OPUNTIA 512

Remembrance Day 2021

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.

THE FIELD OF CROSSES

2021-11-05

photos by Dale Speirs

Every autumn, about 3,500 crosses are erected in a park along Memorial Drive across from the downtown core, one for every Calgarian killed in action during the wars since 1914. The crosses stretch about a kilometre along the freeway. The cover photo is looking east. The white patches in the distance behind the elm trees are more crosses.

Below left: They died so young. The number after each name is the age of death, and the date is when they were killed. Almost all of the dead were in their 20s or 30s.

Below right: The crosses are not all about grandfather's war. Canada was in Afghanistan after the 9/11 attacks.

These crosses have no names, for the dead who have no known grave.

The Americans were late to both world wars, so many of their men joined the Canadian forces. They have not been forgotten.

Jewish veterans are recognized by Stars of David.

The crosses, row on row.

Wearing a poppy as a symbol of remembrance came into official practice in Canada a century ago. On July 6, 1921, the Great War Veterans' Association of Canada – now The Royal Canadian Legion – adopted the bright red flower to honour those who had died in service to their country during the First World War. Today, the millions of poppies worn to mark Remembrance Day pay tribute to the more than 117,000 Canadians who have died in conflicts and peacekeeping activities around the world – and help raise funds for veterans.

100 YEARS

CANADA POST / POSTES CANADA

Le port du coquelicot comme symbole du souvenir est une pratique officielle au Canada depuis maintenant un siècle. Le 6 juillet 1921, la Great War Veterans' Association of Canada (maintenant la Légion royale canadienne) adopte cette fleur rouge vif pour rendre hommage aux personnes qui ont donné leur vie au service de leur pays durant la Première Guerre mondiale. Aujourd'hui, les millions de coquelicots portés le jour du Souvenir au Canada honorent les plus de 117 000 Canadiens morts dans des conflits et des opérations de maintien de la paix partout dans le monde, en plus d'offrir un soutien financier aux anciens combattants.

100 ANS

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Permanent™ stamps
Timbres Permanents^MC
Canada

The Remembrance Poppy 100th Anniversary

Le coquelicot, symbole du souvenir 100e anniversaire

This year is the centennial of the red poppy as a symbol for November 11. The Royal Canadian Legion adopted the flower in 1921 when the event was still Armistice Day. After the second great war, the commemoration was renamed Remembrance Day. Each year Canada Post issues a stamp booklet for the day.

CURRENT EVENTS: PART 28
by Dale Speirs

[Parts 1 to 27 appeared in OPUNTIAs #474, 475, 479, 480, 483, 484, 488 to 503, and 507 to 511.]

As of November 9, Canada had 1,737,362 cases of COVID-19, with 29,215 deaths. 74.6% of the population was double vaccinated. Canada's population is about 38,000,000.

Seen In The COVID-19 Literature.

Albarracin, D., et al (2021) **Rather than inducing psychological reactance, requiring vaccination strengthens intentions to vaccinate in US populations.** SCIENTIFIC REPORTS 11:doi.org/10.1038/s41598-021-00256-z (available as a free pdf)

Authors' abstract: *In a survey and three experiments (one preregistered with a nationally representative sample), we examined if vaccination requirements are likely to backfire, as commonly feared.*

We investigated if relative to encouraging free choice in vaccination, requiring a vaccine weakens or strengthens vaccination intentions, both in general and among individuals with a predisposition to experience psychological reactance.

In the four studies, compared to free choice, requirements strengthened vaccination intentions across racial and ethnic groups, across studies, and across levels of trait psychological reactance. The results consistently suggest that fears of a backlash against vaccine mandates may be unfounded and that requirements will promote COVID-19 vaccine uptake in the United States.

Poulter, B., et al (2021) **COVID-19 lockdowns drive decline in active fires in southeastern United States.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 118:doi.org/10.1073/pnas.2105666118 (available as a free pdf)

Authors' abstract: *The COVID-19 pandemic radically changed human behavior as workplaces implemented social-distancing guidelines and provided an opportunity to evaluate relationships between humans and fire as fire management plans were postponed or cancelled.*

Using active fire data from satellite-based observations, we found that in the southeastern United States, COVID-19 led to a 21% reduction in fire activity compared to the 2003 to 2019 average.

The reduction was more pronounced for federally managed lands, up to 41% below average compared to the past 20 years (38% below average compared to the past decade). Declines in fire activity were partly affected by an unusually wet February before the COVID-19 shutdown began in mid-March 2020.

Despite the wet spring, the predicted number of active fire detections was still lower than expected, confirming a COVID-19 signal on ignitions. In addition, prescribed fire management statistics reported by US federal agencies confirmed the satellite observations and showed that, following the wet February and before the mid-March COVID-19 shutdown, cumulative burned area was approaching record highs across the region.

With fire return intervals in the southeastern United States as frequent as 1 to 2 years, COVID-19 fire impacts will contribute to an increasing backlog in necessary fire management activities, affecting biodiversity and future fire danger.

Weir, B., et al (2021) **Regional impacts of COVID-19 on carbon dioxide detected worldwide from space.** SCIENCE ADVANCES 7:doi.org/10.1126/sciadv.abf9415 (available as a free pdf)

Authors' abstract: *Activity reductions in early 2020 due to the coronavirus disease 2019 pandemic led to unprecedented decreases in carbon dioxide (CO_2) emissions. Despite their record size, the resulting atmospheric signals are smaller than and obscured by climate variability in atmospheric transport and biospheric fluxes, notably that related to the 2019-2020 Indian Ocean Dipole.*

Monitoring CO_2 anomalies and distinguishing human and climatic causes thus remain a new frontier in Earth system science. We show that the impact of short-term regional changes in fossil fuel emissions on CO_2 concentrations was observable from space.

Starting in February and continuing through May, column CO_2 over many of the world's largest emitting regions was 0.14 to 0.62 parts per million less than

expected in a pandemic-free scenario, consistent with reductions of 3 to 13% in annual global emissions.

Han, Q., and D.R. Curtis (2021) **The female burden visualized: Cinematic representation of women during epidemics.** JOURNAL OF POPULAR CULTURE 54:1116-1142 (available as a free pdf)

Authors' extracts: *The images of a heavily pregnant woman treating patients in a hospital and of female medical workers visibly distressed as their heads are shaved in China during the COVID-19 outbreak have brought into the sharp focus the gendered dimensions of epidemic disease outbreaks. In many parts of the world during this pandemic, the majority of front-line key workers in food sales, health and social care, and education and childcare are women.*

Both scholarly literature from disaster studies and development economics has supported the claims from charities and NGOs over the years that women and girls bear the harshest consequences of terrible disasters, such as floods, earthquakes, and droughts.

Recent literature focusing on epidemic disease outbreaks, particularly regarding Ebola in West Africa and Zika in Brazil, has suggested much the same. Frequently, access to sexual and reproductive health resources have been severely compromised, something complicated further during quarantines and isolation when travel is needed.

Recurring representations of female characters tend to fall into two categories: first, the "female carrier" image in which women not fitting within the prescribed gender roles emphasizing domesticity, caregiving, or maternalism are viewed as the infection itself and hence carry a threat to the "collective good," and second, the "burdened woman" image, sacrificing her own well-being for the "collective good."

Although inevitably nuanced and adapted over time, aspects of these images can be traced from the earliest documentary and feature films of the 1920s and 1930s to modern pictures after the turn of the millennium.

McGillion, M.H., et al (2021) **Post-discharge after surgery Virtual Care with Remote Automated Monitoring-1 (PVC-RAM-1) technology versus standard care: randomised controlled trial.** BRITISH MEDICAL JOURNAL 374:doi.org/10.1136/bmj.n2209 (available as a free pdf)

Authors' abstract: *Although many hospitals cancelled elective surgery at the start of the COVID-19 pandemic, semi-urgent (eg, oncology), urgent (eg, hip fracture), and emergent (eg, abdominal aortic aneurysm rupture) surgeries continued.*

Patients discharged after nonelective surgeries often utilise acute hospital care (ie, readmissions or visits to emergency departments or urgent care centres) in the 30 days after discharge.

As hospitals cope with COVID-19 and in many cases resume elective surgeries, a reduction in surgical patients' post-discharge use of acute hospital care is needed to ensure hospital capacity and facilitate management of the backlog of people waiting for elective surgeries.

Virtual care encompasses all the ways that healthcare providers remotely interact (eg, telephone, computer) with their patients. Remote automated monitoring (RAM) refers to use of technology to remotely obtain data on patients' biophysical variables, such as blood pressure.

A strong rationale and preliminary evidence suggest that virtual care and RAM will decrease acute hospital care in adults discharged after surgery

Objective: To determine if virtual care with remote automated monitoring (RAM) technology versus standard care increases days alive at home among adults discharged after non-elective surgery during the covid-19 pandemic. Setting: 8 acute care hospitals in Canada.

905 adults (=40 years) who resided in areas with mobile phone coverage and were to be discharged from hospital after non-elective surgery were randomised either to virtual care and RAM (n=451) or to standard care (n=454). 903 participants (99.8%) completed the 31 day follow-up.

Participants in the experimental group received a tablet computer and RAM technology that measured blood pressure, heart rate, respiratory rate, oxygen saturation, temperature, and body weight. For 30 days the participants took

daily biophysical measurements and photographs of their wound and interacted with nurses virtually.

Participants in the standard care group received post-hospital discharge management according to the centre's usual care. Patients, healthcare providers, and data collectors were aware of patients' group allocations. Outcome adjudicators were blinded to group allocation.

The primary outcome was days alive at home during 31 days of follow-up. The 12 secondary outcomes included acute hospital care, detection and correction of drug errors, and pain at 7, 15, and 30 days after randomisation.

Virtual care and RAM did not significantly affect days alive at home but was associated with a significant increase in detection and correction of drug errors and a decrease in pain.

In post hoc analyses of centres with high escalation of care that commonly led to changes in medical management, virtual care and RAM reduced the risk of acute hospital care, brief acute hospital care, and visits to an emergency department.

Bashor, L., et al (2021) **SARS-CoV-2 evolution in animals suggests mechanisms for rapid variant selection.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 118:doi.org/10.1073/pnas.2105253118

Authors' abstract: *SARS-CoV-2 emerged because of viral spillover from animals to humans, and spillback to other animal species has been observed with accelerating frequency.*

Cross-species transmission generally results in the rapid adaptation of the virus to the new host, and repeated transmissions may hasten viral evolution and novel strain emergence.

We report the surprisingly rapid selection of numerous SARSCoV-2 variants in cell culture and following infection of nonhuman mammalian hosts, including dogs and cats.

SARS-CoV-2 spillback from humans into domestic and wild animals has been well documented, and an accumulating number of studies illustrate that human-to-animal transmission is widespread in cats, mink, deer, and other species.

Experimental inoculations of cats, mink, and ferrets have perpetuated transmission cycles. We sequenced full genomes of Vero cell–expanded SARS-CoV-2 inoculum and viruses recovered from cats (n = 6), dogs (n = 3), hamsters (n = 3), and a ferret (n = 1) following experimental exposure.

Five nonsynonymous changes relative to the USA-WA1/2020 prototype strain were near fixation in the stock used for inoculation but had reverted to wild-type sequences at these sites in dogs, cats, and hamsters within 1- to 3-days postexposure. A total of 14 emergent variants (six in nonstructural genes, six in spike, and one each in orf8 and nucleocapsid) were detected in viruses recovered from animals.

This included substitutions in spike residues H69, N501, and D614, which also vary in human lineages of concern. Even though a live virus was not cultured from dogs, substitutions in replicase genes were detected in amplified sequences. The rapid selection of SARS-CoV-2 variants in vitro and in vivo reveals residues with functional significance during host switching.

These observations also illustrate the potential for spillback from animal hosts to accelerate the evolution of new viral lineages, findings of particular concern for dogs and cats living in households with COVID-19 patients. More generally, this glimpse into viral host switching reveals the unrealized rapidity and plasticity of viral evolution in experimental animal model systems.

ALIEN INVASIONS: PART 7
by Dale Speirs

[Parts 1 to 6 appeared in OPUNTIA #407, 424, 460, 474, 479, and 494.]

"The Invasion" by Robert Willey (1940 September, SUPER SCIENCE STORIES, available as a free pdf from www.archive.org) began with the arrival of three alien dirigible spaceships.

They settled quietly down next to a hydroelectric dam and ran electrical cables to steal the power. Anyone or anything approaching them was vapourized by a death ray.

Other than that, the aliens did little. Seemingly they were there to explore Earth. Nonetheless, the government took umbrage and sent in the military, whose weaponry was like pea-shooters against the alien Zeppelins.

The hero figured out the force shields protecting the ships was permeable to water. The dam was blown, and the aliens were drowned. We had to destroy the village to save it.

QUIET PLEASE was a radio anthology series that aired from 1947 to 1949. Episodes ranged from mystery to fantasy to weird fiction. Ernest Chappell was the narrator, assisted by one or two supporting actors. He had a rich voice that compelled attention. Some episodes are available as free mp3s from the Old Time Radio Researchers at www.otrr.org/OTRRLibrary.

"Northern Lights" was written by Wyllis Cooper and aired on 1949-01-30. "*This is a story about the temporal displacement of mass*", began the narrator as Paul, certainly a good hook for science fiction fans. As the title suggested, the aurora borealis had a part in the episode.

Paul and his partner Norman were working on a time machine, testing with 10-second jumps of a cigarette lighter into the future. The lighter reappeared but was freezing cold, as in solid ice cold. As they celebrated their success, a brown fuzzy caterpillar suddenly appeared in the time machine. It too was frozen but was wriggling and alive.

Where did it come from? They kept it in cold storage. A week later, it began singing. No tap dancing, Paul assured us, just singing. Like Michigan J. Frog from the Warner Brothers cartoon, the caterpillar was bashful about performing for a live audience. They eventually discovered that it sang in synchronization with the flickering of the northern lights outside.

They speculated that the time machine was a teleportation device. The platform of the machine was enlarged to hold a human. Dressing warmly in a heated high-altitude aviator suit, Paul took the first trip.

He found himself standing on an ice plain on a barren world, with auroras flickering in the black sky. The time machine snapped him back to the laboratory. Paul returned covered with thousands of caterpillars.

They began singing but only Paul could hear them. They spoke through his voice to Norman, telling him they had tried to invade Earth but most of the planet was too hot for them. They fled back through the machine. But they would return once they figured out how to turn Earth into a snowball planet.

"The Other Side Of The Stars" was written by Wyllis Cooper and aired on 1949-05-08. The narrator began a meandering story about alien life on the other side of the stars but was interrupted by Steve, the brother of Dorothy, his former girlfriend.

The story veered into the narrator's chase for gold in Colorado. He and Dorothy were looking for the Well of the Skies, somewhere on aboriginal land. They found no gold in the Well, just a conquistador's skeleton. At the bottom of the well, they heard music.

Steve interjected comments every so often, and the narrator mentioned the astronomer Van Dyke's subsequent commentaries. Back up at ground level, the narrator and Dorothy discussed the strange music. Night had fallen, and a strange light was emanating from the well. Dorothy vanished during the night. He went down the well but couldn't find her.

Steve and the narrator digressed into a discussion about how unimportant humans and the Solar System are in the universe. The well wasn't dug by humans. There was an intelligence at the bottom using it to gather the music of the stars.

Van Dyke made a gadget that could translate the music. They talked with the thing at the bottom of the well. It was a scout which had absorbed both

conquistador and Dorothy. All it knew about humans came from their minds. Van Dyke photographed a black cloud approaching the Solar System at the speed of light. The cloud was a hive mind, coming to absorb humanity.

"The Missing Disclaimer" by Sam Sackett (1954 November, IMAGINATION, available as a free pdf from www.gutenberg.org) began with a science fiction magazine editor working for ATOMIC SCIENCE STORIES.

He had accidently forgotten to include the standard disclaimer on the contents page which stated that the stories were works of fiction. Any resemblance to real persons, etcetera. You know the text. The editor was fired without a reference.

Meanwhile a scout code-named K-17 was working for aliens intending to invade Earth. The scout assumed human form and was collecting data. This being about four decades before the World Wide Web got going, it had to collect information by purchasing magazines at newsagents.

Carefully checking the magazines, K-17 observed that some magazines said they were fiction and had disclaimers that the stories were not real. However, ATOMIC had no such disclaimer. Worse yet, it contained an article describing how four-tentacled purple aliens were planning to invade.

Since K-17 was a four-tentacled purple alien, he was much perturbed. The article contained too many coincidences to think it was fiction, so K-17 contacted its superiors and spread the alarm. The decision was made to cancel the invasion. The Earthlings were never to know how close they came to disaster.

FOOD COZIES: PART 21

by Dale Speirs

[Parts 1 to 20 appeared in OPUNTIAs #432 to 434, 436, 438, 441, 442, 444, 447, 450, 454, 456 to 458, 460 to 462, 465, and 475, and 507.]

Doughnut Commit Crimes.

BAD BITES (2014) by Jessica Beck was the 16th novel in a cozy series about Suzanne Hart of April Springs, North Carolina. She owned Donut Hearts, and Marpled on the side. Chester Martin was the victim, who got a knife in his chest. He never had a speaking part or got past Chapter 1.

He left behind a fair number of enemies, so motive wasn't the issue. Hart dug around for the village gossip. She didn't have to work too hard to find the feuds and melodramas, even with a doughnut shop to run. Plus, as a follow-on, she was desperately trying to keep her weight down.

Business had to come first. She was introducing a new line of doughnuts in between her Marpleing, called Hot Chocolate Delights. Guaranteed to kill a diabetic at ten paces. A good line in the novel, not Hart's, was: "*When all else fails, we could always eat.*" (page 93, trade paperback) So say us all.

The J'accuse! meeting was held in a resort lodge, which was set on fire, the better for the killer to work. She was a woman scorned, dumped by Martin. Since there were many more books to come in the series, Hart survived the conflagration.

The recipes appendix began with Hot Chocolate, followed by Apple Crisp, Pot Roast, and Chicken Pot Pie. Last but not least were the Hot Chocolate Delight Donuts.

CARAMEL CANVAS (2019) was the 39th novel in the Donut Hearts series. Suzanne Hart and her husband Jake had been traveling. When they returned to April Springs, she learned her friend Annabeth Kline had died, apparently in an accident.

Hart suspected otherwise, and as the local Marple it was her duty to stir thing up and put the village into yet another uproar. If I was a resident of April Springs, I'd move someplace with a lower murder rate, like Chicago or Detroit.

During Hart's absence, the doughnut shop had been run by her assistants Emma and Sharon. The business was making good money, so Hart had the time to begin sleuthing. Kline had been a painter, so that gave Hart a fresh group to interrogate, all the local artists. One of them almost made it to the end of the novel before becoming the second murder victim.

An art gallery owner was a conniving man, the art supply store had its story, but the motive came down to jealousy. Another woman wanted her man to stay away from Kline. Various recipes in the appendix for plain doughnuts. Basic types, nothing to write home about.

BEYOND A REASONABLE DONUT (2021) by Ginger Bolton (pseudonym of Janet Bolin) was the fifth novel in a cozy series about Emily Westhill of Fallingbrook, Wisconsin. She and her assistant Nina Lapeer operated the Deputy Donut shop.

They had a booth at the local fete but no end of problems. Someone stole their bucket of confectioner's sugar. A female mime bothered them with rude behaviour, even for a mime. (Why is miming legal in any country?) Someone robbed their cash register.

The difficulties didn't end at the fete. Nina's apartment was broken into and a large painting vandalized with the missing sugar. The mime was found lying on the floor with her head jammed into the bucket. She was DOA at the hospital, having inhaled too much sugar into her lungs. She looked like Nina, so the question was who was the intended target.

The police arrested Nina, not realizing she was booked for the series or that Westhill was an experienced Miss Marple who would show them up. The plot was complicated because the mime and the cash register thief weren't actually working together but independently at cross purposes. Some tricky threads were woven through the narrative.

The recipes appendix consisted of Corny Fritters, Guacamole, and Sherried Mushroom Soup. A meal I'll happily miss, as much as I like fritters.

Bakeries.

DYING FOR DEVIL'S FOOD (2019) by Jenn McKinlay was the 11th novel in a series about Melanie Cooper of Scottsdale, Arizona. She and her partners Angie DeLaura and Tate Harper operated Fairy Tale Cupcakes. They also Marpled on the side. Cooper was engaged to DeLaura's brother Joe and Angie was married to Tate, so they were all one happy family.

Cooper reluctantly agreed to cater an order of cupcakes for the 15-year reunion of her high school. She hated her time there but the money was good. Not so good was meeting the school bully Cassidy Haver at the party. Even worse was when Haver was murdered in the ladies washroom, apparently when someone slipped her a poisoned cupcake. A night to remember.

Cooper and Haver had a nasty public spat just before the murder, so the police had their prime suspect. Sales at the cupcake shop were good though, thanks to the notoriety. Eventually the police discovered the poison had been administered by a different method, not via cupcake.

The Marpleing commenced. Haver's husband Danny had asked her for a divorce after he got his girlfriend Megan pregnant. During the standard gunpoint confrontation with the murderer, Cooper learned he was insanely jealous of Megan but killed the wrong woman by mistake.

After the gun smoke was ventilated, on to the recipes appendix. Leading off was Pineapple Upside-Down Cupcakes, which required the use of a blowtorch. I am not making that up. More conventional varieties were Cinnamon Sinners and Hi-Top Meringue cupcakes.

My favourite type of cupcakes: roses from Safeway.

Bitter Fruit.

KILLER JAM (2015) by Karen MacInernay was the first novel in a cozy series about Lucy Resnick, who retired to a farm near Buttercup, Texas. She had only just produced her first batch of Dewberry Jam from her fruit crop when she tangled with Nettie Kocurek.

At the Founders Days Festival, Kocurek was found murdered, with a jam jar next to her. That was enough evidence for the Deppity Dawgs, so Resnick had to learn the Marpleing business while putting up preserves. Farm life was not as bucolic as she thought, with endless chores.

Her sleuthing brought up large-scale fraud, land grabs, murders from the 1940s, plus the usual village gossip. As one might expect, she tangled with the murderer, who had been fearful of Kocurek exposing his frauds.

If the rough life in rural Texas gets you down, there is always the recipes appendix. The Cottage Cheese can be skipped, but following on were Strawberry Custard Pie, Dewberry Jam, Glazed Maple Twists, and, unaccountably, Beeswax Candles.

Tea And Coffee.

SCONES AND BONES (2011) by Laura Childs (pseudonym of Gerry Schmitt) was the twelfth novel in a cozy series about Theodosia Browning of Charleston, South Carolina. She operated the Indigo Tea Shop and was a murder magnet in her spare time.

The local Heritage Society sponsored a Pirates and Plunder party. On display was an antique skull cup, said to be made from an actual pirate. There was a large diamond embedded on the chin of the skull. Stolen at the party, to no reader's surprise since it was announced in the blurb, and in exchange the thief left a body behind, the young man guarding the cup.

That set off one hoorah for Browning but she was a busy woman. The tea shop didn't run itself, plus she was hosting a tea and cheese tasting at the Charleston Food and Wine Festival. Notwithstanding her duties, she made time to pause for caramel scones and Devonshire cream.

At the scene of the crime, Browning found some evidence, picked it up, and didn't tell the police when they arrived. A real Miss Marple she was, contaminating the evidence and obstructing a police investigation. Clues led her on a hunt for treasure, interrupted every so often for visits to the tea shop or the festival.

The tea and cheese tasting featured shrimp on cheesy crostini, parmesan bread twists, and goat cheese truffles. Don't read this book on an empty stomach or else you'll be ordering one of everything from Skip The Dishes or Door Dash.

The climax came at another party, with a wide variety of alarums and excursions. The thief was caught but not without grievous bodily harm being scattered about. A word to the wise. If you go to a party and see the local Miss Marple there, leave immediately. You'll live longer and be healthier.

The recipes appendix included Chilled Peach and Ginger Soup, Lemon Scones, Cheesy Bruschetta, Goat Cheese Truffles, Tea Cakes, and Crumpets. Don't forget the tea.

We All Scream For Ice Cream.

CHILLED TO THE CONE (2021) by Ellie Alexander (pseudonym of Katherin Dyer-Seeley) was a novel in a cozy series about Juliet Capshaw of Ashland, Oregon. Her family's bakery Torte was doing well. The opportunity was given to her to open a summer season ice cream shop in a temporary space.

So she did, pausing only to whip up some French toast for the bakery's restaurant. She was a busy woman. She became busier when a street performer known as The Wizard was murdered just as she went into the ice cream business. Her estranged husband Carlos was also buzzing around the village. Their relationship was on-again off-again.

The murderer was a drug dealer, who not only killed by mistake but was recorded on security cameras. It also helped that Capshaw and the police caught him in the act of trying to kill a second person.

Onward to the recipes appendix. No surprise to see French Toast Bake (with mascarpone cream). From there to Spring Meltaway Cookies, Donut Cake, Curry Pasties, Proposal Chicken, and Brain Freeze (espresso coffee milkshake).

Dine-In Restaurants.

EGG DROP DEAD (2016) by Laura Childs (pseudonym of Gerry Schmit) was the seventh novel in a cozy series about Suzanne Dietz of Kindred, Tennessee. With her partners Petra and Toni, they operated the Cackleberry Club cafe, specializing in breakfast and egg menus.

Dietz went out to the dairy farm of Mike Mullen and found him dead in the barn with a knife in him. The cows hadn't been milked and Chapter 1 wasn't even over. She panicked and ran. Why? She had Marpled six previous cases and seen as many corpses as any county medical examiner. Not believable.

The killing was good for business though. By now the villagers knew the cafe was Rumour Central, and flocked there anytime a murder was done. The French toast sold that day like hotcakes, if you'll pardon the expression. The cafe was convenient for Dietz's sleuthing, as she could pick up a lot of information just waiting tables.

There were suspects aplenty. The Mullen farm was the target of a land grab. The denouement was a Hollywood action-adventure spectacular with gunfights and, when a stray bullet went into the killer's meth lab, an explosion and towering flames.

The recipes appendix was more sedate, with Chicken Stir Fry, Egg Drop Dead Soup, Molasses Bread, Harvest Pumpkin Soup (the story happened in October), Rice Pudding, Pumpkin Fudge (I'll skip that one), Cheddar Breakfast Strata, Cherry Cake Bars, and Apple Scones.

KILLER KUNG PAO (2020) by Vivien Chien was the sixth novel in a series about Lana Lee and her family's restaurant in Cleveland, Ohio. The Ho Lee Noodle House was located in the Asia Village shopping plaza.

Out in the parking lot, Lee witnessed a rear-ender that developed into a screaming match between the two drivers, June Yi of Yi's Tea and Bakery, who hit the shiny new Cadillac of Mildred Mao. A short while later, Mao was murdered, Yi became the main suspect, and Lee became the sleuth.

The merchants' association put Lee in charge of the plaza sidewalk sale, which made her a busy woman because she still worked a full shift at the restaurant. The plaza community was rife with melodrama and back stories.

This time, the obvious suspect really did do it. Yi went after Lee, there was a struggle, and justice was done. The sidewalk sale was a success. The restaurant's table was loaded with steamed dumplings, pork buns, General Tso chicken, and vegetable lo mein. What, no kung pao?

Ghost Writers In The Sky.

THE DIVA SPICES IT UP (2020) by Krista Davis was a novel in a cozy series about Sophie Winston, an event planner specializing in trade shows. The venue was Old Town, Virginia. Each chapter began with a household hint for dinner parties. Throughout the book the characters were constantly preparing meals. Don't read this on an empty stomach.

Sophie Winston was hired to ghostwrite a celebrity cookbook for Tilly Stratford, former actress, wanna-be lifestyle guru, and the trophy wife of Wesley Winthrope. The cookbook had been started by another ghostwriter Abby Bergeron, who suddenly disappeared before it was finished.

In between concocting recipes, Winston went sleuthing into Bergeron's absence. Abby reappeared in Chapter 7, her body in her basement freezer. Lots of motives, from illicit romances to fake spycraft. The alarums were tangled threads throughout the story before the culprit was brought down.

In the recipes appendix, Pumpkin Bundt Cake started off, followed by Roasted Parmesan Chicken Breasts, Maple-Glazed Brussels Sprouts (which should be illegal), Garlic Mashed Potatoes, Cornbread, and Bourbon Apple Fritters (don't eat and drive).

LITERA SCRIPTA BIBLIOTHECA: PART 1
by Dale Speirs

[Previous reviews about fiction set in libraries appeared in OPUNTIAs #440 (pages 7 to 10) and 468 (pages 9 to 17).]

Specialized Libraries.

"The Rexforth Circulating Library" by Don Mark Lemon (1907 January, THE BLACK CAT, available as a free pdf from www.archive.org) began with the unnamed protagonist accidently coming across a new circulating library while out for a stroll.

He went in as a matter of interest and found it to be a bare room with no shelves, just a counter and a clerk. A few women stood about, apparently customers although there were no books evident.

A list was posted of the most popular books that month, and an extraordinary list it was. They were:
Izaak Walton's COMPLEAT ANGLER
Shakespeare's KING HENRY THE FIFTH
LAST OF THE MOHICANS
MEDITATIONS OF AURELIUS
Samuel Johnson's DICTIONARY
HUCKLEBERRY FINN

The man enquired as to membership and was told it was $10 per month, an astonishing amount for 1907. He was well-to-do and decided to gamble on a month's membership.

He asked for HUCKLEBERRY FINN and was told it would be delivered to his house that afternoon by messenger. The clerk handed him a catalogue of the library and bid him good day.

That afternoon, the package was delivered. It was a dress, suitable for dining out or a soiree. He checked the catalogue and then discovered the book titles were codes for different dresses. Women would wear them for a month, then return them. A fair return for $10 per month. The clerk had assumed he was buying the membership for his wife.

THE LIBERRY (1922) by Ian Hay Beith is available as a free pdf from www.gutenberg.org. Although classified as a book, it was only 34 pages, more of a chapbook. Well worth reading, for its sentimentality and good humour.

The protagonist was a poor old man named Baxter and his granddaughter Ada. She was old beyond her years, a tweenie who had to manage for them both, eking out a humble existence on the old man's annuity. They lived in a poor neighbourhood where he had built up a reputation as an oracle with a well-stocked library.

In truth, it was a shabby collection of shabby volumes but he would quote at length from them for anyone seeking free advice. The truth was eventually revealed, that he was illiterate. He had an eidetic memory though, and Ada would read the books aloud to him. He memorized them as she read them.

He took his secret to the grave. Not much else happened but the story had some wry passages. The funniest was a Scottish servant who discovered that not everyone had read Robbie Burns, which rendered him actually speechless at such infamy. Well worth downloading.

"The Locked Room Library" by Gigi Pandian (2021 Jul/Aug, ELLERY QUEEN) was about a small, very specialized library opening in San Francisco. The collection had only mystery novels available for loan.

As the staff prepared for the grand opening, another mystery developed. A ghost was haunting the premises, with alarums aplenty. The investigation finally caught the culprit. All done with gauze and wires, all in good fun, and great publicity for the opening.

In that same issue of ELLERY QUEEN was "The Body In The Bee Library" by Jon L. Breen. There was a murder in the library of a beekeepers' club. The dead man left one of those cryptic clues which no one could interpret. The club was informally known as The Hive.

After all other possible interpretations, the investigating police officer noticed the dying man had turned to a page about non-social bees after he was stabbed. Such bees do not form hives. Of the possible suspects, only one was not a member of The Hive.

A DEATH LONG OVERDUE (2020) by Eva Gates (pseudonym of Vicki Delaney) was the seventh novel in a series about librarian Lucy Richardson of the Bodie Island Lighthouse Library. It was indeed an actual lighthouse, on the Outer Banks of North Carolina.

A college reunion was held in the library. Richardson put on a display about the library's history, which went over well. After the reception, a few alumni took a stroll around the shoreline, which did not go over as well when they found a woman's body floating in the water.

The deceased was the former library director Helena Sanchez, who had been at the party. She was rude and unliked enough such that no one was surprised when she was murdered. The library cat didn't like her either.

The first clue was an old library book that had startled Helena when she saw it in the display. Added into the mix was that she had a twin sister Tina. Richardson uncovered lots of skullduggery in everyone's past.

Tina was used to smoke out the killer by posing as Helena back from the dead. Good psychological warfare and it worked. The motive was a failed romance at the library decades ago, but the murderer never came to terms with it. Mixed in was a stolen diamond necklace hidden in the library floorboards when it was converted from a lighthouse.

Book Theft.

As old as libraries themselves is the problem of book thieves.

The 1960s television series BATMAN was played as a mixture of melodrama, comedy, and slapstick, basically the only way that superheroes can be played. The idea of masked vigilantes barging into police or military work is risible, much less that they would long remain anonymous or their secret headquarters unknown.

"The Bookworm Turns" and "While Gotham City Burns" were a two-part episode that aired in 1966 April, written by Rik Vollaerts. As with other supervillains, The Bookworm had a superego and liked to spread clues about his next heist. And like other supervillains, he more than once had Batman and Robin helpless in his clutches yet never bothered to rip off their masks and find out their identities.

The Bookworm's lair was not the usual abandoned warehouse of other supervillains but was lined with countless bookcases. He liked to quote epigrams from literature. I've met people like that, and found them most annoying.

Setting aside various perils, none of which were suspenseful because the viewer knew the dynamic duo would always escape, the main attraction was a giant steel cookbook, one story tall, that the Bookworm left as a trap. It was sprung when the duo entered inside, the door slammed shut, and steam began pumping in to cook them.

Whilst they were so occupied, they left the Batmobile parked outside with the keys still in the ignition. Not for the first time nor the last, the car was stolen. The Bookworm drove it to the Morganbilt Library where he used the Bat Beam laser to cut a hole into the rare book vault for the heist of the century.

Alas, Batman and Robin had escaped the giant cookbook and were waiting for them at the library. After a quick fistfight, where everybody on both sides telegraphed their punches with wild swings, the Bookworm was rendered hors de combat and sent up the river.

DUE OR DIE (2012) by Jenn McKinlay was a novel in a cozy series about librarian Lindsey Norris of Briar Creek, Connecticut. The Friends of the Library recently elected Carrie Rushton as their president, over Bill Sint, who was a sore loser.

Carrie's husband Markus was a layabout who preferred television to books, and sponged off his wife. He didn't survive past Chapter 5 and was not mourned. Norris was a busy woman, what with Fletchering and dealing with chaotic staff relations in the library.

A nor'easter settled in, keeping those annoying police elsewhere. Wading through snowdrifts to interrogate people slowed down Norris considerably. There were lots of family feuds, greedy heirs, and just plain nasty people. However, in the denouement it came to theft of rare books, in which Markus had been involved.

Lindsey survived her obligatory gunpoint confrontation with the murderer. The rare books made it to the end as well.

WORD TO THE WISE (2019) continued the saga of Lindsey Norris. Her wedding was nigh and she was being stalked by a book lover Aaron Grady. Which was worse was difficult to say, given her mother's interference in the wedding plans.

The latter problem solved itself when Grady's body was found sitting propped up against the outside wall of the library. The new problem was that Norris' fiancé Mike Sullivan was now the main suspect. He had warned Grady away from her, in public and uttering menaces. Marpleing she must go.

Morris eventually dug up an ex-wife of Grady, got herself slugged unconscious, and was trapped by the murderer. The killer was a really, really jealous and possessive woman who didn't like Grady looking at other women.

Next in the series was ONE FOR THE BOOKS (2020). The wedding was almost upon Lindsey Norris and Mike Sullivan. In true Jessica Fletcher tradition, the Justice of the Peace Steve Briggs who was to perform the ceremony was found dead. By Norris, naturally.

The wedding was out of control in other ways. Norris planned a small wedding but by mistake gave the invitations printer a list of everyone in the village. Instead of registering for gifts, Norris told people to donate a book to the library. In that case, they'd probably have to build a new wing onto the building to handle the books.

Lots of feuds and melodrama surrounded the deceased. Notwithstanding the marriage and the sleuthing, Norris still had to keep the library running. The denouement was a boat chase around an island. Briggs' wife wanted out of their marriage but not by divorce, which would leave her little or nothing. Instead, as a grieving widow, she expected to inherit his estate.

Bookmobiles.

THE CASE OF THE MISSING BOOKS (2005) by Ian Sansom was part of a humourous series about Israel Armstrong. He went to Ulster to take up a career as a bookmobile driver, library jobs being scare in his native England. The Tundrum and District Public Library had been closed. As a cheaper alternative, the town council decided to operate a bookmobile. Armstrong's title was not Librarian, but Outreach Support Officer.

The books were supposed to have been transferred from the closed library as the bookmobile stock. They instead vanished into thin air. The search was on, and Armstrong had to find out where the missing 15,000 books had been taken. Bit by bit, or more correctly, shelf by shelf, he gathered in books and managed to stock the bookmobile. A pleasant read.

READ OR ALIVE (2020) by Nora Page (pseudonym of Ann Perramond) was a novel in a series about bookmobile librarian Cleo Watkins of Catalpa Springs, Georgia. The state Antiquarian Book Society, unmindful of the murder rate, staged a book fair in the village.

One of the visitors was Hunter Fox, who cheated Cleo's cousin Dot out of a signed first edition of GONE WITH THE WIND. He wound up dead in a back alley behind the Gilded Page Antiquarian and Rare Books shop, proprietor Henry Lafayette.

The Deppity Dawgs operated on the principle of choosing suspects and then finding evidence to convict them, so Cleo went Marpleing to prove the innocence of Dot and Henry. Her bookmobile gave her an excuse to drive around investigating bookish people, much easier than being confined behind a desk in the library.

Fox didn't work by himself. There were several others, each with their own priorities. A couple of them really, really liked books and would do anything to possess a rare one. Even the bookmobile was hit with thefts, and not because it carried first editions.

The murderer went down on the big charge, but so did his associates on a wide variety of lesser charges. All the police officers made their quota that month.

BOOKING THE CROOK (2019) by Laurie Cass (pseudonym of Janet Koch) was part of the Bookmobile Cat Mysteries cozy series. The protagonist was Minnie Hamilton who, accompanied by her cat Eddie, toured the Chilson, Michigan, district in her bookmobile.

In this novel, the first problem was a new library director who was non-committal about keeping the bookmobile operational. The second problem was that while on her route, she found a customer dead by poison. The victim never got a speaking part as she was dead before the end of Chapter 1.

So on to the sleuthing, which turned up the usual items. Money problems in a family. An unpopular woman who stymied people. The murderer was after a disputed inheritance. Different though, was hijacking the bookmobile.

The good news was that after the murderer was caught, the library, in an unrelated matter, received a bequest that gave the bookmobile permanent funding.

GONE WITH THE WHISKER (2020) was the next installment in the series. The Fourth of July celebrations were underway. When not delivering books, Minnie Hamilton was showing her visiting niece Katrina the sights. Blood will tell, for at the fireworks display Katrina found a body. The deceased was Rex Stuhler, one of the bookmobile's most loyal customers.

Stuhler died in Chapter 1. (Cass didn't believe in dragging out the suspense.) At the beginning of Chapter 2, Hamilton commented that while he had all the latest electronic devices, he still preferred paper books. Perhaps he should have kept up his Kindle subscription after all.

The regular variety of scandal was dredged up, but the killers and motive came from a different direction. Stuhler's misfortune was that he witnessed a drug transaction. The dealers had been using the bookmobile as a drop. Makes sense when you think about it.

Following on was CHECKING OUT CRIME (2021), which began with Minnie Hamilton finding a dead bicyclist as she drove past in her bookmobile. This being the ninth novel in the series, she was therefore well established as an amateur sleuth.

Motoring about the countryside enabled her to compile a list of suspects, many of whom belonged to the same bike club. The murderer was the Chilson town manager, who was determined to reduce pension plan costs by killing off the pensioners. Strange that the town financed the pensions instead of enrolling retirees into a private plan.

Hamilton was getting married, which opened up a vacancy for a new bookmobile driver. We shall see.

Checking Out The Hard Way.

BOOKMARKED TO DIE (2006) by Jo Dereske was part of a cozy series about librarian Wilhelmina Zukas of Bellehaven, Washington State. She was having a midlife crisis because it was her 42nd birthday.

Assorted problems afflicting her were jealousies arising from a Local Authors anthology the library had just published ("Why wasn't I in it?" "Why was she in it?").

Zukas was also required to attend mandatory group counseling, deal with a younger woman aiming at her boyfriend, and find her cat, who had disappeared. Plus two murders, mustn't forget them, one from the Local Authors and the other from the group sessions.

Zukas' sleuthing was done while swimming through a fog of vicious politics, both library and literary. She wandered about stunned most of the time, enough to make the reader (at least myself) want to throw her against a wall, slap her a couple of times, and shout "Get hold of yourself, woman!".

Some hilarious throwaway scenes, such as the library receiving 38 copies of a self-published novel titled I, MOTHER. It was about a woman whose children and family treated her like a robot. That whirring noise you hear in the distance is Isaac Asimov turning over in his grave.

More seriously, one of the victims had a manuscript circulating to publishers which was a roman a clef of local scandals in the village. The manuscript became the MacGuffin of the plot, sought here, there, and everywhere.

The killer was trying to eradicate proof of her plagiarism contained in the manuscript, not to mention the poorly disguised account of her life.

It all ended well, and the cat came back.

A MURDER FOR THE BOOKS (2017) by Victoria Gilbert (pseudonym of Vicki Weavil) was the first novel in a cozy series about Amy Webber of the Taylorsford Public Library in Virginia. The Blue Ridge mountains were quiet and peaceful until she arrived to take up her duties as library director and Miss Marple.

Her neighbour asked her to clear the name of his grandaunt, who was tried for murder in 1925. Webber began researching family histories and past scandals. The past wasn't dead even if the principal characters were. Webber traced sharp practice and cover-ups down to the present day, including her own family. A modern-day murder occurred, and Webber wound up with a broken wrist and sprained ankle. Book learning is more dangerous than thought.

BOUND FOR MURDER (2020) carried on the series. Amy Webber's friend was running for mayor but was hobbled by a scandal involving her grandparents. They ran a commune back in the 1960s on an organic farm that was now discovered to have been fertilized by human bodies.

While the police dug for skeletons, Webber went digging through old newspapers and documents, since not everything was online. Lots of shameful pasts were revealed, such as drug addiction, missing persons, and assumed identities. The library held the archives of the village council.

This time it wasn't just descendants in the line of fire, as a few elderly hippies were still roaming around. The scandal was freshened up with new murders. Genealogy became important because the killer was cleaning up details from the family past. History matters.

Looking back to an older time, consider the story "A Thief In The Night" by Howard Markle Hoke (1912 February, THE BLACK CAT, available as a free pdf from www.archive.org). Set in a resort village, the librarian Barbara Pertii was stagnating in her job when a handsome stranger came into town.

Alfred Yeargood romanced her, and demonstrated he knew books. For example, with his eyes closed he could tell the difference between an American and a British recent hardcover because the glues smelled different. Pertii held back though, once she realized that the number of burglaries had soared just after he had arrived.

Came the night when a homeowner demonstrated his marksmanship and shot dead the burglar. The next day the body was placed on display, and Pertii saw it was her suitor. She staggered back to the library, only to find Alfred there. He told her that he had come to the village in pursuit of his evil twin brother, who was the burglar. Even in 1912 that was an old cliché.

SEEN IN THE LITERATURE

Planets.

Barth, P., et al (2021) **Magma ocean evolution of the TRAPPIST-1 planets.** ASTROBIOLOGY 21:doi.org/10.1089/ast.2020.2277 (available as a free pdf)

Authors' abstract: *As of March 2021, there are 4,692 confirmed exoplanets. Of those exoplanets, 60 are optimistically classified as potentially habitable, meaning they orbit in the star's habitable zone and are rocky. The habitable zone is defined as the region around a star where liquid water can be present on the surface of a rocky planet, assuming a greenhouse atmosphere.*

According to population statistics from the Kepler exoplanetary survey, a planet should likely be less massive than 5 M4 and smaller than 1.7 R4 to be rocky. Only 14 of these 60 planets are in the conservative habitable zone and have a mass smaller than 5 M4 and are, therefore, currently the most likely candidates for being habitable rocky worlds.

Recent observations of the potentially habitable planets TRAPPIST-1 e, f, and g suggest that they possess large water mass fractions of possibly several tens of weight percent of water, even though the host star's activity should drive rapid atmospheric escape. These processes can photolyze water, generating free oxygen and possibly desiccating the planet.

After the planets formed, their mantles were likely completely molten with volatiles dissolving and exsolving from the melt. To understand these planets and prepare for future observations, the magma ocean phase of these worlds must be understood. ... For all planets that we investigated, we find that only 3 to 5% of the initial water will be locked in the mantle after the magma ocean solidified.

Worsham, E.A., and T. Kleine (2021) **Late accretionary history of Earth and Moon preserved in lunar impactites.** SCIENCE ADVANCES 7:doi.org/10.1126/sciadv.abh2837 (available as a free pdf)

Authors' abstract: *Late accretion describes the final addition of Earth's mass following Moon formation and includes a period of Late Heavy Bombardment (LHB), which occurred either as a short-lived cataclysm triggered by a late*

giant planet orbital instability or a declining bombardment during late accretion.

Using genetically characteristic ruthenium and molybdenum isotope compositions of lunar impact-derived rocks, we show that the impactors during the LHB and the entire period of late accretion were the same type of bodies and that they originated in the terrestrial planet region.

Because a cataclysmic LHB would have, in part, resulted in compositionally distinct projectiles, we conclude that the LHB reflects the tail end of accretion. This implies that the giant planet orbital instability occurred during the main phase of planet formation. Last, because of their inner solar system origin, late-accreted bodies cannot be the primary source of Earth's water.

Mills, T., et al (2021) **Iron rain: Measuring the occurrence rate and origin of small iron meteoroids at Earth.** MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY 508:doi.org/10.1093/mnras/stab2743

Authors' abstract: *We report results of a 4-year survey using Electron Multiplied Charged Coupled Device cameras recording 34,761 two-station video meteor events complete to a limiting magnitude of +6. The survey goal was to characterize probable iron meteoroids.*

Using only physical properties of the meteor trajectories including early peaking light curves, short luminous trajectories, and high energies accumulated per area at beginning, we identified 1,068 iron meteors. Our iron candidates are most abundant at slow speeds <15 km s^{-1}, where they make up ~20 per cent of the mm-sized meteoroid population.

They are overwhelmingly on asteroidal orbits, and have particularly low orbital eccentricities and smaller semimajor axes when compared to non-irons between 10 and 20 km s^{-1}. Our iron population appears to be more numerous at fainter magnitudes, comprising 15 per cent of slow (10 to 15 km s^{-1}) meteors with peak brightness of +3 with the fraction rising to 25 per cent at +6 to +7, our survey limit.

The iron orbits are most consistent with an asteroidal source and are in highly evolved orbits, suggesting long collisional lifetimes (10^7 yr). Metal-rich chondrules (nodules) found in abundance in EL chondrites are one possible source for this population. We also propose a possible technique using R-band colours to more robustly identify fainter iron meteors with very high confidence.

Mangold, N., et al (2021) **Perseverance rover reveals an ancient delta-lake system and flood deposits at Jezero crater, Mars.** SCIENCE 374:doi.org/10.1126/science.abl4051 (available as a free pdf)

Authors' abstract: *Observations from orbital spacecraft have shown that Jezero crater on Mars contains a prominent fan-shaped body of sedimentary rock deposited at its western margin. The Perseverance rover landed in Jezero crater in February 2021.*

We analyze images taken by the rover in the 3 months after landing. The fan has outcrop faces, which were invisible from orbit, that record the hydrological evolution of Jezero crater. We interpret the presence of inclined strata in these outcrops as evidence of deltas that advanced into a lake.

In contrast, the uppermost fan strata are composed of boulder conglomerates, which imply deposition by episodic high-energy floods. This sedimentary succession indicates a transition from sustained hydrologic activity in a persistent lake environment to highly energetic short-duration fluvial flows.

Origin Of Life.

[Still unresolved is whether life began as self-reproducing chains of RNA made of nucleotides or proteins made of amino acids, the two of which much later combined to produced metabolic cells. DNA is a derived descendent of RNA and no one believes it was there in the beginning.]

Kankia, B. (2021) **Quadruplex world.** ORIGINS OF LIFE AND EVOLUTION OF BIOSPHERES 51:273-286

Author's abstract: *The RNA world hypothesis relies on the double-helix complementarity principle for both replication and catalytic activity of RNA. However, the de novo appearance of the complementarity rules, without previous evolution steps, is doubtful. Another major problem of the RNA world is its isolated nature, making it almost impossible to accommodate the genetic code and transform it into modern biochemistry.*

These and many other unanswered questions of the RNA world led to suggestions that some simpler molecules must have preceded RNA. Most of these alternative hypotheses proposed the double-helical polymers with different backbones but used the same complementarity principle.

The current paper describes a fundamentally different idea: the de novo appearance of a nucleic acid polymer without any preexisting rules or requirements. This approach, coined as the quadruplex world hypothesis, is based on
(i) the ability of guanines to form stable G-tetrads that facilitate polymerization; and
(ii) the unique property of polyguanines to fold into a monomolecular tetrahelix with a strictly defined building pattern and tertiary structure.

The tetrahelix is capable of high-affinity intermolecular interactions and catalytic activities. The quadruplex world hypothesis has the potential to address almost all the shortcomings of the RNA world.

Pawlowski, P.H. (2021) **The codon usage in the minimal natural cell.** ORIGINS OF LIFE AND EVOLUTION OF BIOSPHERES 51:215-230 (available as a free pdf)

[A codon is a gene sequence of three RNA or DNA nucleotides which produce a specific amino acid or act as a stop signal during protein synthesis. Some microbes can function with as few as 137 genes.]

Author's abstract: *A statistical analysis of the variation in contents with the size of the current known smallest genomes, N. deltocephalinicola, C. ruddii, N. equitans, and M. genitalium, enabled the indication of a minimal set of codons capable of naturally building a modern-type free-living unicellular organism in an early stage of evolution.*

Using a linear regression model, the potential codon distribution in the minimal natural cell was predicted and compared to the composition of the smallest synthetic, JCVI-Syn3.0. The distribution of the molecular weight of potentially coded amino acids was also calculated.

The investigation of a minimal set of genes compatible with the natural cellular life has both theoretical and practical branches. The theoretical research branch brings us closer to understanding the spontaneous emergence of life. Practical approaches focus on the construction of synthetic cells. The determination of the minimal set of genes necessary for survival, and so required for basic metabolism and reproduction, can be achieved by the experimental and computational analysis of the respective biochemical pathways.

The first fully realized synthetic cell JCVI-Syn3.0 has 473 genes encoded by a 531 kbp genome. Its minimalistic genome size is less than that of its natural archetype, free-living Mycoplasma genitalium, with 580 kbp and 525 genes, it exceeds the 491 kbp code, coding 552 genes of marine archaea symbiont Nanoarchaeum equitans and the genomes of endosymbionts Carsonella ruddii, 160 kbp, 182 genes, and Nasuia deltocephalinicola , 112 kbp and 137 genes.

This list might be completed by a speculated 250 kbp genome coding 500 genes of the Last Universal Common Ancestor and a Forster and Church concrete theoretical design of a bottom-up synthetic system, with some of the attributes of a living cell, containing 113 kbp genome coding 151 genes.

The codon distribution seems to be a more fundamental property of the early genomes than the minimum number of genes required to sustain life under ideal environmental conditions. This is because the ancient self-organizing system could have as few as two specific catalysts, instead of a big stable functional proteome.

Early Cellular Life.

Erdmann, W., et al (2021) **How the geomagnetic field influences life on Earth: An integrated approach to geomagnetobiology.** ORIGINS OF LIFE AND EVOLUTION OF BIOSPHERES 51:231-257 (available as a free pdf)

Authors' abstract: *Earth is one of the inner planets of the Solar System, but, unlike the others, it has an oxidising atmosphere, relatively stable temperature, and a constant geomagnetic field (GMF). The GMF does not only protect life on Earth against the solar wind and cosmic rays, but it also shields the atmosphere itself, thus creating relatively stable environmental conditions.*

What is more, the GMF could have influenced the origins of life: organisms from archaea to plants and animals may have been using the GMF as a source

of spatial information since the very beginning. Although the GMF is constant, it does undergo various changes, some of which, e.g. a reversal of the poles, weaken the field significantly or even lead to its short-term disappearance.

This may result in considerable climatic changes and an increased frequency of mutations caused by the solar wind and cosmic radiation. This review analyses data on the influence of the GMF on different aspects of life and it also presents current knowledge in the area.

In conclusion, the GMF has a positive impact on living organisms, whereas a diminishing or disappearing GMF negatively affects living organisms. The influence of the GMF may also be an important factor determining both survival of terrestrial organisms outside Earth and the emergence of life on other planets.

Loron, C.C., et al (2021) **Shale-hosted biota from the Dismal Lakes Group in Arctic Canada supports an early Mesoproterozoic diversification of eukaryotes.** JOURNAL OF PALEONTOLOGY 95:doi.org/10.1017/jpa.2021.45

Authors' abstract: *The Mesoproterozoic is an important era for the development of eukaryotic organisms in oceans. The earliest unambiguous eukaryotic microfossils are reported in late Paleoproterozoic shales from China and Australia. During the Mesoproterozoic, eukaryotes diversified in taxonomy, metabolism, and ecology, with the advent of eukaryotic photosynthesis, osmotrophy, multicellularity, and predation.*

Despite these biological innovations, their fossil record is scarce before the late Mesoproterozoic. Here, we document an assemblage of organic-walled microfossils from the 1590 to 1270 megayears ago Dismal Lakes Group in Canada. The assemblage comprises 25 taxa, including 11 morphospecies identified as eukaryotes, a relatively high diversity for this period.

We also report one new species, Dictyosphaera smaugi new species, and one unnamed taxon. The diversity of eukaryotic forms in this succession is comparable to slightly older assemblages from China and is higher than worldwide contemporaneous assemblages and supports the hypothesis of an earlier diversification of eukaryotes in the Mesoproterozoic.

McMahon, S., et al (2021) **Late Ediacaran life on land: desiccated microbial mats and large biofilm streamers.** PROCEEDINGS OF THE ROYAL SOCIETY OF LONDON 288B:doi.org/10.1098/rspb.2021.1875 (available as a free pdf)

[The fossils studied here are about 575 megayears old, when multicellular organisms were still evolving.]

Authors' abstract: *The Ediacaran period witnessed transformational change across the Earth-life system, but life on land during this interval is poorly understood. Nonmarine/transitional Ediacaran sediments preserve a variety of probable microbially induced sedimentary structures and fossil matgrounds, and the ecology, biogeochemistry and sedimentological impacts of the organisms responsible are now ripe for investigation.*

Here, we report well-preserved fossils from emergent siliciclastic depositional environments in the Ediacaran of Newfoundland, Canada. These include exquisite, mouldically preserved microbial mats with desiccation cracks and flip-overs, abundant Arumberia-type fossils and, most notably, assemblages of centimetre-to-metre-scale, subparallel, branching, overlapping, gently curving ribbon-like features preserved by aluminosilicate and phosphate minerals, with associated filamentous microfossils.

We present morphological, petrographic and taphonomic evidence that the ribbons are best interpreted as fossilized current-induced biofilm streamers, the earliest record of an important mode of life (macroscopic streamer formation) for terrestrial microbial ecosystems today.

Their presence shows that late Ediacaran terrestrial environments could produce substantial biomass, and supports recent interpretations of Arumberia as a current-influenced microbial mat fossil, which we here suggest existed on a 'streamer-arumberiamorph spectrum'.

Finally, the absence of classic Ediacaran macrobiota from these rocks despite evidently favourable conditions for soft tissue preservation upholds the consensus that those organisms were exclusively marine.

Speirs: Many interesting photographs and drawings. Worth downloading if you are interested in the origin of life.]

Zhang, J., and Y. Zhang (2021) **Marine oxygenation, deoxygenation, and life during the Early Paleozoic: An overview.** PALAEOGEOGRAPHY, PALAEOCLIMATOLOGY, PALAEOECOLOGY 584:doi.org/10.1016/j.palaeo.2021.110715

Authors' abstract: *The Early Paleozoic (Cambrian-Devonian) witnessed a series of significant environmental changes including ocean-atmosphere oxygenation and progressive cooling due to a decline in CO_2 levels. These changes were temporally associated with major radiations and extinctions of marine fauna and the establishment of complex ecosystem structure.*

Specifically, it is thought that an increase in shallow-water O_2 concentrations accompanied rapid diversification and colonization of marine invertebrates in the Cambrian and Ordovician, and expanded oceanic anoxia was linked with several extinction events. Temporal coincidence does not, however, imply causation, and many questions related to these relationships remain unanswered.

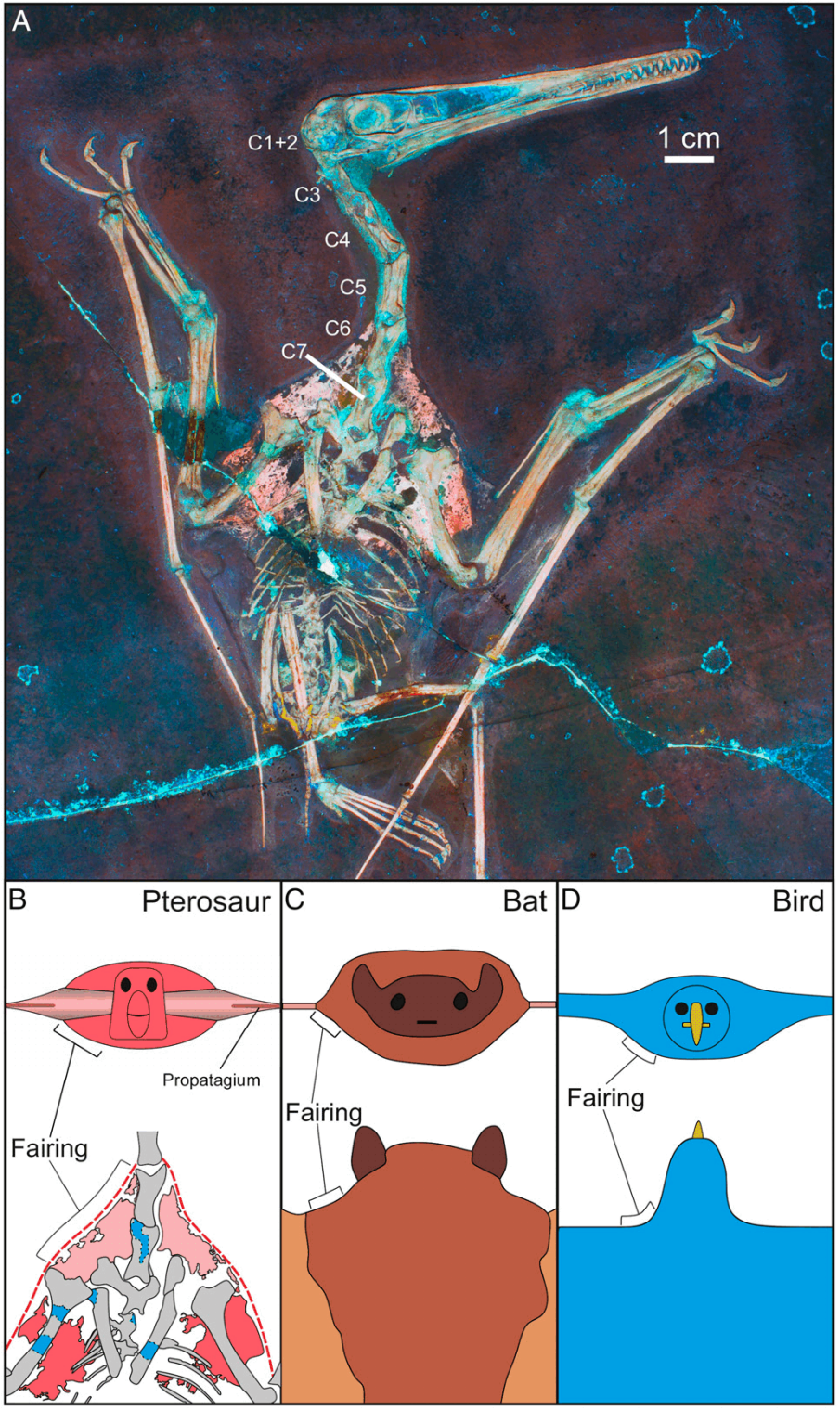
Paleobiology.

Pittman, M., et al (2021) **Pterosaurs evolved a muscular wing-body junction providing multifaceted flight performance benefits: Advanced aerodynamic smoothing, sophisticated wing root control, and wing force generation.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 118:doi.org/10.1073/pnas.2107631118 (available as a free pdf)

Authors' abstract: *Pterosaurs were the first vertebrate flyers and lived for over 160 million years. However, aspects of their flight anatomy and flight performance remain unclear. Using laser-stimulated fluorescence, we observed direct soft tissue evidence of a wing root fairing in a pterosaur, a feature that smooths out the wing-body junction, reducing associated drag, as in modern aircraft and flying animals.*

Unlike bats and birds, the pterosaur wing root fairing was unique in being primarily made of muscle rather than fur or feathers. As a muscular feature, pterosaurs appear to have used their fairing to access further flight performance benefits through sophisticated control of their wing root and contributions to wing elevation and/or anterior wing motion during the flight stroke.

[Images are from this paper.]



Fletcher, T., and A.Ballantyne (2021) **Widespread wildfire across the Pliocene Canadian Arctic Archipelago.** PALAEOGEOGRAPHY, PALAEOCLIMATOLOGY, PALAEOECOLOGY 584:doi.org/10.1016/j.palaeo.2021.110653

Authors' abstract: *Arctic warming is expected to accelerate northward migration of the boreal zone, altering the boreal wildfire regime, with changes in fire frequency, intensity, size, and fire season length. The closest analogue to these future high latitude climate conditions occurred during the Pliocene Epoch (2.58 to 5.33 Ma).*

Palaeoenvironmental reconstructions at four Pliocene-aged sites across the Canadian Arctic Archipelago reveal that boreal forest occurred at the southern-most site on Banks Island (74.30˚N), while open forest or tundra-forest ecosystems existed further north, characterized by species tolerant of low to moderate fire intensity.

The climate that supported these ecosystems was much warmer and wetter than the current climate of the Canadian Arctic Archipelago. Charcoal was discovered in samples across all sites, suggesting that wildfire was ubiquitous within these ecosystems and climate regimes.

The reflectance of the charcoal is consistent with crowning fire or a mixed fire regime on Banks Island and a surface fire regime on Meighen and Ellesmere islands. Boreal forest in southern Ontario, Canada, and open taiga are potential analogues for southern and northern Pliocene Arctic ecosystems, respectively.

Igea, J., and A.J. Tanentzap (2021) **Global topographic uplift has elevated speciation in mammals and birds over the last 3 million years.** NATURE ECOLOGY AND EVOLUTION 5:doi.org/10.1038/s41559-021-01545-6 (available as a free pdf)

Authors' abstract: *Topographic change shapes the evolution of biodiversity by influencing both habitat connectivity and habitat diversity as well as abiotic factors like climate. However, its role in creating global biodiversity gradients remains poorly characterized because geology, climate and evolutionary data have rarely been integrated across concordant timescales.*

Here we show that topographic uplift over the last 3 million years explains more spatial variation in the speciation of all mammals and birds than do the direct effects of palaeoclimate change and both present-day elevation and present-day temperature. By contrast, the effects of topographic changes are much smaller than those of present-day temperatures in eroded areas.

Together, our results stress that historical geological processes rather than traditionally studied macroecological gradients may ultimately generate much of the world's biodiversity.

More broadly, as the Earth's surface continues to rise and fall, topography will remain an important driver of evolutionary change and novelty. Topographic changes directly promote the formation of new species by shaping the connectivity and environmental conditions of the Earth's surface.

First, uplift and erosion of land can create barriers to dispersal that increase the chances of reproductive isolation and ultimately allopatric speciation. This process has been invoked to explain the high percentage of plant endemism in the world's mountains.

Second, topographic change can create novel habitats and niches where new species evolve and diversify. For example, ecological opportunity linked to the Andean uplift has been shown to drive the fast radiation of endemic lupines.

Together, these two mechanisms may explain why global species richness increases with topographic relief and why high-elevation bird lineages speciate at faster rates than low-lying relatives.

Topographic changes also indirectly promote speciation because they modify climate, which itself affects speciation in at least four ways. First, warmer temperatures at lower elevations may increase mutation rates, either directly through oxygen radical production or faster metabolic rates that increase DNA synthesis, and shorten generation times, thereby increasing the likelihood of speciation.

Although endotherms may escape these effects by buffering their body temperatures, warmer temperatures will reduce the costs of maintaining metabolic rates. Lower thermoregulatory costs can release energy that enables large population sizes and promotes speciation by allowing more diverse ecological niches to be occupied.

Second, species interactions such as competition, predation, and mutualism are a constant source of macroevolutionary change, so called Red Queen effects, and these are expected to be more intense at warmer temperatures.

Third, species tend to have wider thermal niches in colder climates because they experience greater temperature variation. This broader niche can reduce opportunities for reproductive isolation and thus speciation if populations are consequently more widespread.

There may also be greater physiological costs of wider temperature adaptation that restricts the number of species that can use this strategy.

Finally, greater climatic instability arising from topographic change may have promoted rapid and repeated ecological speciation by creating novel niches and increased ecological opportunity. This relationship between climatic instability and speciation may, however, be non-linear, as higher speciation rates have also been linked with areas of high climatic stability like Pleistocene refugia.

Nevertheless, the complex interactions between climate and geology have not to our knowledge been explicitly modelled when attempting to explain patterns of biodiversity at large scales. Finally, geological history can promote speciation because it influences present-day abiotic factors like elevation and climate.

Speciation may be favoured in areas with high present-day elevation, such as if topographic relief increases the range of available niches for species to fill, in addition to any effects from the large historical changes in topography. Thus, the effect of elevational change on both historic and present-day conditions must be considered to quantify accurately which mechanisms are more important drivers of speciation.

Zoology.

Beyer, M., et al (2021) **Silk-borne chemicals of spider nuptial gifts elicit female gift acceptance.** BIOLOGY LETTERS 17:doi.org/10.1098/rsbl.2021.0386 (available as a free pdf)

Authors' abstract: *Chemical communication is important in a reproductive context for conveying information used for mate recognition and/or assessment during courtship and mating. Spider silk is a common vehicle for chemical communication between the sexes. However, despite being well described in females, male silk-borne chemicals remain largely unexplored.*

Males of the spider Pisaura mirabilis silk-wrap prey (i.e. nuptial gifts) that is offered to females during courtship and eaten by the female during mating. Interestingly, rejected males often add more silk to their gift which leads to successful mating, suggesting the presence of silk-borne chemicals that facilitate female gift acceptance.

To test this hypothesis, we offered females standardized gifts covered with male silk that was either washed in solvents or unwashed, respectively, to remove or not any chemically active components.

We scored female gift acceptance, and as expected in the case chemicals that mediate female mating behaviour are present in male silk, females were more likely to accept gifts covered with unwashed silk.

Our findings suggest that silk-borne chemicals of nuptial gifts prime female responses, potentially signalling male quality or manipulating females into mating beyond their interests given the occurrence of male cheating behaviour via nutritionally worthless gifts in this system.

Morin, J., et al (2021) **Indigenous sex-selective salmon harvesting demonstrates pre-contact marine resource management in Burrard Inlet, British Columbia, Canada.** SCIENTIFIC REPORTS 11:doi.org/10.1038/s41598-021-00154-4 (available as a free pdf)

Authors' abstract: *To gain insight into pre-contact Coast Salish fishing practices, we used new palaeogenetic analytical techniques to assign sex identifications to salmonid bones from four archaeological sites in Burrard Inlet (Tsleil-Waut), British Columbia, Canada, dating between about 2300 to 1000 BP (ca. 400 BCE to CE 1200).*

Our results indicate that male chum salmon (Oncorhynchus keta) were preferentially targeted at two of the four sampled archaeological sites. Because a single male salmon can mate with several females, selectively harvesting male salmon can increase a fishery's maximum sustainable harvest.

We suggest such selective harvesting of visually distinctive male spawning chum salmon was a common practice, most effectively undertaken at wooden weirs spanning small salmon rivers and streams.

We argue that this selective harvesting of males is indicative of an ancient and probably geographically widespread practice for ensuring sustainable salmon populations. The archaeological data presented here confirms earlier ethnographic accounts describing the selective harvest of male salmon.

Nokelainen, O., et al (2021) **The giant panda is cryptic.** SCIENTIFIC REPORTS 11:doi.org/10.1038/s41598-021-00742-4 (available as a free pdf)

Authors' abstract: *The giant panda (Ailuropoda melanoleuca) is an iconic mammal, but the function of its black-and-white coloration is mysterious. Using photographs of giant pandas taken in the wild and state-ofthe-art image analysis, we confirm the counterintuitive hypothesis that their coloration provides camouflage in their natural environment.*

The black fur blends into dark shades and tree trunks, whereas white fur matches foliage and snow when present, and intermediate pelage tones match rocks and ground. At longer viewing distances giant pandas show high edge disruption that breaks up their outline, and up close they rely more on background matching.

The results are consistent across acuity-corrected canine, feline, and human vision models. We also show quantitatively that the species animal-to-background colour matching falls within the range of other species that are widely recognised as cryptic.

Thus, their coloration is an adaptation to provide background matching in the visual environment in which they live and simultaneously to afford distance-dependent disruptive coloration, the latter of which constitutes the first computational evidence of this form of protective coloration in mammals.

Most mammals have drab coloration, generally showing brown tones, but there are a small number of well-known exceptions that demand evolutionary explanation.

One is the giant panda (Ailuropoda melanoleuca), an iconic flagship species of conservation biology which is familiar to a great many people, but the function of its black-and-white coloration has proven puzzling.

Several hypotheses for its strange appearance have been suggested. These include intraspecific signalling, heat management, aposematism, and background matching, the latter two to avoid predation by tigers (Panthera tigris), leopards (Panthera pardus) and dholes (Cuon alpinus), all of which are suggested to prey on giant pandas, especially young ones.

[Images are from this paper. Spot the panda in each photo if you can.]

Environmental Sciences.

Sylvia, A., et al (2021) **Tournament and non-tournament anglers have little effect on a largemouth bass population compared to natural mortality.** CANADIAN JOURNAL OF FISHERIES AND AQUATIC SCIENCES 78:doi.org/10.1139/cjfas-2020-0442

Authors' abstract: *Popularity of bass (Micropterus spp.) catch and release and tournament angling during the past decade has resulted in increased potential for these activities to induce population level effects. Understanding capture rates and mortality sources relative to total population mortality is essential to focus of management.*

We conducted monthly electrofishing, solicited non-tournament angler tag returns, and censused largemouth bass (Micropterus salmoides) tournaments at Brushy Creek Lake, Iowa, USA, from April 2015 to June 2018.

We used a multistate mark-recapture model to evaluate the effects of air temperature, water temperature, tournament bass per angler, and tournament initial mortality on non-tournament and tournament angler capture probability and natural, non-tournament angling, and initial and delayed tournament mortality.

Average total annual mortality was 0.66 with natural mortality representing the largest mortality source (0.57) followed by delayed tournament mortality (0.06), non-tournament angling mortality (0.02), and initial tournament mortality (0.006).

Our results reveal both non-tournament and tournament angling mortality are low compared to natural mortality in some lakes. Therefore, cumulative angling mortality likely has minimal population level effects on some bass populations.

Ringwood, A.H. (2021) **Bivalves as biological sieves: bioreactivity pathways of microplastics and nanoplastics.** BIOLOGICAL BULLETIN 241:doi.org/10.1086/716259 (available as a free pdf)

Author's abstract: *Oceanic and coastal sampling programs have indicated extensive plastic pollution of marine habitats and revealed the need for understanding the scope and potential impacts of plastics on marine organisms. Sampling regimes for macroplastics (>5 mm) that can be visually collected for quantification and characterization in marine habitats provide valuable environmental data for the larger plastics.*

But less is known about the scope or potential impacts of small micron- and nanosized bits of plastic that result from weathering of macroplastics and inputs of manufactured particles that could profoundly affect marine invertebrates, especially suspension feeders.

Bivalves can serve as important bioaccumulators of plastic particles and exhibit processing pathways that serve as biological sieves. Mesoplastics (1 to 5 mm) and large microplastics (>25 mm) will have a relatively short transit time (hours to days) and will primarily be concentrated in biodeposits (pseudofeces and feces).

Small microplastics (<25mm) and nanoplastics (<1mm) aremore likely to be accumulated in digestive gland tissues and cells, and also hemocytes, and will have longer retention times. Lysosomes are a common target organelle for uptake and toxicity in both of these cell types.

Therefore, bivalves can potentially act as biological sieves for characterizing relative environmental exposures and bioreactivity of microplastics and nanoplastics, based on critical particle capture and processing pathways.

Nakayama, K., et al (2021) **The structure and formation of giant Marimo (*Aegagropila linnaei*) in Lake Akan, Japan.** SCIENTIFIC REPORTS 11:doi.org/10.1038/s41598-021-01028-5 (available as a free pdf)

Authors' abstract: *Aegagropila linnaei is a freshwater green alga, which at one time was distributed widely in the northern hemisphere. The aggregate often forms beautiful spherical shapes known as "lake balls" or "Marimo". The population of Marimo has been rapidly decreasing worldwide, and today the large Marimo, with a diameter of more than 12 cm, exist only in Lake Akan in Japan.*

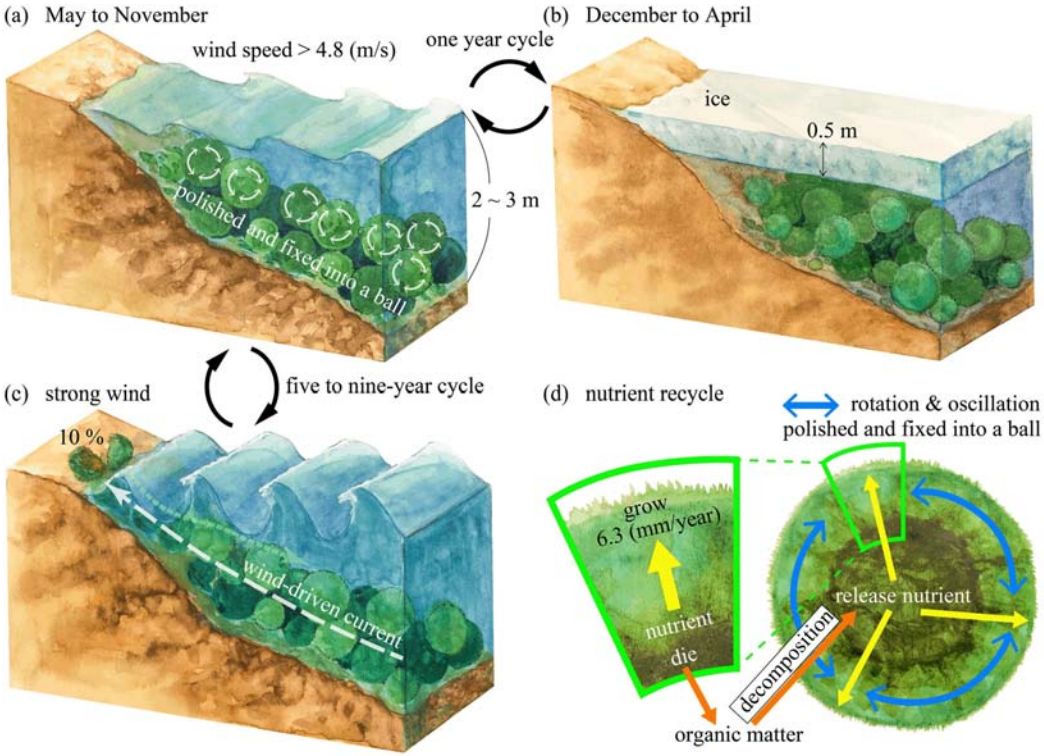
However, how Marimo grow and maintain their unique spherical shape in natural habitats remains unsolved. Here we show that Marimo are "polished" into spheres by the rotation induced by wind waves. Such a process enhances

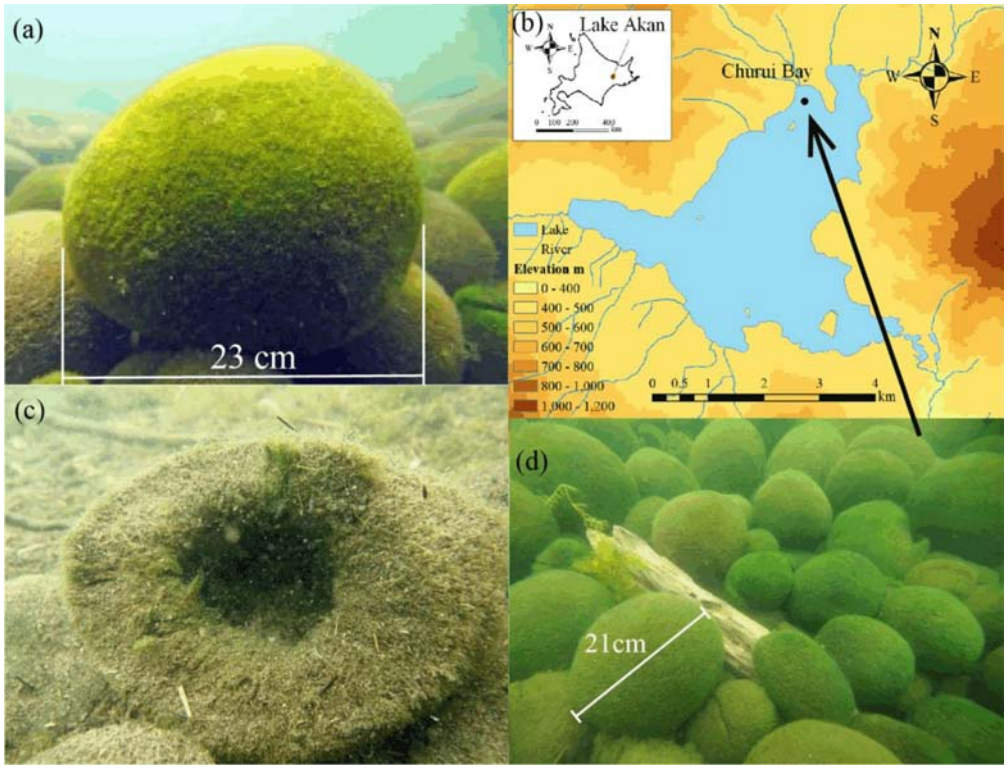
the water exchange between the interior and exterior of the Marimo, thereby recycling nutrients for growth.

Our results provide an intriguing model of a physical environment interacting with biological processes in a self-sustaining ecosystem. We also demonstrate that Marimo have a spherical annual ring structure, and their growth rate is associated with ice cover.

The balance between the ecology of Marimo and the water environment in Lake Akan is highly vulnerable and at risk of irreversible degradation. We must endeavor to rescue Marimo from the fate of a "canary in the coal mine" of global climate change.

[Images are from this paper.]





Humans: Prehistory.

Wilkin, S., et al (2021) **Dairying enabled Early Bronze Age Yamnaya steppe expansions.** NATURE 598:doi.org/10.1038/s41586-021-03798-4 (available as a free pdf)

Authors' abstract: *During the Early Bronze Age, populations of the western Eurasian steppe expanded across an immense area of northern Eurasia. Combined archaeological and genetic evidence supports widespread Early Bronze Age population movements out of the Pontic-Caspian steppe that resulted in gene flow across vast distances, linking populations of Yamnaya pastoralists in Scandinavia with pastoral populations (known as the Afanasievo) far to the east in the Altai Mountains and Mongolia.*

Although some models hold that this expansion was the outcome of a newly mobile pastoral economy characterized by horse traction, bulk wagon transport, and regular dietary dependence on meat and milk, hard evidence for these economic features has not been found.

Here we draw on proteomic analysis of dental calculus from individuals from the western Eurasian steppe to demonstrate a major transition in dairying at the start of the Bronze Age.

The rapid onset of ubiquitous dairying at a point in time when steppe populations are known to have begun dispersing offers critical insight into a key catalyst of steppe mobility. The identification of horse milk proteins also indicates horse domestication by the Early Bronze Age, which provides support for its role in steppe dispersals.

Our results point to a potential epicentre for horse domestication in the Pontic-Caspian steppe by the third millennium BC, and offer strong support for the notion that the novel exploitation of secondary animal products was a key driver of the expansions of Eurasian steppe pastoralists by the Early Bronze Age.

Librado, P., et al (2021) **The origins and spread of domestic horses from the Western Eurasian steppes.** NATURE 598:doi.org/10.1038/s41586-021-04018-9 (available as a free pdf)

Authors' abstract: *Domestication of horses fundamentally transformed long-range mobility and warfare1. However, modern domesticated breeds do not descend from the earliest domestic horse lineage associated with archaeological evidence of bridling, milking and corralling at Botai, Central Asia around 3500 BC.*

Other longstanding candidate regions for horse domestication, such as Iberia and Anatolia, have also recently been challenged. Thus, the genetic, geographic and temporal origins of modern domestic horses have remained unknown. Here we pinpoint the Western Eurasian steppes, especially the lower Volga-Don region, as the homeland of modern domestic horses.

Furthermore, we map the population changes accompanying domestication from 273 ancient horse genomes. This reveals that modern domestic horses ultimately replaced almost all other local populations as they expanded rapidly across Eurasia from about 2000 BC, synchronously with equestrian material culture, including Sintashta spoke-wheeled chariots.

We find that equestrianism involved strong selection for critical locomotor and behavioural adaptations at the GSDMC and ZFPM1 genes. Our results reject the commonly held association between horseback riding and the massive expansion of Yamnaya steppe pastoralists into Europe around 3000 BC driving the spread of Indo-European languages.

This contrasts with the scenario in Asia where Indo-Iranian languages, chariots and horses spread together, following the early second millennium bc Sintashta culture.

Hamley, K.M., et al (2021) **Evidence of prehistoric human activity in the Falkland Islands.** SCIENCE ADVANCES 7:doi.org/10.1126/sciadv.abh3803 (available as a free pdf)

Authors' abstract: *When Darwin visited the Falkland Islands in 1833, he noted the puzzling occurrence of the islands' sole terrestrial mammal, Dusicyon australis (or "warrah"). The warrah's origins have been debated, and prehistoric human transport was previously rejected because of a lack of evidence of pre-European human activity in the Falkland Islands.*

We report several lines of evidence indicating that humans were present in the Falkland Islands centuries before Europeans, including
(i) an abrupt increase in fire activity,
(ii) deposits of mixed marine vertebrates that predate European exploration by centuries, and
(iii) a surface-find projectile point made of local quartzite.

Dietary evidence from D. australis remains further supports a potential mutualism with humans. The findings from our study are consistent with the culture of the Yaghan (Yámana) people from Tierra del Fuego. If people reached the Falkland Islands centuries before European colonization, this reopens the possibility of human introduction of the warrah.

Humans: Modern.

Moltke, I., et al (2021) **Identifying a living great-grandson of the Lakota Sioux leader Tatanka Iyotake (Sitting Bull).** SCIENCE ADVANCES 7:doi.org/10.1126/sciadv.abh2013 (available as a free pdf)

Authors' abstract: *A great-grandson of the legendary Lakota Sioux leader Sitting Bull (Tatanka Iyotake), Ernie LaPointe, wished to have their familial relationship confirmed via genetic analysis, in part, to help settle concerns over Sitting Bull's final resting place.*

To address Ernie LaPointe's claim of family relationship, we obtained minor amounts of genomic data from a small piece of hair from Sitting Bull's scalp lock, which was repatriated in 2007. We then compared these data to genome-wide data from LaPointe and other Lakota Sioux using a new probabilistic approach and concluded that Ernie LaPointe is Sitting Bull's great-grandson.

To our knowledge, this is the first published example of a familial relationship between contemporary and a historical individual that has been confirmed using such limited amounts of ancient DNA across such distant relatives. Hence, this study opens the possibility for broadening genealogical research, even when only minor amounts of ancient genetic material are accessible.

Careau, V., et al (2021) **Energy compensation and adiposity in humans.** CURRENT BIOLOGY 31:doi.org/10.1016/j.cub.2021.08.016 (available as a free pdf)

Authors' abstract: *Increasing levels of activity may bring diminishing returns in energy expenditure because of compensatory responses in non-activity energy expenditures.*

This suggestion has profound implications for both the evolution of metabolism and human health. It implies that a long-term increase in activity does not directly translate into an increase in total energy expenditure (TEE) because other components of TEE may decrease in response, energy compensation.

We used the largest dataset compiled on adult TEE and basal energy expenditure (BEE) (n = 1,754) of people living normal lives to find that energy compensation by a typical human averages 28% due to reduced BEE. This suggests that only 72% of the extra calories we burn from additional activity translates into extra calories burned that day.

Moreover, the degree of energy compensation varied considerably between people of different body compositions. This association between compensation and adiposity could be due to among-individual differences in compensation. People who compensate more may be more likely to accumulate body fat.

Alternatively, the process might occur within individuals. As we get fatter, our body might compensate more strongly for the calories burned during activity, making losing fat progressively more difficult. Determining the causality of the relationship between energy compensation and adiposity will be key to improving public health strategies regarding obesity.

do Nascimento, J.P.M., et al (2021) **Antibiotic resistance and biofilm synthesis genes in airborne *Staphylococcus* in commercial aircraft cabins.** AEROBIOLOGIA 37:733-753

Authors' abstract: *Passenger air transport is one of the main routes for the global spread of multi-drug-resistant bacteria. This may be due to airborne pathogen transmission, which may occur within the commercial aircraft cabin.*

Because of this, we performed an investigation of aerial contamination by Staphylococcus species in 166 commercial aircraft and analyzed the presence of antibiotic resistance and biofilm synthesis genes in the collected isolates.

Fourteen species and four subspecies of Staphylococcus were detected in the analyzed samples. ... Only S. epidermidis isolates were positive for biofilm formation.

To date, this is the first study to report a significant diversity of airborne Staphylococcus and the presence of airborne methicillin-resistant Staphylococcus aureus (MRSA) in the cabin environment in commercial aircraft.

Our results point to the importance of indoor air quality monitoring in the cabin environment as a preventive measure for the airborne spread of clinically significant pathogens.

Technology.

Durden, Tyler (2021-10-29) **Canadian company Meta Materials surges after confusion over Facebook name change.** ZERO HEDGE www.zerohedge.com

Author's extracts: *Shares of Canadian material-science firm Meta Materials surged early Friday in the latest apparent ticker confusion with Facebook's new name change to "Meta". Meta Materials, which trades under the ticket MMAT was up as much as 24% early on Friday,*

The mix-up left it as one of the most actively traded stocks on the day, with 11 million shares traded before mid-day. 1.35 million shares had changed hands in the pre-market session Friday, the report said.

Obviously, Facebook's new name "Meta Platforms Inc." doesn't mean it is associated in any way with Meta Materials (as an aside, FB's new ticker will be MVRS). The Roundhill Ball Metaverse ETF, with the ticker META, also experienced increased volume after the name change.

[Image is from the Zero Hedge blog.]

Meta Materials, which trades under the ticket MMAT

Speirs: The good news is that anyone can now trade stocks inexpensively online. The bad news is that anyone can now trade stocks online. This was not the first time stocks were confused by Robin Hood amateurs.

The most famous misunderstanding in recent years was when Zoom Video Communications, the ones who developed the virtual meeting, became a star in 2020. A different company Zoom Technologies, completely unrelated, saw its shares go to $200 before dropping back to 29 cents in its normal range. Careless stock buyers, all amateurs, had no one else to blame but themselves.

Alikhani, P., et al (2021) **Experimental relativistic zero-knowledge proofs.** NATURE 599:47-50 (2021)

Authors' abstract: *Protecting secrets is a key challenge in our contemporary information-based era. In common situations, however, revealing secrets appears unavoidable; for instance, when identifying oneself in a bank to retrieve money. In turn, this may have highly undesirable consequences in the unlikely, yet not unrealistic, case where the bank's security gets compromised.*

This naturally raises the question of whether disclosing secrets is fundamentally necessary for identifying oneself, or more generally for proving a statement to be correct.

Developments in computer science provide an elegant solution via the concept of zero-knowledge proofs: a prover can convince a verifier of the validity of a certain statement without facilitating the elaboration of a proof at all.

In this work, we report the experimental realization of such a zero-knowledge protocol involving two separated verifier-prover pairs. Security is enforced via the physical principle of special relativity, and no computational assumption (such as the existence of one-way functions) is required.

Our implementation exclusively relies on off-the-shelf equipment and works at both short (60 m) and long distances (=400 m) in about one second. This demonstrates the practical potential of multi-prover zero-knowledge protocols, promising for identification tasks and blockchain applications such as cryptocurrencies or smart contracts.

Ward, A.F. (2021) **People mistake the Internet's knowledge for their own.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 118:doi.org/10.1073/pnas.2105061118

Author's abstract: *In the current digital age, people are constantly connected to online information. The present research provides evidence that on-demand access to external information, enabled by the Internet and search engines like Google, blurs the boundaries between internal and external knowledge, causing people to believe they could, or did, remember what they actually just found.*

Using Google to answer general knowledge questions artificially inflates peoples' confidence in their own ability to remember and process information and leads to erroneously optimistic predictions regarding how much they will know without the Internet. When information is at our fingertips, we may mistakenly believe that it originated from inside our heads.

Eight experiments (n = 1,917) provide evidence that when people "Google" for online information, they fail to accurately distinguish between knowledge stored internally, in their own memories, and knowledge stored externally, on the Internet.

Relative to those using only their own knowledge, people who use Google to answer general knowledge questions are not only more confident in their ability to access external information, they are also more confident in their own ability to think and remember.

Moreover, those who use Google predict that they will know more in the future without the help of the Internet, an erroneous belief that both indicates misattribution of prior knowledge and highlights a practically important consequence of this misattribution: overconfidence when the Internet is no longer available.

Although humans have long relied on external knowledge, the mis-attribution of online knowledge to the self may be facilitated by the swift and seamless interface between internal thought and external information that characterizes online search. Online search is often faster than internal memory search, preventing people from fully recognizing the limitations of their own knowledge.

The Internet delivers information seamlessly, dovetailing with internal cognitive processes and offering minimal physical cues that might draw attention to its contributions. As a result, people may lose sight of where their own knowledge ends and where the Internet's knowledge begins. Thinking with Google may cause people to mistake the Internet's knowledge for their own.

FREE STUFF ONLINE

You will have noticed that I provide sources for the pdfs and mp3s I review in this bulletin. Here is a summary of some good resources, all of which are free.

For scientific papers for which free pdfs are available, the easiest method is to Google either the title of the paper or its digital object identifier, the phrase beginning with doi.org. Most papers are behind a paywall, so unless you have access to a university library computer, you can only get the abstract.

For zines, www.efanzines.com provides current pdf zines as well as some older ones. A club called Fanac at www.fanac.org is the reverse; they provide thousands of old zines from the 1930s to date, with a few modern zines. Both sites have a free email notification service you can subscribe to.

The Old Time Radio Researchers have thousands of old-time radio shows (1930s to 1950s) covering all the genres, such as comedy, science fiction, fantasy, and mystery. Visit www.otrr.org/OTRRLibrary. They also publish a bulletin OLD RADIO TIMES, available at www.otrr.org/?c=times, with a free email notification service. Don't pay money for audio books and listen to a droning voice when you can listen for free to full-cast shows such as Jack Benny or Inner Sanctum.

For pulp fiction magazines from all genres, visit www.archive.org/details/pulpmagazinearchive?&sort=-downloads&page=2
Books in the public domain are free from www.gutenberg.org