# OPUNTIA 402

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**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.

## COWTOWN PRICKLYPEARS

photos by Dale Speirs

It occurred to me that I haven't shown in this zine any photos of opuntias from my yard. Alberta has two species of native pricklypears, *Opuntia polyacantha* and *Opuntia fragilis*. They are found in the dry flatlands of southern Alberta, the Red Deer River badlands of south-central Alberta, and the dry slopes of the Peace River valley in the far northwest of the province.

Calgary is directly on the contact between the prairies and mountains. The western suburbs are in the foothills, and the central and eastern suburbs on the first steppe of the prairies. Pricklypears do not quite reach the Calgary area but grow well enough here, and many people grow them in their gardens.

I collected mine from the Red Deer River badlands. They are legally weeds and thus not protected, although no one worries about them in cities. *O. fragilis* seldom flowers, but my *O. polyacantha* put out a good crop of flowers in 2017. The cover photo shows a full view of one of my plants in early July.

Opuntias have thigmotactic flowers. When the stamens, which carry the pollen on their anthers (tips), are mechanically stimulated, they bend inward to the central pistil, which is the female organ and has the ovary at its base. The tip is the stigma, which is often sticky, the better to catch the pollen.

The stimulation is usually an insect foraging for pollen. Thigmotaxis ensures the insect is liberally dusted with pollen so that it will carry some to the next flower and thus pollinate it. The two before and after photos at right are of the same flower in my garden, stimulated by my index finger.

**BOTANICAL FICTION: PART 9**
by Dale Speirs

[Parts 1 to 8 appeared in OPUNTIAs #316, 317, 320, 323, 325, 334, 369, and 380.]

**How Does Your Garden Grow?**

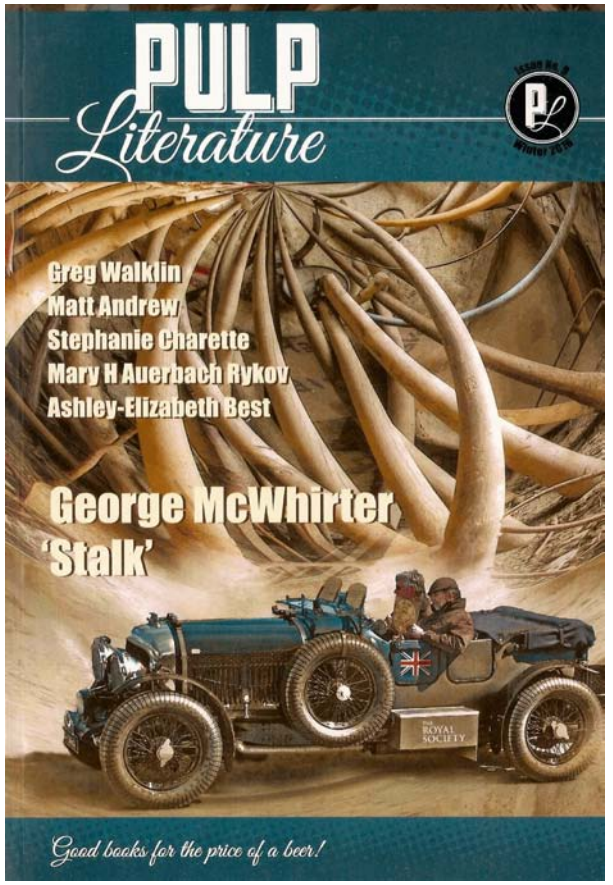
Gardening can arouse emotions as much as being on an SF convention committee, especially in competitive venues. "Madison's Gardening Project" is a 1954 episode of the old-time radio comedy show OUR MISS BROOKS. This series is available as free mp3s from www.archive.org but unfortunately someone 'edited' this episode, chopping out the credits and the last few lines. However, the main story survives, although the title varies in different sources.

Constance Brooks is an English teacher at Madison High School. She rooms with the widow Mrs Davis, and each episode of the series begins with the two of them talking at breakfast and setting up the plot. The school principal is a pompous blowhard Osgoode Conklin. Brooks has her heart set on the handsome biology teacher Philip Boynton, but so does her rival and fellow English teacher Daisy Enright.

In the opening sequence, Davis tells Brooks that a friend of hers vacationing in Hawaii sent her a crate full of tropical fruits and vegetables, more than she could use. That point having been set up for future use, Brooks then goes off to school. The schools of the town are having a garden competition. Brooks is in charge of the Madison garden but it is sabotaged by Enright, who lets the school mascot, a goat, graze it at night.

Not to be stymied, Brooks uses fresh vegetables intended for the school cafeteria as temporary plants, just in the ground long enough for the judging by Mr Stone, head of the Board of Education. The second crop, such as it is, also is vandalized. Davis hears about it and sneaks in her Hawaiian vegetables and fruits. This baffles Stone, and he demands to know how they could have been grown at Madison.

Both Brooks and Conklin get the laughs from their sarcastic remarks and blowups respectively. The supporting cast weaves in and out, getting underfoot and moving the plot forward by their mess-ups. The comedy stands up quite well to the test of time, and is worth listening to.




"Stalk" by George McWhirter (2016 Winter, PULP LITERATURE #9) is about an rich man, Jack Woodruff, who grows a giant beanstalk because he can.

He hires a genius geneticist to develop it using modern GMO methodology. Officially there is method in his madness. He wants to develop plants whose giant stems can be used for deepwater oil rigs because they have resilience and flexibility.

Unofficially Woodruff is obsessed with the Jack In The Beanstalk story. After the success of the first cloudscraper beanstalk, he goes beyond that, hiring a pregnant woman to have a genetically modified son who will be a giant. If all else fails, the kid can play professional basketball, which is a cute but practical touch.

The geneticist also modifies beans to produce growth hormones and supplements that will transform children fed them into giants as well. The genetics work is a little facile, and the scientists whips up new batches of genes too easily.

One is reminded of spotweld-that-busbar ANALOG stories during the John W. Campbell Jr era, when engineers solved complex problems within a ten-page story as if they were just changing a flat tire. That disclaimer aside, McWhirter's story is a good one.

**Carnivorous Plants.**

I daresay that 95% of botanical fiction is the giant man-eating plant, almost always a tree. There is no such thing in nature but the legend began in the 1800s as a result of a misunderstanding by European explorers penetrating into the jungles of southeastern Asia.

In that part of the world are carnivorous pitcher plants of the genus *Nepenthes*. Some species have very large pitchers, enough to trap small mammals such as rodents. *Nepenthes* are vine plants, and grow up onto shrubs and trees for support, then dangle their traps. It was an obvious mistake for explorers to think it was the tree sending out the traps, and so it was the reports sent back home were garbled. Fiction writers leapt upon the idea of carnivorous trees. Since all tropical jungles seemed alike to them, they transplanted the carnivorous trees to the Amazon or African jungles, where *Nepenthes* is not found.

The discovery of Mount Roraima at what is today the junction of Brazil, Guyana, and Venezuela was also worked into the mix. Sir Arthur Conan Doyle used it for his novel THE LOST WORLD, subsequently made into several movies. (See OPUNTIA #67.1B for an extended review about them.)

Mount Roraima was and still is one of the greatest natural wonders of the world. It is a table mountain of plutonic bedrock with vertical sides 2.5 km high. It is the tallest mountain in South America east of the Andes. There is no easy path to the top, and the first ascent wasn't until 1884. It has a distinctive flora and fauna, albeit no dinosaurs or carnivorous trees.


Which brings me to THE DEVIL TREE OF EL DORADO by Frank Aubrey, a book published in 1897 which combines carnivorous trees, Mount Roraima, and El Dorado, the fabled city of gold, into an action-adventure. He also works in a lost race of whites who came from Egypt, with enough details to make me wonder if he was a Mormon. The novel is available from www.gutenberg.org as a free download in several formats.

The book was written in full British imperialist mode. The first sentence is: *Should Roraima be handed over to Venezuela?*, followed by a lament that you can't trust those greasers to look after it properly. The protagonists are Leonard Elwood and Jack Templemore, who yearn to go down in the history books as the first to ascend Mount Roraima. After about twenty pages of yearnings, interspersed with infodumps about Mount Roraima, off they go.

Many assorted adventures later, they reach the mountain top. There is indeed a lost white race, including beautiful princess, all of whom speak pseudo-medieval English. It isn't until Chapter 21 that they find the devil tree. They went exploring and found a natural amphitheatre. In the centre of the arena was the tree.

*But what at once riveted their attention, almost to the point of fascination, was an extraordinary-looking tree that stood in the arena. This tree had no leaves, but branches only. In colour it was of a somber violet-blue, tinged in places with a ruddy hue. The trunk was about thirty feet in height, and eight or nine feet in diameter.*

*The branches, which were many, a hundred or more probably, drooped over from where the trunk ended and trailed about the ground. But what was most astonishing, these branches were all in motion. Though there was no wind, they waved to and fro, ran restlessly along the ground like lithe snakes, and intertwined one with another, at the same time making a harsh, rustling sound.*

Along the way, the boys had picked up a pet puma. Its fate is described as a cautionary tale: *One of the long trailing branches, some of them appeared to be two hundred or three hundred feet in length, came up over the end of the pier, and, with a rustle, made its way swiftly towards them. It was within two or three feet of where they stood looking at it, when the puma, with a loud growl, sprang forward and bit at it.*

*Immediately the branch curled itself round the animal's body and began dragging it along the pier towards the tree. Then two or three other branches advanced and went to the assistance of the first one, coiling round the poor puma and dragging it farther along, despite its teeth and claws and its desperate struggles. In succession, other branches crept up over the end of the stonework, and, just in time, Jack seized Leonard and dragged him back. ...*

*More branches came to the aid of the others; they coiled round its mouth and closed it; round its legs and bound them; and soon, helpless, a mere bundle in the coiling, curling branches, as it were, it was drawn off the pier to the ground below. Then it was rolled on and on till it had almost reached the tree-trunk, where were shorter but thicker and stronger branches waiting for it.*

*These, in their turn, soon coiled round it; then, slowly, they bent upwards, carrying the poor animal in their relentless grasp, and lowered it into a hollow in the centre of the top of the trunk, where it almost disappeared from sight. Then all the thicker branches coiled round it and shut it completely out from view, forming a sort of huge knot round the top of the tree and remaining motionless; while the longer and more slender branches continued to play restlessly about, seeking for further prey.*

The reason an amphitheatre surrounds the devil tree is because it was used for human sacrifices. More excitement and adventure follows, but there is a return to the tree. It is destroyed by mining underneath it and detonating a cask of gunpowder under it. No concern at all in those days for endangered species.

A fair action adventure novel, trotting out all the cliches of the genre, although to be fair, 125 years ago they weren't cliches.

"Hot House Flower" by Stephanie Charette (2016 Winter, PULP LITERATURE #9) fits into the template of carnivorous trees. The only difference is that the tree in question, brought back from a tropical island, produces branches tipped with humanoid figures who do the weeding and other maintenance work around the tree. The rest is the standard plot, culminating in the usual screaming and horror.

**You Are What You Eat.**

Definitely not the standard plot is a 1917 story "The Vegetable Man" by Luigi Ugolini, translated into English for the 2011 anthology THE WEIRD, edited by Ann and Jeff VanderMeer. It concerns the fate of Dr Benito Olivares, who was botanizing in the Amazon when he encountered a strange plant that had a pair of eyes.

When he touched it, thorns spiked him and injected a green toxin. Over the months that followed, he began to turn into a plant. First his skin became green, and then his arms became rigid branches. The doctors could do nothing. He slowly metamorphoses into a giant plant, with eyes.

**Cozy Mysteries.**

Cozy mysteries have evolved into a standard format from their distant origin in the Miss Marple series. The book titles usually are puns. The main protagonist is an amateur sleuth who busily snoops about contaminating evidence, indirectly obstructing police, and getting into the line of fire from the murderer.

A subgenre of cozies is the gardening cozy. The first example I present is DEATH AT THE SPRING PLANT SALE (2003) by Ann Ripley, part of a cozy series about Louise Eldridge. She is the host of a television show "Gardening With Nature", covering the District of Columbia and adjacent areas of Maryland and Virginia. She attends the Bethesda Garden Club's annual spring sale, where the politics are every bit as vicious as over yonder on Pennsylvania Avenue.

Catherine Freeman, the BGC president, is shot dead in her driveway. Her husband Walter is a big name at the Federal Reserve, so police think he may have been the intended target. Catherine was ultra-competitive in the BGC, so there are suspects in that organization, as well as a plant nursery owner she had clashed with, and finally, not to forget, an old girlfriend of her husband.

Eldridge, already a confirmed snooper, mixes herself into a volatile slurry of politicians, high-ranking bureaucrats, and very disgruntled horticulturists. A second body appears, as it usually does in cozies.

In the denouement, there wasn't just one culprit but a plethora of them, many from the BGC. Blackmail was as common among them as sabotaging plant nurseries, and the murders were just two among numerous felonies. That doesn't include the traditional the-end-justifies-the-means procedures of amateur sleuths like Eldridge, such as unlawful entry, theft of evidence, and contaminating crime scenes.

The subplot threads tangle themselves into a messy ball of yarn that takes three chapters at the end of the book to resolve who did what to whom and why. It does sort out though. The author was clever in laying out the subplots. Sometimes the middle chapters bogged down, and I had to skim pages.

ROTTEN TO THE CORE (2009) by Sheila Connolly is a novel in a series about Meg Corey. She inherited an apple orchard near Granford, Massachusetts. This book opens shortly after the body from the last novel has been interred. With hardly a time for a cup of applejack, Corey finds another body in her orchard. The defunct was a local organic farmer who died of pesticide poisoning.

In between all the details of running a commercial orchard, Corey has to do a bit of sleuthing in self defense. Not surprising, since she has only been there for a short while and already has two bodies to her credit. Besides a bratty daughter, she has to deal with environmentalists and the feuds of local citizens, some of which go back generations. More people are poisoned by pesticides slipped into their food. It all comes down to a romantic love triangle and a woman scorned. The J'accuse! meeting is ever so polite. In the appendix of the book are nice recipes for apple deserts.

SLEEPING WITH ANEMONE (2010) by Kate Collins (pseudonym of Linda Tsoutsouris) is a novel in a cozy series about flower shop owner Abby Knight. In this installment, she is campaigning against the multinational Uniworld Food for their farming practices, which gets her tossed from a home-and-garden show. It also gets her a brick tossed through the flower shop window and three kidnap attempts.

The megacorporation isn't acting with honour, which confuses the investigation. As is common in cozies, the real plot motivator is something else, a stolen valuable antique brooch that the thieves want to get back at any risk. Knight not only got possession of it, but her mother, a crafts hobbyist, is making copies for sale in the flower shop. The thieves are frustrated in having to steal the brooches over and over, and still not being able to get the genuine original.

The story ends the hard way with a home invasion and the usual last-second escape. Everything sorts out for the best in the end. Uniworld Food is stymied by disclosures about its business practices. Knight falls in love and accepts a marriage proposal. This ensures a string of sequels that cover the engagement (plus murders), wedding preparations (plus murders), the ceremony itself (plus murders), and the honeymoon (plus murders). Pity the groom.

## THE MANY LOST WORLDS: PART 2

by Dale Speirs

[Part 1 appeared in OPUNTIA #67.1B.]

### According To Doyle.

With his novel, THE LOST WORLD, Sir Arthur Conan Doyle started a trend that eventually died out as our planet was fully mapped. There are no more places left in modern times to hide a lost world with Mesozoic critters roaming about. By 1957, when the movie THE LAND UNKNOWN was released, the only area left to hide dinosaurs and giant carnivourous plants was inside fog-covered volcanic craters in Antarctica. There was some basis to this, as explorers had discovered, in the midst of icefields, a warm open valley, heated from underground. No jungle or dinosaurs, of course.

This movie modernizes Doyle's story and changes all the characters, but still follows the basic plot. A U.S. Navy helicopter is on a survey flight over the Antarctic ice cap when it runs into trouble and makes a crash landing inside the aforementioned volcanic crater. The helicopter is fully loaded with passengers but the process shots of it flying against a background of Antarctic mountains show a model toy helicopter completely empty, apparently flying itself.

The usual cliches are trotted out. An unconvincing mechanical dinosaur, men in rubber suits for the smaller beasts, monitor lizards on split screens, giant carnivorous plants, and a flabby pterosaur all make their appearance. Every expense was spared. The movie is padded out with lots of stock shots from Antarctic expeditions and old Irwin Allen epics, including his own version of THE LOST WORLD. A typical black-and-white B-movie of that decade, written by Charles Palmer, William N. Robson, and Laszlo Gorog.

There is lots of action. Whenever things get dull, the local *Tyrannosaurus rex* shows up and roars at the characters. There is also a mad hermit who crashed into the crater ten years previously, and who understandably yearns for the heroine. If a character backs up in a scene where nothing else is happening, you know he or she will be grabbed from behind by a giant carnivorous plant.

A movie worth viewing once. To watch it as part of a drinking game, I suggest everyone takes a swallow of beer whenever the mechanical dinosaur roars or the heroine screams. You'll be blotto by the end credits.

**Just Sit Right Back And You'll Hear A Tale.**

Edgar Rice Burroughs also did a number of lost world stories, whether on the surface, deep underground, or on another planet. Like Doyle, many of his books are still read today. Even excluding the Tarzan series, which was a major industry in itself, there have been many movies based on his works.

THE LAND THAT TIME FORGOT is a 2009 movie based on ERB's book, set in our modern era. There being no place to hide a lost land today, the movie solves the problem by having a cabin cruiser sail through a space-time warp during a raging storm. That grounds the skipper, his first mate, and their passengers, not necessarily on a three-hour tour, onto an uncharted desert isle.

The plot picks up when a pterodactyl picks off a member of the shore party. The rest of them dash into the jungle for safety where they are immediately confronted by a carnosaur. They run back to the shore, only to find their dinghy gone and the cabin cruiser no longer anchored off shore. Run to the rock and it will not hide you, it seems.

After some more sprinting around, the next plot element is introduced, survivors from other time periods who also hit the space-time warp. 1945, 1955, Cretaceous, they are all mixed in together, including a German U-boat crew. A three-cornered battle breaks out between the Nazis, the dinosaurs, and the good guys. The humans are using Hollywood submachine guns, the kind that fire a thousand rounds from one clip without jamming or melting the gun barrel.

There is much running about and stealing each other's water craft, in between spraying the local carnosaurs with automatic weapons fire. The heroes end up stealing the U-boat after the Germans steal theirs, but one couple are stranded on the island to become the Adam and Eve of the lost land.

The movie is padded out with many sequences of people running back and forth through the jungle, so the fast-forward button will come in handy. Every so often the pace slows down for the characters to have what were meant to be long philosophical discussions but which come off as tedious. Again, hit the fast-forward button.

**SERIES DETECTIVES: PART 1. SCIENTIFIC DETECTION**
by Dale Speirs

THE TREASURE TRAIN (1916) by Arthur B. Reeve, available as a free download from www.gutenberg.org, is a short story collection about Prof. Craig Kennedy, a private investigator who uses his laboratory to foil the forces of evil.

The first story "The Treasure Train" is about thieves planning a train robbery of gold in transit from Halifax to New York City. The gold, as actually did happen during World War One, was being shipped from European countries to America for safety and to pay for munitions and food.

The heist used chlorine gas to stop the train but the robbers are stymied by Kennedy. It turns out that wasn't the main plan of the ringleaders. The gold was in charge of the Continental Express Company. There was too much of it for the gang to steal more than a fraction of it. Gold is, after all, extremely heavy, and not something to be casually tossed into a getaway vehicle.

Even a small amount of stolen gold would be a tidy sum, but nothing compared to what the ringleaders were going to make short-selling Continental Express Company on the stock exchange. They had already sold the stock short**, relying on news of the robbery to cause a temporary collapse in the price of CEC shares. Near the bottom, they would buy back the stock and cover the spread for a nice profit. Additionally they could buy additional stock at the bottom and then sell it when the price rebounded, as it would, once panicky speculators realized CEC was still a sound company and continue in business.

The ringleaders could have multiplied their money immensely for little cash down, what is known as buying on margin. Margin buying is using credit from a broker to buy. $1 will get you $10 of stock, or whatever amount the broker is willing to credit. If the trade goes in the opposite direction than intended, then you not only lose your $1, you owe the broker $9 plus interest on the shares.

Kennedy foils the ringleaders by using the railroad telegraph to send news that nothing had happened and all was well. That meant they had to cover their shorts at the normal price, which would cost them big money on a margin trade.

**This is done by borrowing shares from someone for a fee or paying interest during the maneuver, then returning the shares after the buyback. Common but dangerous, and is discouraged by brokers for retail investors. Don't try this at home; leave it to the big boys. Even the Wall Street operators often get hurt.

Fake news to whipsaw the price of a stock was no new thing even back then, and is still sometimes tried today. Nowadays it normally fails because stock exchanges investigate major short selling. After 9/11, the SEC and the U.S. Treasury Dept. did such an investigation to see if any terrorists had short sold the NYSE market in advance of the attacks. It might be possible to short sell small amounts but anyone trying a big trade is just waving a red flag at exchange operators. An interesting story, and a more clever plot than most detective fiction.

"The Truth Detector" begins with the sudden illness of Diamond Jack Mansfield and the theft of his diamonds. Doctor Murray, attending physician, says he is baffled because the symptoms don't match the usual sorts of sickness. The illness is traced to poisonous mushrooms, done by the thief to get the diamonds. Kennedy uses his laboratory equipment to determine that the mushrooms were safe but had poison added to make it look like an accident.

The suspects are rounded up and questioned by Kennedy. He uses a primitive form of polygraph which measures respiration changes, which he calls a pneumograph. The ending has a double twist, more of a cliche, and then identifies Murray as the culprit for a surprise reason. Not a great story but it is interesting how polygraphs were used a century ago.

"The Soul Analysis" is about the efforts of Kennedy to liberate a woman from a sanatorium where she was being held against her will and being deliberately driven insane by various chemicals. A routine plot even back then. She is liberated in the night. The asylum staff call out the police. Kennedy must infiltrate through the police cordon thrown around the dark countryside. He does it with a peculiar instrument installed in the getaway car.

*"A phonometer", he replied. "It was invented to measure the intensity of sound. But it is much more valuable as an instrument that tells with precision from what direction a sound comes. It needs only a small dry battery and can be carried around easily. The sound enters the two horns of the phonometer, is focused at the neck, and strikes on a delicate diaphragm, behind which is a needle. The diaphragm vibrates and the needle moves. The louder the sound the greater the movement of this needle."*

*"At this end, where it looks as though I were sighting like a surveyor, I am gazing into a lens, with a tiny electric bulb close to my eye. The light of this bulb is reflected in a mirror which is moved by the moving needle. When the sound is loudest the two horns are at right angles to the direction whence it comes. So it is only necessary to twist the phonometer about on its pivot until the sound is received most loudly in the horns and the band of light is greatest. I know then that the horns are at right angles to the direction from which the sound proceeds, and that, as I lift my head, I am looking straight toward the source of the sound. I can tell its direction to a few degrees."*

*I looked through it myself to see how sound was visualized by light. "Hush!" cautioned Kennedy. Down on the main road we could see a car pass along slowly in the direction of Montrose, from which we had come. Without the phonometer to warn us, it must inevitably have met us and blocked our escape over the road ahead.*

All ends well, and the damsel in distress is rescued.

"The Mystic Poisoner" is about an Englishman, late of India, who died in a locked hotel room. He is found almost completely paralyzed but before he dies manages to scribble the letters 'G A D' on a piece of paper. Kennedy is summoned because poisoning is suspected. The word is deduced to be 'gadhr', Hindu for 'revolution'.

Kennedy finds tiny glass beads around the body. There is a suspect down the hall, and a bit of snooping uncovers a cipher message: SOWC FSSJWA EKNLFFBY WOVHLX IHWAJYKH 101MLEL EPJNVPSL WCLURL GHIHDA ELBA. Much ado is made about how difficult it is to break the code.

But before that, this. Kennedy analyzes the glass beads in his laboratory and finds they are impregnated with an alkaloid poison commonly used in India to dispose of enemies. His main suspect is later killed by the same method, a small package that exploded and sprayed the room with poison beads. In her room, the key to the code is found and used to decrypt the message. The Hindu terrorist is caught.

The original text of the book must have contained the cipher key properly laid out in a grid, but unfortunately whoever transcribed the text for Project Gutenberg typed it linear, which rendered it as a meaningless jumble of letters. It detracted from the story because Kennedy took the time to explain how it worked but the reader cannot follow along.

"The Phantom Destroyer" begins with a visit to Kennedy's laboratory by Donald MacLeod, of the unlikely Nitropolis Powder Company's Secret Service. The company's munition plant has had five explosions in five days, so sabotage is suspected. No cause can be found.

The investigation begins in a boarding house adjacent to the munitions plant. It is not surprising that the boarders all work in the plant, for who else would want to live next to such a place? Kennedy brings out several of his gadgets, beginning with a listening device that can detect sounds beyond the frequencies heard by humans.

He finds an unexploded small device equipped with a shaped-charge warhead, obviously the type of device used by the saboteurs. Immediately after another attack, he launches his own solid-fuel rocket, which has a multi-lens camera for aerial photography.

From there, the results become more fantastic. The bombs had been dropped from an airplane made of transparent celluloid so it wouldn't be seen, and using a well-muffled engine. The landlady of the boarding house, who had discovered the secret project, was murdered by shutting her up in a building and running a car engine until the fumes killed her. It was the landlord who did it, mentioned at the beginning of the story as a militant pacificist.

Engine fumes are an old story to us, but in 1916 the idea was new enough that it had to be explained to the reader by Kennedy (original spelling of words kept as is, not edited): *The gas-engine and gas-motor have brought with them another of those unanticipated menaces of which I spoke. Whenever the explosion of the combustible mixture is incomplete or of moderated intensity a gas of which little is known may be formed in considerable quantities.*

*In this case, as in several others that have come to my attention, vapors arising from the combustion must have emitted certain noxious products. The fumes that caused Ida Snedden's* [the landlady] *death were not of carbon monoxide from the stove, MacLeod. They were splitting-products of gasolene, which are so new to science that they have not yet been named.*

*Mrs. Snedden's death, I may say for the benefit of the coroner, was due to the absorption of some of these unidentified gaseous poisons. They are as deadly as a knife-thrust through the heart, under certain conditions. Due to the non-oxidation of some of the elements of gasolene, they escape from the exhaust of every running gas-engine. In the open air, where only a whiff or two would be inhale now and then, they are not dangerous. But in a closed room they may kill in an incredibly short time. In fact, the condition has given rise to an entirely new phenomenon which some one has named 'petromortis'.*

"The Beauty Mask" is the old story of trying to bump off a rich heiress for her fortune without being nailed by police for murder. The story involves a multi-generational soap opera of love scorned and gained, a secret marriage, an inconvenient ex-wife, ambitious young swains who would rather marry money than have to work for it, and medical doctors who might be incompetent or diabolical.

The heiress is in a coma after plastic surgery. Yes, they had it back then, especially with the advances in surgery needed to deal with the mutilated soldiers of the War To End All Wars. She had been supplied with a mask to wear on her face while the scars healed. A puzzling factor was a red sore on her forehead just above the bridge of the nose. It would not heal.

The solution requires a two-page infodump from Kennedy: *"One by one the functions of the internal secretions are being discovered. Our variously acquired bits of information concerning the ductless glands lie before us like the fragments of a modern picture puzzle. And so, I may tell you, in connection with recent experimental studies of the role of the pituitary, Doctor Cushing and other collaborators at Johns Hopkins have noticed a marked tendency to pass into a profoundly lethargic state when the secretion of the pituitary is totally or nearly so removed."*

*...*

*"The narcolepsy", continued Kennedy, taking the mask, "was due, I find, to something that affected the pituitary gland. I have here a photograph of her taken when she was wearing the mask." He ran his finger lightly over the part just above the eyes. "Feel that little lump, Walter", he directed.*

*...*

*"Located in one of the best protected and most inaccessible parts of the body", Kennedy considered, slowly, "how could the pituitary be reached? If you will study my skiagraph, you will see how I got my first clue. There was something over that spot which caused the refractory sore. What was it? Radium, carefully placed in the mask with guards of lead foil in such a way as to protect the eyes, but direct the emission full at the gland which was to be affected, and the secretions stopped."*

It transpires that one of the doctors set it up. Kennedy believes in justice, not the courts, so there is a twist ending that resolves everything happily for the heiress. Or will, once she wakes up.

The story was cutting edge stuff at the time, as the connection between pituitary glands and radium would have been innovative for such a story in 1916. The infodumps can be forgiven.

"The Love Meter" begins with a young businessman poisoned in his office, probably by a gas since his throat and sinuses are burned. Kennedy is called in as the poisons expert, but most of the story is an interrelated tangle of not one but two different love triangles between two families. One almost needs to draw a flow chart to remember whose love was unrequited and who was diddling who after office hours.

Kennedy searches the office (the police had not been called in by the families, who wanted discretion) and finds an empty cartridge, confirming that it was poisonous gas fired into the room. This time around, Kennedy gets to display his knowledge of polarized light, which was used to test the for the identity of the poison. At the J'accuse! meeting, everyone has to first sit through a lecture on dextro- versus levo- rotary chemicals. They also have to hold on to tin-can bare-wire galvanometers, which act as primitive truth detectors. Now you know where L. Ron Hubbard got the idea.

*"Though some scientists would call this merely a sensitive form of galvanometer", he remarked, "it is, to me, more than that. It registers feelings, emotions. It has been registering your own every moment that I have been talking."*

*"But most of all it registers the grand passion. I might even call it a love meter. Love might seem to be a subject which could not be investigated. But even love can be attributed to electrical forces, or, perhaps better, is expressed by the generation of an electric current, as though the attraction between men and women were the giving off of electrons or radiations of one to the other. I have seen this galvanometer stationary during the ordinary meeting of men and women, yet exhibit all sorts of strange vibrations when true lovers meet."*

*Not used to Kennedy's peculiar methods, they were now on guard, ignorant of the fact that that alone was sufficient to corroborate unescapably any evidence they had already given of their feelings toward each other.*

"The Vital Principle" is an interesting twist. Members of a family are slowly dying from what appears to be beriberi. That disease is a nutritional deficiency, not caused by poisoning or pathogens. The cure is simple; put the victim on a balanced diet with lots of vitamins and no boiled food.

Kennedy is called into the case, first to confirm the diagnosis, then to figure out how it was done. The culprit was adding sodium bicarbonate to the food and then boiling it, which strips all the vitamins out. It was done with the intent to shorten the line of succession to an inheritance. Kennedy had only to find out who was sneaking into the kitchen and setting up the food.

"The Rubber Dagger" has Kennedy analyzing again after a group hypnosis session gone wrong. A Russian hypnotist, painted with guilt but obviously not the true murderer, is conducting a group session in which each person is hypnotized and then asked to simulate what they would like to do to someone else in the group.

One man resents another for getting him into a bad investment, and mock stabs him with a rubber knife. The stabee promptly dies, apparently from pre-existing arteriosclerosis giving him a heart attack from the shock. Kennedy snoops about and examines the residue in the dead man's tea cup. Someone had slipped in a bit of digitalis, which magnified the shock to the point that the arteries clamped shut.

As to whodunit, there were some faithless spouses in the audience, and their partners who felt betrayed. One of them is allowed by Kennedy to talk himself into prison by inadvertently letting slip some vital information.

"The Submarine Mine" uses the situation of the war footing that existed in 1916, even though the USA would not enter the fighting for another year. A shipbuilder is about to launch a leviathan named Usona, taking advantage of the lack of competition from Europe. He is plagued by sabotage though, as well as assassination attempts from snipers firing bullets with what today we call weaponized anthrax.

Kennedy is called in and does his usual scientific studies, busily mixing stuff in his laboratory and analyzing bits of glass or dirt. That the sniper was firing bullets dipped in toxic bacteria is something he determined from examining a spent bullet.

The vital clue was found when a night watchman was only slightly grazed by a bullet, yet wound up in hospital fighting for his life after the nick started a full-fledged infection.

But wait! There's more! Not content to rest on his laurels, Kennedy hires a private airplane and circles above the Usona just before it is to be launched. What can't be seen from the pier or water level is a shadowy shape in line with the path the ship will take when it slides down into the water. It is a submersed contact mine. Kennedy opens fire with a rifle from the air, and manages to detonate the mine. Had the ship launched otherwise, it would have been blown up and sunk, bankrupting the shipyard owner. So much for those dastardly Europeans.

"The Gun Runner" takes Kennedy on a trip to the Danish West Indies, as they prepare to transfer some islands to American sovereignty. This gives Kennedy an opportunity to try out his new portable laboratory, a giant trunk with the necessary equipment and chemicals. He will, of course, need it.

The Caribbean during World War One was a ferment of gun-running and espionage, as all the European interests contended with each other. Someone has come up with a new method of poisoning American agents without the poison showing up in the autopsy.

Kennedy does a bit of amateur sleuthing, and finds a European agent has keratin hidden in her handbag. This is a harmless substance, so he is initially baffled. Then he finds a batch of tiny poisonous seeds. Putting two and two together, he concludes the seeds are coated with the keratin and mixed into the target's food. The seeds go through the stomach undigested because keratin is not affected much by stomach acids. In the intestines though, the keratin is finally digested away, then the seeds, and thus the poison is released.

In those days, toxicology tests for poisoning were made on the stomach, not the intestine, and therefore failed to catch the cause. The European agents didn't count on Prof. Kennedy.

"The Sunken Treasure" continues in the Caribbean, this time off another island where the search for gold on a sunken ship has claimed a life. The wreck was recent, not an old pirate ship. The ship had gone down while bound from Mexico to New York City and carrying the treasure.

A diver went down to inspect the wreck, which was in shallow waters. On his return, he suffered severe nitrogen narcosis, commonly called the bends, yet he shouldn't have since he hadn't been under that much water pressure. Kennedy examines the air pump that was used for the diver and finds that someone had switched the chemical scrubber on the air line. Instead of taking out carbon dioxide, it added nitrogen gas, the culprit in the bends.

The recovery ship is found to have been targeted for destruction. Dynamite and a timer were found in its hull and successfully defused in time. Someone wanted to make certain that the recovered gold would not stay long with those who brought it up.

Kennedy examines a skull recovered from the wreck. He uses reconstruction techniques to model the face, which turns out to be that of the captain of the sunken ship. With that, he terrorizes the culprit, sort of a Banquo's head rather than a ghost, and the whole plot is revealed.

I found this collection to be a fascinating leap forward in fictional forensic science for its time. Sherlock Holmes, fiddling with chemicals at his workbench, was a tyro compared to Craig Kennedy's forensic abilities. This is a book worth reading for those who like detective fiction.

**WHEN WORDS COLLIDE 2018**

Calgary's annual readercon When Words Collide will be held the weekend of August 10 to 12, 2018, at the Delta Calgary South Hotel on Southland Drive and Bonaventure Drive SE. This is a multi-genre convention covering science fiction, mysteries, fantasy, romance, westerns, and historical fiction, held for the eighth time. Information from: www.whenwordscollide.org

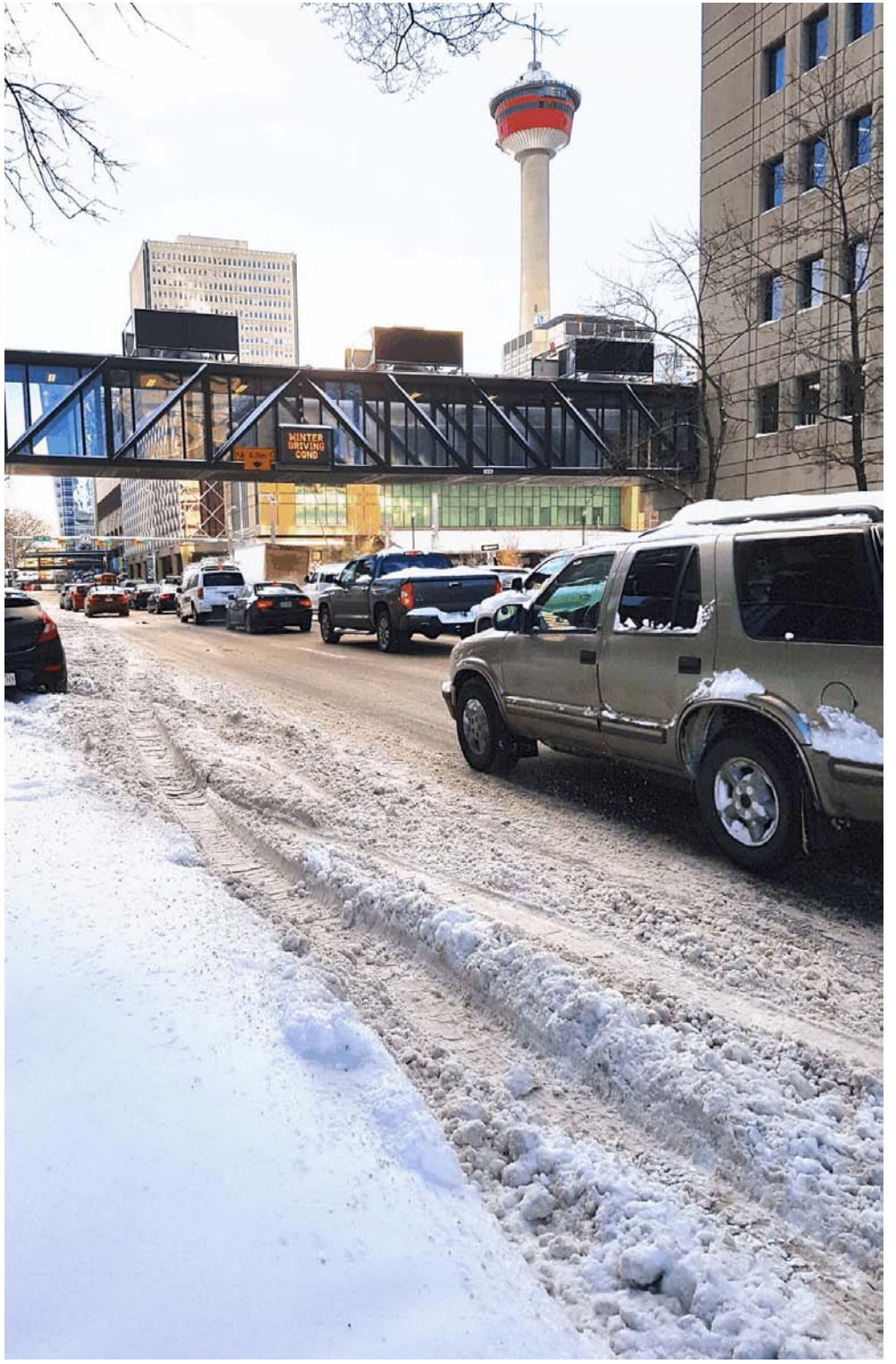
Lots of writer workshops and panels on publishing, editing, writing, social media, and reading. The dealer bourse is strictly limited to books, with many small-press publishers attending. I've attended every WWC and enjoyed them all. My reports of previous conventions appeared in OPUNTIAs #71, 253, 266, 282, 318, 350, and 387.

Membership is capped at 750, and as of January 5 was 51% sold. This convention, and the hotel, are booked up solid by June, so don't delay.

**SIGNS, SIGNS, EVERYWHERE A SIGN**
photos by Dale Speirs

I've always wondered why anyone puts up snow signs for something which should be self evident. It isn't liability concerns, because Canadian law says you have to pay attention to your surroundings, and damage claims can only be made where the hazard was not evident. You can't sue Parks Canada if you fall off a cliff while mountain climbing in Banff National Park, and if you spin out on an icy road the best you can do is hope some other driver hits you first.

Now that I'm retired, I don't have to drive in weather like this. I take the bus and let someone else worry. Smartphone cameras are great for snapshots around town, this one being taken on December 20, 2017, at 1 Street SE and 7 Avenue downtown as I was walking over to the library. Why the City felt it necessary to inform motorists that there were winter driving conditions is beyond me.

Taken on Remembrance Day 2017 as I was walking back downtown after the ceremonies at the Field of Crosses on Memorial Drive NW. This is the ramp for the pedestrian bridge over Memorial Drive. I like the action figures.


I took this photo in September 2017 while running an errand in the Fisher Industrial Park in southeast Calgary. The warehouse district is a place I seldom have reason to be, and a fair distance from my house, so I haven't been back there to see what the sign looks like in winter. Overly elaborate, methinks.

**SEEN IN THE LITERATURE**

Melott, A.L., and B.C. Thomas (2017) **Terrestrial effects of moderately nearby supernovae.** arXiv:1712.02730 Preprint at www.arxiv.org

Authors' abstract: *Supernovae have been considered as a possible cause of terrestrial extinctions and lesser events for a long time, at least since Schindewolf (1954). ... Due to recent detections, there have been new computations which shed light on the effects of events at moderate distances, such as 150 to 300 light years. Such events should occur much more frequently than the mass extinction level events at about 30 light years or less which are expected only at intervals of several hundred megayears.*

*It has been known for some time that moderately nearby supernovae may have substantial effects on the Earth. Events at ~150 light years will happen on average every few Myr, but will tend to happen in groups, with long periods between with no events. The effects of cosmic rays from such events appears to be greater than estimated previously. Ozone depletion and the increase of hazardous UVB continues to be important, but new effects come to the fore.*

*Muon irradiation on the ground and hundreds of meters down into the ocean will increase cancer and mutation rates, the differences being most notable in terrestrial megafauna and benthic organisms. Typically larger organisms live long enough to develop cancer; in microorganisms the primary effects would be associated with mutation rates. Atmospheric ionization in the troposphere will greatly increase lightning rates, with a concomitant increase in the rate of wildfires.*

Tappe, S., et al (2017) **Geodynamics of kimberlites on a cooling Earth: Clues to plate tectonic evolution and deep volatile cycles.** EARTH AND PLANETARY SCIENCE LETTERS 484:1-14

[Kimberlite is the source rock of diamonds.]

Authors' abstract: *Kimberlite magmatism has occurred in cratonic regions on every continent. The global age distribution suggests that this form of mantle melting has been more prominent after 1.2 Ga, and notably between 250 to 50 megayears, than during early Earth history before 2 gigayears (i.e., the Paleoproterozoic and Archean). Although preservation bias has been discussed as a possible reason for the skewed kimberlite age distribution, new treatment of an updated global database suggests that the apparent secular evolution of kimberlite and related $CO_2$-rich ultramafic magmatism is genuine and probably coupled to lowering temperatures of Earth's upper mantle through time.*

*Incipient melting near the $CO_2$- and $H_2O$-bearing peridotite solidus at >200 km depth (1100 to 1400 ˚C) is the petrologically most feasible process that can produce high-MgO carbonated silicate melts with enriched trace element concentrations akin to kimberlites.*

*These conditions occur within the convecting asthenospheric mantle directly beneath thick continental lithosphere. In this transient upper mantle source region, variable CHO volatile mixtures control melting of peridotite in the absence of heat anomalies so that low-degree carbonated silicate melts may be permanently present at ambient mantle temperatures below 1400 ˚C.*

*However, extraction of low volume melts to Earth's surface requires tectonic triggers. Abrupt changes in the speed and direction of plate motions, such as typified by the dynamics of supercontinent cycles, can be effective in the creation of lithospheric pathways aiding kimberlite magma ascent.*

*Provided that $CO_2$- and $H_2O$-fluxed deep cratonic keels, which formed parts of larger drifting tectonic plates, existed by 3 Ga or even before, kimberlite volcanism could have been frequent during the Archean. However, we argue that frequent kimberlite magmatism had to await establishment of an incipient melting regime beneath the maturing continents, which only became significant after secular mantle cooling to below 1400 ˚C during post-Archean times, probably sometime shortly after 2 Ga. At around this time kimberlites replace komatiites as the hallmark mantle-derived magmatic feature of continental shields worldwide.*

*The remarkable Mesozoic to Cenozoic 'kimberlite bloom' between 250 to 50 Ma may represent the ideal circumstance under which the relatively cool and volatile-fluxed cratonic roots of the Pangea supercontinent underwent significant tectonic disturbance. This created more than 60% of world's known kimberlites in a combination of redox- and decompression-related low-degree partial melting.*

*Less than 2% of world's known kimberlites formed after 50 Ma, and the tectonic settings of rare 'young' kimberlites from eastern Africa and western North*

*America demonstrate that far-field stresses on cratonic lithosphere enforced by either continental rifting or cold subduction play a crucial role in enabling kimberlite magma transfer to Earth's surface.*

Speirs: The interesting aspects of this paper are that diamonds were not possible until plate tectonics began on Earth, and then only when supercontinents broke apart, creating upwelling rifts that allowed kimberlite to form.

Buchner, E. (2017) **An approach towards the projectile trajectory during the oblique Steinheim meteorite impact by the interpretation of structural crater features and the distribution of shatter cones.** GEOLOGICAL MAGAZINE 155:193-202

Author's abstract: *The distinct alignment of the Steinheim Basin and the Nördlinger Ries impact structures in SW Germany and the Central European tektite strewn field suggest ENE-directed trajectories of the Ries and Steinheim impacting bodies.*

*From impact experiments, the asymmetry of the Steinheim crater and the arrangement of structural features therein are in good agreement with features produced during an oblique impact at 30˚ from the horizontal. The restriction of shatter cones to the eastern segment of the Steinheim Basin crater also suggests a west to east-directed trend of the impact direction, and supports previous models that favoured such impactor trajectory.*

Speirs: There are hundreds if not thousands of impact craters known on Earth, some billions of years old, most buried under later sediments and discovered by seismic surveys. What some geologists are now doing is going through the catalogue and determining which groups of craters were from a multiple impact of one bolide. As this paper shows, one can demonstrate that a meteorite breaking up in the atmosphere just before impact will lay down a string of craters stretching over thousands of kilometres.

Schoenemann, B., H. Pärnastec, and E.N.K. Clarkson (2017) **Structure and function of a compound eye, more than half a billion years old.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 114:13489-13494

Authors' abstract: *An exceptionally well-preserved arthropod fossil from near the base of the lower Cambrian shows the internal sensory structures of a compound eye, more than half a billion years old. The trilobite to which it belongs is found in a zone where the first complete organisms appear in the fossil record; thus, it is probably the oldest record of a visual system that ever will be available. This compound eye proved to possess the same kind of structure as the eyes of bees and dragonflies living today, but it lacks the lenses that are typical of modern eyes of this type.*

*Until now, the fossil record has not been capable of revealing any details of the mechanisms of complex vision at the beginning of metazoan evolution. Here, we describe functional units, at a cellular level, of a compound eye from the base of the Cambrian, more than half a billion years old.*

*Remains of early Cambrian arthropods showed the external lattices of enormous compound eyes, but not the internal structures or anything about how those compound eyes may have functioned. In a phosphatized trilobite eye from the lower Cambrian of the Baltic, we found lithified remnants of cellular systems, typical of a modern focal apposition eye, similar to those of a bee or dragonfly.*

*This shows that sophisticated eyes already existed at the beginning of the fossil record of higher organisms, while the differences between the ancient system and the internal structures of a modern apposition compound eye open important insights into the evolution of vision.*

*One hypothesis may suggest that the circular discs (lenses) had only been more or less transparent parts of the cuticle, and that, as explained, the rhabdom itself overtook all light-gathering functions. This also may explain, why in most early Cambrian trilobites, where the visual surfaces are preserved, no distinct facets can be made out in their compound eyes. The very few visual units of this compound eye, resulting in a pixilated mode of vision, surely did not provide an image formation but probably functioned as a movement detector discovering objects passing by, but without any detailed impression of the surroundings in its shallow water environments.*

*It may be mentioned that another trilobite, Holmia kjerulfi from Norway, Botoman Formation, thus just less than 2 megayears younger, already had established densely packed compound eyes, comparable to those of modern dragonflies.*

Speirs: The development of vision in animals was of such overwhelming advantage that it became established in less than 500,000 years, lightning speed in geological terms. I reviewed the book IN THE BLINK OF AN EYE by Andrew Parker in OPUNTIA #53.1A, which goes into detail about this.

Vermeij, G.J. (2017) **How the land became the locus of major evolutionary innovations.** CURRENT BIOLOGY 27:3178-3182.

Author's abstract: *Life originated in the sea and evolved its early metabolic pathways in water. Nevertheless, activities of organisms on land have influenced and enriched marine ecosystems with oxygen and nutrients for billions of years. In contrast to the history of species diversity in the sea and on land and the flows of resources within and between these two realms, little is known about the times and places of origin of major metabolic and ecological innovations during the Phanerozoic* [the era of diversified life, from 541 megayears ago to present day].

*Many innovations among multicellular organisms originated in the sea during or before the Cambrian* [541 to 488 megayears ago], including predation and most of its variations, biomineralization, colonial or c*lonal growth, bioerosion, deposit feeding, bioturbation by animals, communication at a distance by vision and olfaction, photosymbiosis, chemosymbiosis, suspension feeding, osmotrophy, internal fertilization, jet propulsion, undulatory locomotion, and appendages for movement.*

*Activity is less constrained in air than in the denser, more viscous medium of water. I therefore predict that high-performance metabolic and ecological innovations should predominantly originate on land after the Ordovician* [488 to 443 megayears ago] *once organisms had conquered the challenges of life away from water and later appeared in the sea, either in marine-colonizing clades or by arising separately in clades that never left the sea. In support of this hypothesis, I show that 11 of 13 major post-Ordovician innovations appeared first or only on land.*

Weronika, E., and K. Lukasz (2017) **Tardigrades in space research: Past and future.** ORIGIN OF LIFE AND EVOLUTION OF BIOSPHERES 47:545-553

Authors' abstract: *To survive exposure to space conditions, organisms should have certain characteristics including a high tolerance for freezing, radiation and desiccation. The organisms with the best chance for survival under such conditions are extremophiles, like some species of Bacteria and Archea, Rotifera, several species of Nematoda, some of the arthropods and Tardigrada (water bears).*

*There is no denying that tardigrades are one of the toughest animals on our planet and are the most unique in the extremophiles group. Tardigrada are very small animals (50 to 2,100 micrometres in length), and they inhabit great number of Earth environments. Ever since it was proven that tardigrades have high resistance to the different kinds of stress factors associated with cosmic journeys, combined with their relatively complex structure and their relative ease of observation, they have become a perfect model organism for space research.*

*Water bears (Tardigrada), discovered in 1773, are a phylum of small invertebrates belonging to the supertype Articulata. They can be found all over the Earth and can inhabit very diverse environments (from the deepest oceans to mountain tops). Water bears are small, cylindrical invertebrates, up to 2.1 mm in length, and are divided into five segments.*

*In 2007, three projects were conducted during the FOTON-M3 mission studies. The Tardigrade Resistance to Space Effects (TARSE) Project was the first one involved in the mission of FOTON-M3. Its aim was to analyse the impact of environmental stress, life history traits and DNA damages in space (on board the spacecraft) on eutardigrade Paramacrobiotus richtersi. In this project active and anhydrobiotic tardigrades were exposed to radiation in microgravity conditions. Both active and inactive individuals had high survival rates with no induction of HSPs while showing an induction of the antioxidant response.*

*The next project involved in the mission of FOTON-M3 was TARDIS (Tardigrada In Space). The main goal of this project was to check whether tardigrades from two species, Milnesium tardigradum Doyère, 1840 and Richtersius coronifer, were able to survive conditions of open space. The experiments showed that tardigrades can survive exposure to the space vacuum,*

*but the addition of factors such as ultraviolet solar radiation, ionising solar radiation and galactic cosmic radiation significantly reduced their survival rate.*

*In the third project from the FOTON-M3 mission, RoTaRad (Rotifers, Tardigrades and Radiation), scientists examined effects on initial survival, long-term survival and fecundity of selected species of limno-terrestrial tardigrades in extreme stress conditions (mainly cosmic radiation).*

*Next was the Endeavour mission in 2011 and the project TARDIKISS (Tardigrades in Space). The main aim of this project was to broaden our knowledge of life history traits and mechanisms of repairing structural DNA damage during exposure to space flight stresses. The first results showed that microgravity and cosmic radiation did not significantly affect the survival rate of tardigrades.*

Falcon-Lang, H.J., et al (2017) **New insights on the stepwise collapse of the Carboniferous coal forests: Evidence from cyclothems and coniferopsid tree-stumps near the Desmoinesian-Missourian boundary in Peoria County, Illinois, USA.** PALAEOGEOGRAPHY, PALAEOCLIMATOLOGY, PALAEOECOLOGY 490:375-392

Authors' abstract: *The first phase in the stepwise collapse of the Carboniferous Coal Forests occurred near the Desmoinesian-Missourian boundary (early Kasimovian, ~307 Ma), and involved extirpation of Lycospora-producing lepidodendrids, and some other lycopsids, across most of tropical Euramerica.*

*In this paper, we follow-up on historical reports of silicified tree-stumps in Peoria County, northwest-central Illinois, USA, which have significant implications for understanding Carboniferous Coal Forest collapse. Rooted near the paleoweathered top of the Lonsdale Limestone, and widespread across an area of ~250 km, the silicified tree-stumps belong to Amyelon-type coniferopsids. A key feature of the fossil wood is the occurrence of abundant axial parenchyma arranged along irregular growth interruptions, suggestive of climatic seasonality, an inference consistent with silicic preservation.*

*The silicified fossil forest directly underlies the Exline Limestone and Athensville Coal, the horizons that mark the US-wide loss of Lycospora, and demonstrate that lowland areas were colonized by dryland coniferopsid forests following Coal Forest collapse. Placed in a cyclothem context, the silicified fossil forest horizon lies above the Maria Creek mudstone paleosol (top of Piasa cyclothem), in which earlier delta $^{18}O$ analyses have identified a major pulse of global warming, and coincides with the 'Hanna City' paleosol (top of Lonsdale cyclothem), which is correlative with the Seminole Sandstone, a Midcontinent incised valley-fill representative of one of the most profound glacioeustatic falls seen in the Pennsylvanian record.*

*Our new findings therefore demonstrate that Coal Forest collapse was closely linked to intensification of glacial cycle amplitude near the Desmoinesian-Missourian boundary, involving both extreme episodes of global warming and cooling. Tropical aridification was the main driver of floral change. Aridification was linked to an amplification of glacial cyclicity.*

Speirs: Glaciation 300 megayears ago triggered aridification of the tropics, which wiped out the lycopsid trees that made most of the coal in the USA, and replaced them new forests of different tree species.

Werner, J., and E.M. Griebeler (2017) **Was endothermy in amniotes induced by an early stop in growth during ontogeny?** SCIENCE OF NATURE 104:doi.org/10.1007/s00114-017-1513-1

[Amniotes are vertebrates which lay eggs or carry them inside their bodies, such as reptiles, birds, and mammals. Ectotherms are the cold-blooded vertebrates and endotherms the warm-blooded vertebrates.]

Authors' abstract: *Endothermy and its evolution are still an unresolved issue. Here, we present a model which transforms an ectothermic amniote (ancestor) into a derived amniote (descendant) showing many characteristics seen in extant endothermic birds and mammals.*

*Consistent with the fossil record within the ancestral lineages of birds and mammals, the model assumes that mutations in genes which get active during ontogeny and affect body growth resulted in a reduced asymptotic body size and an early growth stop of the descendant.*

*We show that such a postulated early growth stop in the descendant simultaneously increases the growth rate and metabolic rate, and also changes six life history traits (offspring mass, annual clutch/litter mass, number of offspring per year, age and mass at which sexual maturity is reached, age at*

*which the individual is fully grown) of the descendant compared to a similar sized ancestor. All these changes coincide with known differences between recent ectothermic and endothermic amniotes.*

Kirkham, C., et al (2017) **The formation of giant clastic extrusions at the end of the Messinian Salinity Crisis.** EARTH AND PLANETARY SCIENCE LETTERS 482:434-445

[The Messinian Salinity Crisis began 5.96 megayears ago when Africa, which is still slowly moving northeast against Europe and Asia, closed off the Strait of Gibraltar. The Mediterranean Sea then dried up completely within 1,000 years, producing salt desert bottomlands as far as 5 km below sea level. The Atlantic Ocean broke through 5.33 megayears ago, reflooding the Mediterranean. The process is repeating itself, although it will be millions of years before Africa once again closes the Mediterranean.]

Authors' abstract: *This paper documents the discovery of five multi-km scale lensoid bodies that directly overlie the upper surface of the thick (>1 km) Messinian Evaporite sequence. They were identified through the analysis of 3D seismic data from the western Nile Cone.*

*The convergence of the upper and lower bounding reflections of these lensoid bodies, their external and internal reflection configuration, the positive 'depositional' relief at their upper surface, and the stratal relationship with underlying and overlying deposits supports the interpretation that these are giant clastic extrusions. The interpretations combined with the stratal position of these clastic extrusions demonstrate a prior unsuspected link between periods of major environment change and basin hydrodynamics on a plate scale.*

*All five lensoid bodies were extruded onto a single, seismically resolvable marker horizon correlatable with the end of the Messinian Salinity Crisis (Horizon M). It is argued that the source of these clastic extrusions is pre-Messinian in origin, which implies massive sediment remobilisation at depth in the pre-evaporitic succession and intrusion through the thick evaporite layer.*

*We propose that the scale and timing of this dramatic event was primed and triggered by near-lithostatic overpressure in the pre-evaporitic sediments generated through (1) their rapid burial and loading during the Messinian Salinity Crisis and (2) catastrophic re-flooding during its immediate aftermath. The largest of these clastic extrusions has a volume of over c. 116 km$^3$, making it amongst the largest extruded sedimentary bodies described on Earth. The findings extend the understanding of the upper scale of other analogous clastic extrusions such as mud volcanoes and sediment-hosted hydrothermal systems. Following the 2006 eruption of the Lusi sediment-hosted hydrothermal system in Indonesia, an understanding of the upper scale limit of clastic extrusions has even greater societal relevance, in order to increase awareness of the risk posed by the potential size and longevity of future giant clastic extrusions.*

Speirs: The thickness and weight of the salt deposits was so great that the layers underneath became plastic and flowed up, bubbling like a mud volcano or giant springs.

Retallack, G.J., et al (2018) **Advent of strong South Asian monsoon by 20 million years ago.** JOURNAL OF GEOLOGY 126:1-24

Authors' abstract: *Monsoonal circulation in deep time has been inferred from variation in stable isotopes of tooth enamel, diatom blooms, and dust influx in the Indian Ocean and the advent of $C_4$* [dryland photosynthesis] *grasses, but these proxies are compromised by temperature, biotic, and source effects.*

*Our study uses a proxy of carbonate distribution within paleosol* [fossil soil layers] *profiles to infer appearance of monsoonal circulation of modern strength in the Himachal Pradesh segment of the Himalayan foreland by at least 20 megayears ago, cued to High Himalayan deformation and ongoing Tibetan Plateau uplift and retreat of the Paratethys Sea. Paleosol records also demonstrate declining chemical weathering with Himalayan and Tibetan uplift, which was a force for global warming, rather than cooling, over the past 20 My.*

Gualtier, L., et al (2018) **The persistent signature of tropical cyclones in ambient seismic noise.** EARTH AND PLANETARY SCIENCE LETTERS 484:287-294

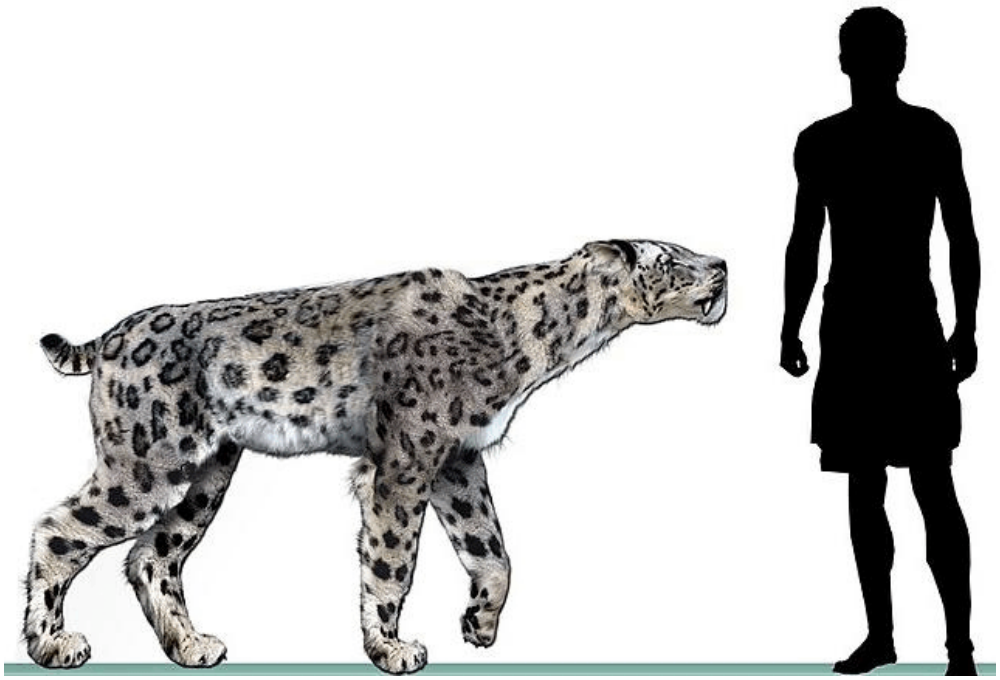
Authors' abstract: *Through the analysis of more than a decade of seismic data recorded at several stations located in and adjacent to the northwest Pacific Ocean, here we show that there is a persistent and frequency-dependent signature of tropical cyclones in ambient seismic noise that depends on*

*characteristics of the storm and on the detailed location of the station relative to the storm. An adaptive statistical model shows that the spectral amplitude of ambient seismic noise, and notably of the short-period secondary microseisms, has a strong relationship with tropical cyclone intensity and can be employed to extract information on the tropical cyclones.*

Ewald, T., et al (2018) **Scimitar cat (*Homotherium serum* Cope) from southwestern Alberta, Canada.** CANADIAN JOURNAL OF EARTH SCIENCES 55:8-17

Authors' abstract: *Skull and tooth fragments of Homotherium serum recently recovered from the Wally's Beach site in southwestern Alberta provide the first indications that scimitar cat populated the area of the St. Mary Reservoir. Accelerator mass spectrometry radiocarbon dating provides a calibrated age (2s) of 12,715 to 12,655 cal. years BP. This is the fourth known occurrence of the species in Canada, the first outside of Yukon, and currently the youngest precisely dated occurrence of the species in North America. Well-preserved dentition combined with the temporal and geographic context allows the sample to be identified as H. serum. The specimen is significant as it represents an extension of the geographic and chronological range of the species.*

[Image from Wikipedia]



**AROUND COWTOWN**
photos by Dale Speirs

Just cleaning out a bunch of photos taken in the summer and autumn of 2017 around Calgary. Below, the relentless march of condominium towers continues in the Beltline district adjacent to the downtown core. These towers at 10 Avenue SW and 8 Street were just completed. Shoebox apartments downtown start at $500,000, will be worth $200,000 ten years from now. They sold out quickly to Millennials who haven't a clue about real estate cycles.

Below: Installation art on Stephen Avenue Pedestrian Mall (8 Avenue South) downtown. The door was locked when I tried it.

At right: Tomkins Park in the Beltline at 17 Avenue SW and 8 Street, taken in May 2017.