannard, a wealthy sculptor and artiste. As part of the sale, he had agreed to do a portrait of the widow Beatrice Faulkner, so she was a guest in the house her late husband once owned.

Stannard didn't make it out of Chapter 1, someone having stuck an etching needle into him. His wife Joyce, and his model Natalie Vernon, were among the usual suspects. His dying words were "*Natalie, not Joyce*".

Another actor in the mansion was Eric's son Barry, by a previous marriage and now 20 years old. Barry was in love with Vernon, while his stepmother was

suspicious that she was Eric's mistress. The inquest was riddled with perjury and filled with dramatics from over-acting suspects.

From there the novel filled out the background on the characters, taking the scenic route to the denouement. The family members did their part to sustain assorted idiot plots. The widow was the perpetrator, the evidence being last-minute revelations about secret passages in the mansion. She was also in love with Eric, who seemed to be quite the ladies man before he departed this world.

The book reads much slower to the modern reader, written as it was in the era before broadcast radio and television. In those days, a story was expected to last. It could probably be made into a period-piece movie (no cellphones please) with a zippier script.

"Death On The Rails" was a 1941 episode of the old-time radio series THE SHADOW, no writer credited. Despite its title, this episode had nothing to do with trains. (This and other OTR shows are available as free mp3s from www.archive.org.)

The Shadow was Lamont Cranston, a wealthy young man about town. His girlfriend, the lovely Margo Lane, was the only one who knew his secret. Her function was to be the person to whom Cranston explained the plot, plus to scream whenever she saw a dead body. After about 500 bodies or so by the time this episode was made, she should shrug her shoulders and tell Cranston that here was another one..

Lane rented an isolated manor house for the summer, miles from anywhere, with only a nervous maid named Kate for company. Cranston didn't like the idea but couldn't shake her. The women arrived and began to settle in. Lane brought along a stack of murder mysteries for summer reading, which Kate remarked was bringing coal to Newcastle.

Cranston telephoned and said he was coming up for the night. Before he arrived, a wayfaring stranger calling himself Porter pounded on the door, seeking shelter from a storm. He lied about everything and was found out, but Lane couldn't get rid of him and he made himself at home. The storm took out the telephone line.

An angry woman then barged into the manor, chasing after the stranger. He shot her dead, and the two women fled. They met Cranston out on the road,

followed by a cast of characters shooting at each other. The manor was busier than a railroad station. Alarums succeed excursions one after the other. It all boiled down to a gang of train robbers fleeing the scene, double-crossing each other, Porter taking the loot for himself, and everyone converging to the manor.

The excitement was too much for Lane. After fainting from screaming so much that she ran out of breath, she awoke to find everyone gathered around her and Cranston most solicitous. It was all a hoax, he explained. He hired a troupe of actors to frighten her because he didn't want her staying in such a remote place.

Even for *The Shadow*, it was a contrived ending. One might think Cranston had control issues and was abusive to Lane.

Nero Wolfe, a mountain of a man, was a private detective loath to leave the security of his brownstone, preferring to tend his orchids in a rooftop greenhouse of his Manhattan brownstone, eat gourmet meals prepared by his chef, and read books. The practical work of investigating his cases was done by his secretary Archie Goodwin. The original stories and novels by Rex Stout (died 1975) are referred to as the corpus, and stories by other authors as pastiches.

Murder was often done during the cases or was the cause of the investigation. The duo were therefore well acquainted with the local NYPD Homicide Squad, headed by Inspector Cramer. The NCO was Sergeant Purley Stebbins, and the 2-in-C was Lieutenant Rowcliff, a nasty man in the corpus, as a result of which many pastiche writers liked to give him a nasty death.

Under various titles, the Nero Wolfe old-time radio series aired from 1943 to 1951. Several actors portrayed him, of whom Sydney Greenstreet was the best. Rex Stout did not write any of the episodes but only collected a royalty cheque.

"The Case Of The Phantom Fingers" was a 1951 episode. No writer credit was given, although the actors and producers were mentioned. The story began with Wolfe making one of his rare trips out of his brownstone house, heading upstate to visit an orchid grower who had developed a black flowered cultivar.

It was raining hard as they traveled, and they found themselves cut off front and rear by flood waters. The only escape was to turn up a private road leading to a mansion at the top of a hill. En route, they found a man dying from a gunshot. They brought him to the house but he died in the car.

Leaving the body where it was, they entered the house and, one by one, encountered four people. One of them joined the other man in death very quickly, this time by knife. The other three had shaky stories about why they were roaming the house.

A woman said she lived on the next hill over and had been out walking. When the rain began, she took refuge in the big house but found no one there. The other two were men who had separately arrived and whose stories were a bit fantastical but could have been true.

Whoever killed the second man didn't have time to wipe the fingerprints from the knife handle. Goodwin found an ink pad and some blank index cards in a desk drawer, and fingerprinted the three visitors for comparison against the knife. As they did so, the woman stumbled against the table, blaming it on her spike heels catching on a rug. The prints were hers, and after some exciting moments, she was brought to heel, you'll pardon the expression.

This was one of the better radio episodes and is worth listening to. The writer played fair with the listener and revealed the clue which Wolfe immediately spotted and which brought her to justice. I got it too, I'm pleased to say, having grown up on a farm. Women do not walk across fields in spike-heeled shoes.

CHRISTMAS IS MURDER (2008) was a novel by C.S. Challinor, part of a series about Rex Graves, a Scottish lawyer. He had been invited to the south of England to stay at Swanmere Manor, converted into a hotel by its owner Dahlia Smithings. She asked him to stay for the Christmas holidays. Just after he arrived, a blizzard set in and so did murder.

The big house was isolated and the guests were confined with no outside help until after the storm passed. Hotel guest Henry Lawdry died from an apparent heart attack, or perhaps one of the Smithings fruit tarts was poisoned. There were eight other guests, plus Graves and a small staff. Then one of the guests had a bad fall down stone steps and broke her neck. There didn't seem to be any connection between her and Lawdry, so motive was a puzzle.

The death toll climbed. Graves's main effort was to discern what the victims had in common. If he knew that, then he could figure out the motive and from there compile a list of suspects. The plot made a right-angle turn when he discovered the landlady and her help had the strongest motive.

The story quickly wrapped up. Graves typed a report for the police when they finally got through the snow and arrived at the manor. This novel was relatively short and moved at a brisk pace. A steady read.

Fun With Beneficiaries.

A traditional activity in manor houses is reading the will of the late owner. The will invariably stated that in the event one beneficiary died, his residue would go to the others, thus triggering off a murderous rout.

THE ADVENTURES OF PHILIP MARLOWE was an old-time radio series based on the novels of Raymond Chandler. It aired from 1947 to 1951. This was a hard-boiled detective series with little humour. “The Last Laugh” was a 1949 episode written by Robert Mitchell and Gene Levitt.

Marlowe was asked by a lawyer to attend a reading of the will of the late and unlamented Julius Spangler, an old coot who delighted in practical jokes. He and Marlowe tangled on a case several years prior but apparently all was forgiven because he left a bequest for Marlowe.

The reading was in a manor house perched atop a high cliff on a private island. It was, of course, a dark and stormy night. Five other heirs were gathered with the lawyer. Spangler left four of the heirs impractical bequests and the bulk of his fortune to his private secretary, who didn’t deserve it.

As the heirs squabbled with each other, Spangler suddenly appeared. The will, he told them, was another practical joke. He would show them the real will tomorrow. No he wouldn’t, for an hour later he took a high dive off a balcony onto the jagged rocks below. The railing had been tampered.

Marlowe did what he could as the resident detective. Eventually the secretary was revealed as the killer, but there was other excitement and many of the heirs knew how to use blunt instruments. The culprit wanted to fake will to stand and destroyed the real will. Nonetheless he wasn’t going to inherit anything but an electric chair.

Sharp Practice.

“Homicide House” was a 1945 episode of THE HAUNTING HOUR, an old-time radio series that gave no credits to actors or writers. This episode opened

with an elderly millionaire named Van Kleek being murdered in a Florida hotel. Jump cut to a New York City newspaper, where an editor sent a pair of young reporters to investigate the old Van Kleek mansion overlooking the East River. It was soon to be torn down to make way for a skyscraper.

The last two Van Kleeks prior to the millionaire disappeared in 1898 in a shipwreck. The mansion was boarded up and had been abandoned for fifty years. The reporters went to the mansion to get some photographs and background for a story. As they approached it, they heard a shot from inside, and broke in to investigate.

Each thing they did was explained for the listener. “Let’s go up these stairs.” Then the sound of footsteps, judging by which they were wearing tap shoes. Next was “Now that we’ve walked up these stairs, let’s go down that hallway”. More footsteps, and repeat indefinitely.

The reporters heard footsteps on the second floor, went upstairs, and found a butler and an elderly brother and sister. The last of the Van Kleeks had been holed up in the mansion for fifty years. Their butler went out to buy food and look after their business errands. The sister thought it was still 1898.

The siblings invited the reporters to stay for supper. The brother explained why they had been holed up for five decades, an infodump that did manage to tie up some loose ends. That shot they heard was just a door slamming. Nonetheless the reporters were suspicious, especially after they found the fresh corpse of an undercover detective, which explained the shot they heard.

The Van Kleeks were revealed as actors operating an inheritance fraud with the butler. He was genuine, and was to identify the actors as the Van Kleeks to the executor of that Florida millionaire. They would split the loot three ways and retire. But first, they had to remove the inconvenient reporters. One of the reporters blinded them with flash bulbs on his camera. They grabbed the gun from the butler, and it all worked for a good scoop.

A fair story, but all the over-explaining was excessive, even for radio. The writer, whomever he was, didn’t seem to trust the imagination of the listeners, or else he was padding his word count. Probably both.

THE HERRING IN THE LIBRARY (2010) by L.C. Tyler is a novel in a series about an English crime writer Ethelred Tressider and his literary agent Elsie

Thirkettle. They were dining at Muntham Court when, halfway through the evening, their host Sir Robert Muntham was found dead.

Tressider and Muntham were at school together. Now the former was a mediocre-selling author of stories about Master Thomas, a 14th-century detective. The latter had taken early retirement from the banking industry and bought a manor house with his petty cash account.

The novel alternated between the viewpoints of Tressider and Thirkettle, with occasional extracts from a Master Thomas work in progress. Like most authors, Tressider incorporated his real-life experiences into his novels, so the two parallel passages of the Master Thomas text and Tressider's viewpoint illustrated his thinking and psychology.

Sir Robert was strangled in his library, which was locked from the inside. Tressider had to break a window to get in. The constabulary decided it was suicide. At first, this seemed to put them on par with Deppity Dawgs in the USA, but bear with them.

Tressider received a letter shortly after, written by Sir Roger in premonition of his death. It had a clue written in cryptic verse. Tressider did some sleuthing, assisted and/or hindered by Thirkettle, but all grist for the mill of Master Thomas.

The ending defies a quick plot summary. Sir Robert had worked an elaborate revenge from beyond the grave. The widow was left without a penny because of his massive hidden debts, his life insurance policy was invalidated because it really was suicide, and Tressider was left the estate. It was a burden, for manor houses are not cheap to operate. The novel had a convoluted finish but was worth reading to the bitter end.

Open House.

In modern times, few of the upper crust can keep a manor house going on their own, so most now have tours or have converted to hotels. Take, for example, Marshfield Manor, a stately pile near the village of Emberstowne, North Carolina. GRACE UNDER PRESSURE (2010) by Julie Hyzy is the first novel in a series about Grace Wheaton, who had just taken up a job as assistant curator in the manor, owned by her uncle Bennett Marshfield.

He had been getting threatening letters demanding money with menaces, and an intruder had shown up to disturb the peace. When the head curator was shot dead in the manor, Wheaton got a sudden promotion into his job, and into the serious trouble and strife that swirled around Marshfield and his mansion.

The manor house had a team of security guards, but for all the good they did, it might have been better for Marshfield to hire off-duty Deppity Dawgs. It didn't help that Wheaton provided the idiot in the idiot plots. For all the Marpleing she did, she nonetheless walked about with a plank in her eye.

There were many people angry at Marshfield over a failed Ponzi scheme. Lots of investors lost lots of money. The real culprit was working her own end of the game. Wheaton somehow survived to help bring in the murderer and the thief, and the manor house survived to another day.

The novel was somewhat marred by Wheaton's idiotic behaviour which should have eliminated her from the gene pool. The final chapter, instead of being the denouement, was a blatant set-up for the next novel. The good news is that there are no food recipes in an appendix.

GRACE SEES RED (2016) is a later installment in the blood-soaked saga of Marshfield Manor. (I reviewed other novels in this series under other topical columns.) So much so, that the plot moved away from the village to another, if only to smooth out the murder rate statistics.

Grace Wheaton's assistant Frances Sliwa called her away to the village of Rosette. An elderly man was found dead in a nursing home (pause for jokes) and Sliwa was a suspect.

I liked the way Chapter 5 opened, with Wheaton casually saying: "*Though Frances had never been a suspect in any of the murders around Marshfield Manor ...*" as if she were discussing dandelions in the front lawn or dusting the library shelves.

Wheaton and Sliwa began sleuthing, one because she was an inordinate busybody and the other because she was under suspicion of spiking the deceased with insulin.

It came out that the murderers, husband and wife, were heirs of the deceased, and were tired of waiting for the old geezer to shuffle off this mortal coil. They

decided to help him along into the next world. Wheaton, always the idiot, got herself trapped with them but managed to talk one of them into shooting the other. Honour among thieves and all that.

The novel ended with a message to Wheaton that her crazed sister Liza had been paroled. So we learned what the next novel will be about.

The Lord Of The Manor.

Now for an episode of THE AVENGERS, not the mob of American superheroes prancing about in brightly-coloured spandex, but the 1960s British television show. John Steed was the main protagonist of the series, a suave, bowler-hatted debonair agent working for MI5.

His colleague was Mrs Emma Peel, not an assistant but a counterspy in her own right, who could and frequently did use judo to overcome her assailants. The series fluctuated between serious spy-counterspy adventures and parodies of then-current movies or shows. Some episodes drifted into weird fiction or avant garde.

One such episode was “The House That Jack Built”, written by Brian Clemens and first aired in 1966. Peel was lured to a vacant manor house which was supposedly an inheritance for her.

She entered the study, then walked back the way she came. Instead of returning to the entrance hall, she found herself in a strange room with an equally strange gadget and multiple exits. Each exit led her back to the gadget, which did nothing but rotate. Finally she stumbled back into the study. After some more exploring, she discovered that there were inconspicuous switches on the door frames. Every time she closed a door, the switch would cause the room on the other side to rotate and be replaced by another.

Peel came across an escaped convict who had taken refuge in the manor to hide from his pursuers, and had been driven insane by the changing floor plan of the big house. He wasn’t much use, other than to show Peel what room not to enter when he ran into one that proved to be a gas chamber.

Continuing to explore the manor, Peel came across a room devoted to her life story. Newspaper clippings and photographs on the walls revealed details for the first time in the series about her previous life. Her maiden name was Knight,

and her father had been a successful manufacturer. When he died suddenly in an accident, she took over the business and did very well.

The turning point of the plot was a newspaper clipping about how she had fired an automation engineer named Keller. In short order, she and the viewers realized that the manor house had been converted by him into a giant automated machine. It was specifically designed to drive her insane and make her commit suicide.

Wherever she went, from room to room, there were prerecorded messages, audio and visual, from Keller. He told her he knew he was dying and wanted revenge, so he set up the house to trap her and harass her to the death.

He bragged that his wonderful automated machine would last a thousand years. Being a home owner myself, my first thought was to wonder who would mow the lawn and paint the house in the interim.

Peel begged to differ. She stopped the machine by dropping a house key onto a circuit board and shorting out the computer controls. Steed, who had only a walk-on part in this episode, arrived at the denouement but there wasn’t much for him to do.

And so they departed the manor house. It wasn’t mentioned but presumably a telephone call was made to MI5 for technicians to come out and clear up the place. One also guesses that after that was done, it would have gone on the real estate market as a fixer-upper.

Haunted Houses.

The big house on a remote estate, riddled with ghosts and evil butlers, is a cliché of horror and weird fiction. Never a one-bedroom condo, always a mansion with thirty rooms and a kitchen that could feed a regiment.

THE HERMIT’S CAVE was an old-time radio series that aired from 1935 to 1944, an anthology of mystery and weird fiction. This and other OTR shows are available as free mp3s from www.otrrlibrary.org

“The House Of Purple Shadows”, no author credited, was a 1940 episode. It began as a standard haunted house story, with humans exploring it and then fleeing in panic because of the mysterious goings-on. Books or table lamps

moved as if an invisible hand had pushed them. Moans were heard inside the house but could not be localized to a room.

The episode then switched to a narration by a ghost, explaining how those strange events were its attempts to communicate with the living. It wanted to tell them what happened to it, but they couldn't see it, only hear a moan. The ghost blamed the house, a malignant thing that trapped souls in its purple shadows.

Other ghosts joined the first one, pulled into its dimension by the purple glow. One of them managed to set the house on fire and burn it down, thereby liberating the ghosts. Humans outside saw a brief giant purple flame leaping up into the night sky. The story had its flaws but was performed well. Worth listening to once while sitting in a dark living room by yourself.

RESULTS, INC was a short-lived old-time radio mystery series that aired in the autumn of 1944. The protagonists were private detectives Johnny Strange and Theresa Travers. The latter was ostensibly Strange's secretary but she worked for 25% of the commission and went along on his investigating.

The series was played as a comedy although without a live audience. One suspects that wouldn't have made much difference. It wasn't bad but it never grew wings and flew. The series was competently done but was a standard private investigator show. Worth listening to once.

"The Haunted House", written by Leonard Sinclair, was the first episode in the series. The initial ten minutes was the set-up of Strange starting up his new agency and hiring Travers. Their first client was a mystery novelist who wanted them to find her a haunted house she could stay in to get colour for her next novel. Real estate agents wouldn't take her seriously, so for \$200 (very big money in those days) Strange and Travers went house hunting.

They did in fact find an old farmhouse where a murder had taken place seven years prior, after which the place remained vacant. They arrived late in the afternoon. Just before entering the house, an air raid warden came by and told them a county-wide blackout drill was in effect that night. No lighted windows or car driving please.

After he departed, they went inside. Not long after, they found they were keeping company with an escaped madman, the one who had committed the

murder. After some of the usual alarms, they managed to save themselves with lighting up the open windows, which soon brought the indignant warden to save them.

The old-time radio series MURDER AT MIDNIGHT was an anthology series broadcast from 1946 to 1947. Despite its name, it included many science fiction, weird fiction, and fantasy stories. The series was quite well done and is worth listening to.

The 1946 episode "The House Where Death Lived", written by Robert Newman, told of the unfortunate Dr Alexander Goff, a paranormal researcher who visited an old mansion that had been abandoned for a decade since its last occupant, Calhoun, had murdered his wife and been carted off to an insane asylum.

Calhoun had died in the asylum the day before Goff made his visit, looking for material for his latest book on the paranormal. Goff received permission from the trustees to examine the house, which had a long history of apparitions and manifestations going back more than a century.

He thought the place was empty, and was surprised to find a caretaker, who kindly showed him around and pointed out where a multitude of murders had taken place. The basement was particularly popular with past murderers because of the old tripwire on the dark staircase method. Many husbands dispatched their wives with a sword cane.

Goff came back later but the caretaker was gone. Only then did he realize he had actually been led about by Calhoun's ghost. Goff moved into the house, waiting in vain for Calhoun's ghost to return. He was frustrated because he wanted to finish the manuscript of his new book with the full history of the mansion, and needed Calhoun to supply the details.

Goff's wife appeared to take him back home. He would not go, and to make that point certain, stabbed her to death with Calhoun's old sword cane. Only then did Calhoun reappear, and gave Goff more details than he wanted to know.

The house was cursed with a long line of murderers. Each was condemned to haunt the house until the next one appeared, and only then could have the freedom of oblivion.

Goff decided to break that chain by setting the house on fire. As the flames spread, Calhoun held him fast to the scene until the fire killed him, thereby allowing Calhoun to escape and trapping Goff for eternity in the ruins of the mansion.

THIRD TIME’S A CRIME (2017) by Diana Orgain was a novel in a cozy series about Georgia Thornton, an ex-cop who now scrabbled for a living by competing in reality television shows. As this novel opened, she and nine other contestants were in a haunted castle in Golden, California.

The premise was that they had to solve the 1968 disappearance of Jane Reiner, a young woman who had been living in the castle and whose ghost haunted it since. However the script they were using had an unexpected rewrite when the cast and crew arrived and found the groundskeeper’s body on the bottom of an empty pool.

The ‘reality’ of these shows makes professional wrestling look honest by comparison. Once inside the castle, every little thing was distorted into proof of haunting. Anyplace else, a smelly room in an abandoned building would be resolved by opening a window and airing out the place. On this reality show, it was proof the dead woman was still present.

“Cold Case In The Castle” got underway. Some blackbirds flew into a window, which made for a good film clip. The psychic they brought along was in full cry with ominous forebodings galore. Quote: “*Unexpected blackbird migration is definite proof of paranormal activity.*” At least she didn’t blame it on climate change.

Thornton’s partner was her boyfriend Scott. She did discover the groundskeeper’s body. Then another contestant was killed, so the producer knew they would get great ratings. The real tragedy was that Thornton and Scott were voted off the show. Notwithstanding that, she managed to solve Reiner’s murder by taking a DNA sample off a third-floor windowsill. People who watch CSI are prepared to believe that after fifty years the test would work.

There was method in Thornton’s madness, however, as she bluffed the murderer into coming out in the open because of the DNA swab. The J’accuse! confrontation pleased the producer to no end, as the scene made a great finish to the show.

SEEN IN THE LITERATURE

Heller, R. (2019) **Decryption of messages from extraterrestrial intelligence using the power of social media: The SETI Decrypt Challenge.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 18:296-303

Author’s abstract: *With the advent of modern astronomy, humans might now have acquired the technological and intellectual requirements to communicate with other intelligent beings beyond the solar system, if they exist.*

Radio signals have been identified as a means for interstellar communication about 60 years ago. And the Square Kilometer Array will be capable of detecting extrasolar radio sources analogous to terrestrial high-power radars out to several tens of light years.

The ultimate question is: will we be able to understand the message or, vice versa, if we submit a message to extraterrestrial intelligence first, how can we make sure that they will understand us? Here I report on the largest blind experiment of a pretend radio message received on Earth from beyond the solar system.

I posted a sequence of about two million binary digits (‘0’ and ‘1’) to the social media that encoded a configuration frame, two slides with mathematical content and four images along with spatial and temporal information about their contents. Six questions were asked that would need to be answered to document the successful decryption of the message.

Within a month after the posting, over 300 replies were received in total, including comments and requests for hints, 66 of which contained the correct solutions. About half of the solutions were derived fully independently, the other half profited from public online discussions and spoilers.

This experiment demonstrates the power of the world wide web to help interpreting possible future messages from extraterrestrial intelligence and to test the decryptability of our own deliberate interstellar messages.

Haliki, E. (2019) **Broadcast network model of pulsars as beacons of extraterrestrial civilizations.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 18:455-462

Author’s abstract: *According to the Kardashev scale, likely extraterrestrial civilizations above Type-I might use natural energy sources of the Universe, which is also true for transmitting their signals out to distances. A variety of studies have shown that radio pulsars are most likely candidates for this.*

First, the current study examined how the radio beams of pulsars scan across their environment. Later when the radio beams of pulsars have been modulated, a network model has been proposed on how many habitable planets possible to be home for other assumed advanced civilizations could be reached.

It has been found that size of each pulsar's broadcast network depends on the inclination angle. If a civilization controls multiple pulsars, it could comb a considerable fraction of their own celestial sphere and pulsars share their signals in a decentralized fashion as in the mail servers. Moreover, it is briefly cited how beam-modulating mechanisms can be built and searched around pulsars.

Galera, E., et al (2019) **Invasion percolation solves Fermi Paradox but challenges SETI projects.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 18:316-322

Authors’ abstract: *Non-homogeneous fractal-like colonization processes, where the cluster of visited sites has large voids and grows slowly, could explain the negative results of Search for Extraterrestrial Intelligence (SETI) preserving the possibility of a galactic spanning civilization.*

Here we present a generalized invasion percolation model to illustrate a minimal colonization process with large voids and delayed colonization. Spatial correlation between unvisited sites, in the form of large empty regions, suggests that to search civilizations in the Sun neighbourhood may be a misdirected SETI strategy. A weaker form of the Fermi Paradox also suggests this last conclusion.

Stevenson, D.S. (2019) **Niche amplitude, tidal-locking and Fermi’s Paradox.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 18:377-383

Author’s abstract: *‘Where is everybody?’ remarked Enrico Fermi, leading to the famous, and as yet unanswered ‘Fermi’s Paradox’ as this remark has come to be known. While there are a number of possible solutions that vary from the distances are too great; the cost prohibitive or civilizations naturally decline or eliminate themselves before interstellar travel becomes possible, none of these are intellectually satisfying.*

More recently, Manasvi Lingam and Abraham Loeb suggested that for those planets orbiting red dwarfs, atmospheric erosion may be a partial solution to this ‘paradox’. Such planets may experience greater exposure to stellar winds and/or extreme ultraviolet and X-radiation (henceforth abbreviated to EUV). While this proposition is undeniably reasonable, it is likely incomplete.

A more fundamental limitation on the development of biological complexity is imposed by plate tectonics: time. On asynchronously rotating planets, the habitable area for any species is defined by latitudinal bands that encompass the globe. Conversely, on synchronous rotators, the comparative habitable area is limited to broadly concentric regions surrounding the Sub-Stellar Point (SSP).

Given that terrestrial mammals and from them humans evolved in tropical or subtropical regions, the geographical area subtended with these conditions is likely to be smaller and transected by suitable landmasses for shorter periods than on asynchronously rotating worlds.

Habitable subaerial regions for individual species are therefore more limited in area. This leads to a greater limitation on the temporal intervals over which biological complexity can evolve.

Wallace, R. (2019) **Do aliens dream of offworld sheep?** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 18:396-404

Author’s abstract: *The Stanley Miller experiment suggests that amino acid-based life is ubiquitous in our universe, although its varieties will not have followed the particular, highly contingent and path-dependent, evolutionary trajectory found on Earth.*

Are many alien organisms likely to be individually conscious in ways we would recognize? Almost certainly. Will alien consciousness require a 'sleep cycle'? A strong argument suggests it will. Can some species develop analogs to culture and high-order technology? Less likely, but still fairly probable. If so, will we be able to communicate with them? Only on a basic level, and only with profound difficulty. The reasoning is fairly direct and involves convolution of a learned heritage system with individual and collective consciousness.

Hippke, M. (2019) **Spaceflight from Super-Earths is difficult.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 18:393-395

Author's abstract: Many rocky exoplanets are heavier and larger than the Earth and have higher surface gravity. This makes space-flight on these worlds very challenging because the required fuel mass for a given payload is an exponential function of planetary surface gravity, $\exp(g_0)$.

We find that chemical rockets still allow for escape velocities on Super-Earths up to $10\times$ Earth mass. More massive rocky worlds, if they exist, would require other means to leave the planet, such as nuclear propulsion. This is relevant for space colonization and the search for extraterrestrial intelligence.

Sotos, J.G. (2019) **Biotechnology and the lifetime of technical civilizations.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 18:445-454

Author's abstract: The number of people able to end Earth's technical civilization has heretofore been small. Emerging dual-use technologies, such as biotechnology, may give similar power to thousands or millions of individuals.

To quantitatively investigate the ramifications of such a marked shift on the survival of both terrestrial and extraterrestrial technical civilizations, this paper presents a two-parameter model for civilizational lifespans, i.e. the quantity L in Drake's equation for the number of communicating extraterrestrial civilizations.

One parameter characterizes the population lethality of a civilization's biotechnology and the other characterizes the civilization's psychosociology. L is demonstrated to be less than the inverse of the product of these two

parameters. Using empiric data from PubMed to inform the biotechnology parameter, the model predicts human civilization's median survival time as decades to centuries, even with optimistic psychosociological parameter values, thereby positioning biotechnology as a proximate threat to human civilization.

For an ensemble of civilizations having some median calculated survival time, the model predicts that, after 80 times that duration, only one in 10 civilizations will survive, a tempo and degree of winnowing compatible with Hanson's 'Great Filter.'

Thus, assuming that civilizations universally develop advanced biotechnology, before they become vigorous interstellar colonizers, the model provides a resolution to the Fermi paradox.

Rettberg, P., et al (2019) **Biological contamination prevention for outer Solar System moons of astrobiological interest: What do we need to know?** ASTROBIOLOGY 19:951-974

Authors' abstract: To ensure that scientific investments in space exploration are not compromised by terrestrial contamination of celestial bodies, special care needs to be taken to preserve planetary conditions for future astrobiological exploration. Significant effort has been made and is being taken to address planetary protection in the context of inner Solar System exploration.

In particular for missions to Mars, detailed internationally accepted guidelines have been established. For missions to the icy moons in the outer Solar System, Europa and Enceladus, the planetary protection requirements are so far based on a probabilistic approach and a conservative estimate of poorly known parameters.

Panitz, C., et al (2019) **Tolerances of Deinococcus geothermalis biofilms and planktonic cells exposed to space and simulated Martian conditions in low Earth orbit for almost two years.** ASTROBIOLOGY 19:979-994

Authors' abstract: Fossilized biofilms represent one of the oldest known confirmations of life on the Earth. The success of microbes in biofilms results from properties that are inherent in the biofilm, including enhanced interaction,

protection, and biodiversity. Given the diversity of microbes that live in biofilms in harsh environments on the Earth, it is logical to hypothesize that, if microbes inhabit other bodies in the Universe, there are also biofilms on those bodies.

The Biofilm Organisms Surfing Space experiment was conducted as part of the EXPOSE-R2 mission on the International Space Station. The experiment was an international collaboration designed to perform a comparative study regarding the survival of biofilms versus planktonic cells of various microorganisms, exposed to space and Mars-like conditions.

The objective was to determine whether there are lifestyle-dependent differences to cope with the unique mixture of stress factors, including desiccation, temperature oscillations, vacuum, or a Mars-like gas atmosphere and pressure in combination with extraterrestrial or Mars-like ultraviolet (UV) radiation residing during the long-term space mission. In this study, the outcome of the flight and mission ground reference analysis of *Deinococcus geothermalis* is presented.

Cultural tests demonstrated that *D. geothermalis* remained viable in the desiccated state, being able to survive space and Mars-like conditions and tolerating high extraterrestrial UV radiation for more than 2 years. Culturability decreased, but was better preserved, in the biofilm consortium than in planktonic cells.

These results are correlated to differences in genomic integrity after exposure, as visualized by random amplified polymorphic DNA-polymerase chain reaction. Interestingly, cultivation-independent viability markers such as membrane integrity, ATP content, and intracellular esterase activity remained nearly unaffected, indicating that subpopulations of the cells had survived in a viable but nonculturable state. These findings support the hypothesis of long-term survival of microorganisms under the harsh environmental conditions in space and on Mars to a higher degree if exposed as biofilm.

Wadsworth, J., et al (2019) **Aggregated cell masses provide protection against space extremes and a microhabitat for hitchhiking co-inhabitants.** ASTROBIOLOGY 19:995-1007

Authors' abstract: The European Space Agency's EXPOSE facility, located on the outside of the International Space Station, was used to investigate the

survival of cell aggregates of a cyanobacterium, *Gloeocapsa* sp., in space and simulated martian conditions for 531 days in low Earth orbit as part of the Biofilm Organisms Surfing Space experiments.

Postflight analysis showed that the cell aggregates of the organism conferred protection against space conditions compared to planktonic cells. These cell aggregates, which consisted of groups of metabolically inactive cells that do not form structured layered biofilms, demonstrated that disordered primitive aggregates of sheathed cells can provide protection against environmental stress such as UV radiation.

Furthermore, the experiment demonstrated that the cyanobacterial cell aggregates provided a microhabitat for a smaller bacterial cocultured species that also survived in space. This observation shows that viable cells can hitchhike through space within the confines of larger protecting cells or cell aggregates, with implications for planetary protection, human health, and other space microbiology applications.

Billi, D., et al (2019) **Dried biofilms of desert strains of *Chroococcidiopsis* survived prolonged exposure to space and Mars-like conditions in low Earth orbit.** ASTROBIOLOGY 19:1008-1017

Authors' abstract: Dried biofilms and dried multilayered planktonic counterparts obtained from three desert strains of *Chroococcidiopsis* were exposed to low Earth conditions by using the EXPOSE-R2 facility outside the International Space Station.

During the space mission, samples in Tray 1 (space vacuum and solar radiation, from $\lambda \sim 110$ nm) and Tray 2 (Mars-like UV flux, $\lambda > 200$ nm and Mars-like atmosphere) received total UV (200-400 nm) fluences of about 4.58×10 kJ/m and 4.92×10 kJ/m, respectively, and 0.5 Gy of cosmic ionizing radiation.

Postflight analyses were performed on 2.5-year-old samples due to the space mission duration, from launch to sample return to the lab. The occurrence of survivors was determined by evaluating cell division upon rehydration and damage to the genome and photosynthetic apparatus by polymerase chain reaction-stop assays and confocal laser scanning microscopy.

Biofilms recovered better than their planktonic counterparts, accumulating less damage not only when exposed to UV radiation under space and Mars-like conditions but also when exposed in dark conditions to low Earth conditions and laboratory control conditions.

This suggests that, despite the shielding provided by top-cell layers being sufficient for a certain degree of survival of the multilayered planktonic samples, the enhanced survival of biofilms was due to the presence of abundant extracellular polymeric substances and to additional features acquired upon drying.

Lastauskiene, E., et al (2019) **Application of pulsed electric fields for the elimination of highly drug-resistant Candida grown under modelled microgravity conditions.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 18:405-411

Authors' abstract: *Candida lusitaniae* and *C. guilliermondii* are perfect model organisms for the study of *Candida* genera behaviour in various conditions. Both of them are rare pathogens capable to cause candidiasis in the patients with weakened immune system and can undergo morphology switches related to the increased antifungal drug resistance.

Candida genera yeasts are able to inhabit diverse range of ecological niches including space ships and space stations. During the long-term expeditions, astronauts are affected by various factors that can change the state immune system.

In such conditions, the commensal usually non-pathogenic microorganisms can spread through the body of the host and cause infections. Weakened immune system and limited use of drugs in spaceships promote the search of the alternative methods for the biocontrol of microorganisms.

Several studies demonstrate that microorganisms are altering their gene expression, physiology, morphology, pathogenicity and evolving resistance to the antifungals under microgravity conditions.

*Our research indicated that switch to the pseudohyphae morphology leads up 30-fold increased resistance to amphotericin B in *C. lusitaniae* and *C. guilliermondii*.*

Cultivation of yeasts in rotary cell culture system (RCCS) is related to the altered cell growth and resistance to the antifungal treatment. Our results showed that growth in the RCCS led to the extreme increase in cell resistance to amphotericin B as compared with the standard growth conditions.

*In our research, we applied electroporation for the biocontrol of two *Candida* species. *C. lusitaniae* and *C. guilliermondii* cells grown in RCCS exhibited significantly increased survivability after pulsed electric field (PEF) treatment in comparison with cells grown under routine conditions.*

*We have shown that PEF bursts of 2.5 to 25 kV cm⁻¹ of 100 μs × 8 duration display a dose-dependent permeabilization of both studied *Candida* species. Our research indicated that budding cells and pseudohyphae morphology cells, with increased resistance to amphotericin B, can be effectively inactivated after applying PEF higher than 15 kV cm⁻¹.*

Costard, F., et al (2019) **The Lomonosov Crater impact event: A possible mega-tsunami source on Mars.** JOURNAL OF GEOPHYSICAL RESEARCH: PLANETS 124:/doi.org/10.1029/2019JE006008

[The Late Hesperian/Early Amazonian time period on Mars was about 3 billion years ago, about the time that unicellular algae were first evolving on Earth.]

Authors' abstract: *Recent research suggests that major meteorite impact events into a Late Hesperian/Early Amazonian ocean likely produced a mega-tsunami that would have resurfaced coastal areas in northwestern Arabia Terra.*

The orientations of the associated lobate deposits, a conspicuous type of landforms called Thumbprint Terrain, suggests that if an impact event triggered the mega-tsunami, the most likely location of the source crater is within the northern plains regions situated north of Arabia Terra.