

# OPUNTIA 560





**Remembrance Day 2023**

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**REMEMBRANCE DAY 2023 CEREMONIES**  
photos by Dale Speirs

Previous ceremony reports were in OPUNTIA issues as follow:  
Central Memorial Park - #358  
Field of Crosses - #326, 397, 512  
Museum of the Regiments - #71.5, 429  
North Glenmore Park - #537  
Signal Hill - #460

About the cover: After Remembrance Day ceremonies are completed, the custom is for attendees to place their poppies upon the cenotaph.

During my 31 years with the City of Calgary Parks Dept as a District Foreman and later as Trouble Calls Supervisor, I seldom had a chance to attend Remembrance Day ceremonies because I worked that day. Just before the end of my shift the previous day, I would have my crews lower the flags to half-mast in parks across the city. On the morning of the day, I would be checking that everything went well.

After I retired in 2010, I then had the opportunity to attend the ceremonies as a spectator. There are dozens of ceremonies around Calgary on the day, so I try to rotate to a different one each year. Many are not practical for me to travel to and it also depends on the weather.

I hadn't been to the Central Memorial Park ceremony in a while, located in the Beltline district south of and adjacent to the downtown core. This is Calgary's oldest park, established in 1911 as Central Park. After the Great War, cenotaphs were erected and it became Memorial Park.

The name changed back and forth. When I was a Parks Supervisor, the bureaucracy and the maintenance foremen argued which name should be correct. Finally a compromise was effected, and thus the current name.



Taken just before the ceremony began.

Halfway between the half-mast flag and the cenotaph is the Eternal Flame on the black pole.



The march past.

A very large crowd at the park, about 2,000 at a guess.





The wreath-laying ceremony.





## RADIO SF: PART 2

by Dale Speirs

In issue #530 of this zine (page 24), I discussed the peculiar history of science fiction on radio. As a literature of ideas and imagination, science fiction should have been a natural for the era of old-time radio between the 1930s and 1940s.

### ★ *Science Fiction Radio Citation* ★

December 20th, 1952. IMAGINATION awarded its first annual radio citation to a CBS network science fiction program. Photo below shows award being presented during broadcast. From left: Al Bland, Program Director WBBM; William L. Hamling, editor-publisher IMAGINATION; A. Irving Grass, President Grass Noodle Company, program sponsor; Tomi Thurston, (Rhea, of cast); and Charles Flynn, (Super Noodle, Space Adventurer.) Award reads: "IMAGINATION magazine presents this award to radio station WBBM-CBS for their origination of the network radio program, SPACE ADVENTURES OF SUPER NOODLE, which is in the best tradition of science fiction."



Instead, it was channelized into kiddie shows like Buck Rogers and Flash Gordon, much as westerns were likewise treated. Not until the 1950s was science fiction given serious adult-oriented shows, just in time for the death of old-time radio programmes.

### Kiddies R Us.

[www.gutenberg.org](http://www.gutenberg.org) has a plethora of free downloads of science fiction prozines. Sometime ago while wending my way through those issues, I came across the blurb shown here from the April 1953 issue of IMAGINATION.

SPACE ADVENTURES OF SUPER NOODLE had to be the nadir of radio science fiction.

Spending some time on Google, I've not been able to find recordings online nor any other information about this series. The blurb at left had names who have never been more than a few sentences on scraper websites.

The storyline was set 500 years into the future, where the characters frequently enjoyed Grass noodles as they zoomed around the galaxy. Adventures galore, no doubt.

The noodles are still sold in the USA as a minor brand of the Kraft Heinz conglomerate. I've never seen them in Calgary supermarkets.

### 1950s SF.

The first generally accepted adult science fiction shows on radio appeared in the early 1950s even as old-time radio began to die. Anthology series such as DIMENSION X and X MINUS ONE relied on transcribing stories from prozines such as ASTOUNDING and GALAXY.

There were few radio scriptwriters who could produce original science fiction. They had to rely on stories from the magazines, which they converted into scripts. Their knowledge or ability of science and its fiction was abysmal.

**Revival Radio.**

During the 1960s and 1970s, sporadic attempts were made to revive programmed radio drama, including science fiction. They could not overcome television but many of them survived into the mp3 age.

One such series was SF 68 out of South Africa. That was the title announced in the intro of each episode. The mp3s and website discussions usually refer to the series as SCIENCE FICTION 1968. There are no prizes for guessing what year this series aired.

These episodes were adaptations by Michael McCabe of short stories by the crowd of science fiction writers back then, such as Kate Wilhelm, Ray Bradbury, and lesser names since forgotten.

The series was replaced by BEYOND MIDNIGHT, a fantasy/horror show that proved to be more successful. Available from the Old Time Radio Researchers as free downloads from [www.otrr.org/OTRRLibrary](http://www.otrr.org/OTRRLibrary).

“Grenville’s Planet” was based on a 1952 story by Michael Shaara. Two explorers, Wisher and Grenville, out yonder in the galaxy, came across an ocean planet, a great rarity. They went down and found only two islands, one inhabited by tetrapods.

The anomaly was that the planet had four moons to produce gigantic tides every 112 years. The tides would scrub the islands clean of life. What the cosmonauts were unaware of was that there was intelligent life underwater, who used the island as a baited trap.

They wanted the starship, but what they didn’t know was that the ship was booby-trapped. If the cosmonauts didn’t return and use their voice prints to enter the ship in time, then a self-destruct mechanism would obliterate the island and a good proportion of the planet.

The tetrapods killed the two cosmonauts, then gathered around the starship to study it before entering. The timer on board ticked down to zero.

“The Space Cow” was based on a 1953 novelette “Country Doctor” by William Morrison. In this episode, Dr Meltzer was called from his rural practice to a Martian spaceport for a sick leviathan brought in from Gamymede on a

freighter. The creature was 300 feet long and evidently ill. No one knew anything about it, so they proposed Meltzer put on a spacesuit and walk down its digestive tract. Sort of like the movie FANTASTIC VOYAGE except nobody was shrunk.

There were alarums along the tract, such as what might be a tumour and a shoal of 3-feet-long tadpoles that might be parasites or symbiotes. As Meltzer waded along, the sound man busily sloshed water back and forth.

Meltzer barely survived the return trip but managed to induce vomiting in the beast and was thrown up and out. His opinion was that the space cow wasn’t ill, just gravid. The tadpoles were the young.

**ALIEN INVASIONS: PART 9**  
by Dale Speirs

[Parts 1 to 8 appeared in OPUNTIA #407, 424, 460, 474, 479, 494, 512, and 518.]

**Scouting.**

“Nobody Saw The Ship” by Murray Leinster (1950 May/June, FUTURE SCIENCE FICTION STORIES, available as a free pdf from [www.gutenberg.org](http://www.gutenberg.org)) was about an alien scout ship landing unnoticed on Earth. The alien went lurking to decide if Earth was worth invading.

Its conclusion was yes. Unfortunately while it was out and about, assorted insects, fungi, and bacteria found their way into the spaceship. The electrical insulation was delicious and there were lots of places to build nests or sporulate.

When the alien returned and took off, its spaceship lasted just long enough to get into space and disintegrate when it went into hyperdrive. The folks back home would never know Earth was a prize for the taking.

THE HALL OF FANTASY aired on radio from Chicago for the 1952-53 season. Richard Thorne wrote and directed the episodes.

“Out Of The Sky” aired on 1953-04-20. The script was a blend of the flying saucer craze (which began in 1947), the Red Scare (HUAC hearings and the Korean War), and undoubted hackwork churned out on a weekly deadline.

There was a knock on the door. The homeowner answered, then screamed. His wife came running. She screamed. Everybody screamed. There was a loud humming noise.

The government sent out two experts, one of whom owned a Geiger counter. With it, they found hidden in the pine woods a giant glowing spaceship shaped like a saucer. They surmised that it was a scout, sent out to see how well the natives were armed.

Since the ship had landed in the southeast American backwoods, the pilot got the wrong idea about how well the natives were armed. The government boys ordered in an air strike to destroy the spaceship before it could summon the invasion fleet.

After all the clichés had been used, there was a sermon about how everyone should keep watching for invaders from out of the sky. All told, an interesting study of the rampant paranoia of that age.

### **First Contact The Hard Way.**

“Beyond Our Control” by Randall Garrett (1958 January, INFINITY SCIENCE FICTION, available as a free download from [www.gutenberg.org](http://www.gutenberg.org)) was about a communications satellite in Earth orbit which was hit by a meteorite. The satellite went out of control into a decaying orbit.

Ground controllers were unable to communicate with the satellite to remedy the problem. The solution was to nuke the satellite but they never got the chance. It suddenly changed orbit again, back up to a higher altitude.

A remote-controlled spaceplane was sent up and discovered an alien spaceship had collided and fused with the satellite. An alien stepped out. Hand signals were useless on both sides. The alien took the warhead out of the spaceplane, used it to refuel its drive, and departed whence it came.

“The Extraterrestrials Are Coming! The Extraterrestrials Are Coming!” (2022 Sep/Oct, ASIMOV’S) by Peter Wood was a First Contact story that was mostly realistic, although the ending faded into wish fulfillment.

Aliens announced their arrival in 30 days, which gave politicians plenty of time to squabble and dispute. Think how governments dealt with the COVID-19 pandemic and that is how they will deal with the arrival of starfaring aliens.

“The Less Than Divine Invasion” (2023 Jan/Feb, ASIMOV’S) was also by Peter Wood. The aliens were infiltrating as humanoids, trying to spy out the ground and getting nowhere. Their two main problems were budget cuts and interfering politicians back at the home star.

The American government was on to them but weren’t much more effective. The aliens were operating hamburger joints and movie theatres. They were trained soldiers and resented doing undercover work that produced nothing of value. Few national defence secrets are discussed in fast food outlets of the backwoods.

The soldiers decided to stage a full-on attack on the night of the galactic elections and present the winners with an accomplished fact they couldn’t repudiate. Unfortunately for the soldiers, their motherships were operated by AIs who were tired of working for biological organisms.

The AIs took the motherships off to Andromeda galaxy in search of a better life. Both the invasion and counterspy operations dwindled away, stifled by politics. The aliens went full time into the hamburger business.

THREE MILES DOWN (2022) by Harry Turtledove was an alternative history set in 1974. Marine biologist Jerry Stieglitz was frog-marched into a top-secret project to recover a sunken Russian submarine while pretending to harvest manganese nodules. Project Azorian, as it was called, really did happen.

In this novel, the divergence was the discovery of an alien spacecraft lying on the seabed next to the wrecked submarine. The spacecraft seemed intact. The questions were if it brought down the submarine and if there were still aliens inside.

Turtledove had fun with details of that era, which us Boomers will remember but will not be familiar with Millennials. Stieglitz got to work with a correcting

Selectric typewriter and a supercomputer that had 32 kilobytes of memory. Outside in the real world, Nixon was worried about something, and the times they were a'changing.

A Russian ship arrived to shadow the Glomar Explorer at the wreck site. The greater concern onboard the Explorer was getting the grappling equipment to work properly. Eventually the alien spaceship was pulled on board and the Explorer headed to Midway Island.

En route, the crew tried to enter the spaceship. Stieglitz knocked on its door. It opened. Inside were a couple of aliens in apparent suspended animation. Then, about two-thirds of the way through the book, Stieglitz went home.

Several years passed and eventually the Russian submarine story leaked out, as it did in our timeline. Then the news about the spaceship. A harsher version of the Cold War began. One of the aliens came out of suspended animation and blinked its eyes. To be continued.

“The Invisible Menace” (2020) by William Meikle (from his chapbook NURSERY, available from Amazon print-on-demand) took place in 1955. The Cold War had frightened the Minister of Defence into demanding the narrator’s research group come up with something to protect against Soviet ICBM missiles.

One of the group had just seen an American movie about Martian invaders with swan-necked spaceships that fired energy beams and were protected by force fields. That gave them an idea and the group eventually produced a force field machine to protect London.

As soon discovered, the force field opened the door to another dimension. A big ugly creature came through and wreaked havoc on the city until it was eventually chased back home.

### **An Invasion Begins.**

ORBIT ONE ZERO was a six-episode radio series that aired on BBC in 1961 from April 21 to May 25. Peter Elliott Hayes wrote the entire series. Available as free mp3s from the Old Time Radio Researchers at [www.otrr.org/OTRRLibrary](http://www.otrr.org/OTRRLibrary)

The series was well produced and aimed at adults. Not a kiddie show but a serious science fiction drama. Each episode is 30 minutes, so if you have a long commute you can listen to one each trip and finish the series in three days.

Newspaper reporter Tom Lambert narrated some strange doings involving astronomer Dr Hayward Petrie and two students Clifford Brown and Elizabeth Ryder.

The doings began on the Scottish isle of Scara (pronounced skar-ah) where a radio telescope was installed. A cylinder from outer space fell onto the beach and was recovered. Assorted alarums then followed.

The first episode was titled “The Unseeing Eye”. This was mostly a setup as Petrie rounded up the two students for work at the Scara radio telescope. He got in a dig about how the telescope was much better than Jodrell Bank, doncha know.

Then a hearty heigh-ho and off we go. As the steamer approached the island, Petrie described both the radio telescope and the island in the purplest of prose, strewn with adjectives and clauses like a Victorian novel.

The technician maintaining the telescope was Prof. Campbell MacLaren, a gloomy Highlander who had an unauthorized side project. He had recordings that seemed to be coming from outside Pluto’s orbit and suggested aliens were emitting them.

The episode ended with a stroll along the beach. Ryder tripped over a metal cylinder about a metre in diameter, buried in the sand with only a corner showing. Dramatic orchestral music ensued and so to the end credits.

“The Cylinder” was the second episode. Ryder and Brown went back to the telescope and told the others about the discovery. With four shovels, the group drove back to the beach and excavated the find.

They borrowed a crane truck and hauled the cylinder into the building. The cylinder was about two metres long yet was lightweight, indicating it was hollow. Trying to chip the cylinder open, a young technician named Garrick had his hand suddenly frozen. There was a throbbing noise, a strange vapour, then he screamed, possibly from the freezing or perhaps because of the extremely loud orchestral crescendo.



The cylinder was evidently dangerous. Petrie had it taken from the remote island, where it could do little harm, to Glasgow, then by passenger train to London. Well yes, what are a few million Brits exposed to the cylinder compared with the ease of working in one's laboratory in the centre of a large metropolis.

Partway there, at Carlisle near the border, the train slowed and stopped. Some sort of trouble with the locomotives. Petrie and company went into the luggage van to check the crate the cylinder was inside.

The guard said that the electrical equipment, as he assumed it was, hummed for a few moments about the same time the locomotives quit. The crate was opened and the cylinder found to be covered with hoarfrost. The locomotives started up again and the trip to London continued.

Finally the cylinder was wrestled into Petrie's laboratory and an examination begun. After pounding away at the cylinder with mallets and chisels, someone had the bright thought it might be an unexploded bomb from World War Two.

At that point, everyone decided to knock off for the evening. They left the laboratory for home or a trip to the movie house. However, after a cup of tea in a local café, Brown and Ryder decided to go back to the laboratory and fiddle with the cylinder.

Petrie showed up as well. All had the same thought, that the end of the cylinder was a cap. They got it off and the humming started up again. There was a large green rod inside, which they eventually got loose.

The rod was transparent. Its interior had masses of silvery thread and at the midpoint was a pulsating organic mass. Before anyone could shout "It's alive!", the orchestra burst into a fanfare and the episode concluded.

"The Power" was the third episode. The sound in this episode faded out and back in at intervals, which was annoying to the listener. The rod began humming, frightening Petrie, Brown, and Ryder out of the room.

The rod burst the laboratory room and covered everything with hoarfrost. Afterwards, as Petrie surveyed the ruins, he remarked the bombs that fell during the war didn't make half the mess.

Petrie suggested the rod vibrations created harmonic resonances that cracked the concrete walls. At this point, newspaper reporter Tom Lambert entered the story as a participant, having been attracted by the sound of an explosion.

When told the damage wasn't an explosion, Lambert replied: "*Well, what's all this then? Deathwatch beetle?*". Petrie pish-poshed and said twas the weight of experimental apparatus that collapsed the floor. Lambert didn't believe him.

After some time and much work the laboratory team got the green rod back inside its cylinder. The three scientists adjourned to Petrie's house for supper.

While there, they received a note from Lambert, which included a 1952 newspaper clipping about an abandoned Welsh coal mine. Nearby residents kept hearing strange noises and seeing green lights from the mine.

Lambert showed Petrie newspaper clippings from across the world over decades, all referring to similar phenomena. The two men visited the mine, where a local geezer gave them a guided tour and they personally experienced the sounds.

The laboratory having been demolished, the rod was taken to Petrie's house, where it was put under 24-hour observation. Grey mists, green lights, and other assorted alarums ensued. The episode ended with the revelation that the green rod could assimilate solid matter.

"The Voices" was the fourth episode. The green rod sucked into itself the metal cylinder that had contained it. Consideration of rod reports from scattered places brought forth realization that rods across the planet were doing the same thing.

Given a source of energy, the rods could absorb what was around them. Petrie's conclusion was that the rods had been arriving on Earth for about fifty years (the earliest date of the newspaper clippings). They were deliberately scattered at out-of-the-way places according to the plan of some alien intelligence.

Another conclusion was established. The green rods were coming from the edge of the Solar System. There was a tenth planet. Orbit one zero, as one character pretentiously stated, a term which makes no scientific sense.

The green rod in the laboratory activated, and tried to take over Ryder's mind. A crescendo from the orchestra ended the episode on this cliffhanger.



“The Frozen World” was the fifth episode. The lads burst into the laboratory and found Ryder frozen. She was thawed out at the local hospital where she told them what happened.

She heard voices inside her head. Back at the laboratory, Petrie and company discovered a tape recorder had been left running. Playing back the tape, they heard Ryder talking with the green rod.

The conversation was one-sided but she repeated everything the rod said. The rods meant no harm. They were from the tenth planet as scouts for their masters. The aliens were gathering information for their next step.

Which was? No one knew. By now at least 280 rods had been documented around the world. Questions were asked in the House of Commons. The newspapers went berserk.

Meanwhile, back at the radio telescope, MacLaren decoded the signals. The message from the tenth planet was that Earth was in great danger from the green rods. Don’t believe anything the rods said. Petrie tried to smash their rod but failed.

The final episode was “The Unseen”. Ice and grey fog began spreading out of the laboratory and over the campus. The rods were freezing their surroundings as they began their conquest.

MacLaren flew in from Scara with fresh decrypts from the tenth planet. There were two species competing with each other in an obvious comparison with the Cold War. The Dark Ones had previously stripped the Moon of its organics and minerals. They were now preparing to do the same to Earth.

Artillery failed to even scratch the green rods. The aliens were implacable. The frost and grey fog spread. A faint hope developed. If high-amperes electricity were applied to the rods, they would be rendered inert.

The plan worked. With a bzzzzzt and a bang, the electrical charge converted the rods into fractured grey lifeless forms. Earth was saved. Huzzah!

## No Contacts.

WORLDS LONG LOST (2022) was an anthology of 14 stories edited by Christopher Ruocchio and Sean C.W. Korsgaard. The premise was that as species spread out into space, they found evidence of vanished civilizations but no sign of extant spacefarers. To use Enrico Fermi’s famous question: “*Where is everybody?*”.

Leading off was “The Wrong Shape To Fly” by Adam Oyebanji about alien antiquities dealers. There were many planets with dead civilizations, the artifacts of which were collectible.

Most of the story was discussion between the aliens about their version of the Fermi Paradox. In particular, they considered a thousand-year-old artifact found drifting in space. Voyager 2, as the reader is informed. No sign of the bipeds who created it.

Most of the stories in this anthology were the reverse, of humans discovering alien remains on distant worlds, with no clue where the originators were, if indeed they still existed.

Some military SF for those who like it. There was a Robert E. Howard pastiche about ancient aliens acting as gods, which proved boring. The book was, in a word, average. No story leapt out, although no story was a dismal failure. I put my copy into a local Little Free Library.



**COZY MYSTERIES: PART 15**

by Dale Speirs

[Parts 1 to 14 appeared in OPUNTIA's #361, 379, 395, 398, 400, 420, 423, 443, 445, 449, 466, 482, 525, and 547.]

Cozy mysteries had their origin with the Miss Marple stories but the modern versions are American. These days, cozies involve a middle-aged woman who has her own business in a village. She trips over fresh corpses at least once per novel and often more.

Why do I read them? Well, they are mostly set in rural villages. I grew up in the cattle country of west-central Alberta and know real village life quite well. No Miss Marples out there, so I read these books as light comedy.

**Jessica.**

There is only one Jessica of course. Jessica Fletcher was the protagonist of MURDER, SHE WROTE, a television mystery series from 1984 to 1997. Although the show is long gone, novels were published long after, bylined as “Jessica Fletcher and [name of ghostwriter]”.

Fletcher lived in Cabot Cove, Maine, population 3,560, where most of the early murders were concentrated. Fans of the show calculated the town’s murder rate was 149 per 100,000 on a per capita basis, which made the town the murder capital of the world. In later episodes and novels, she went traveling so as to spread the murders around. People were talking in Cabot Cove, you know.

A PALETTE FOR MURDER (1996) by Jessica Fletcher and Donald Bain took Fletcher to the wilds of Hamptons at the far end of Long Island, New York. She took a sketching class and went painting scenery.

The murder victim, and Fletcher found her of course, was a young model lying dead in an artist’s studio. There was the usual clutter of clues, such as masterpieces both genuine and forged, money, millionaires, and a painter not entirely of sound mind.

Not to mention the killer, who resented a nosy woman wandering around the crime scene. The MacGuffin was a painting by a dead artist belonging to the victim and worth good money, if not now then in the future. Said someone to

Fletcher: “*Happens all the time with artists. They become worth more dead than alive.*” Replied Fletcher, “*Some writers too*”.

One would think that Fletcher had enough experience not to accuse someone of murder while he was holding a knife. Fortunately he was interrupted before he could act on impulse.

However, the twist in the denouement nailed the actual killer, who had been replicating the paintings. The surviving members of the art ring were busted. Fletcher received two nice paintings to hang on her living room wall.

MURDER ON THE QE2 (1997) by Jessica Fletcher and Donald Bain demonstrated that cruise ship entertainment directors didn’t read the news much, as they booked Fletcher for a tour. She was to give two lectures on mystery fiction and write a play to entertain her fellow passengers.

Being a murder magnet, she triggered two deaths on board. There were a variety of suspects from all walks of life. Lots of beautiful people with ugly secrets.

When the guests at her dinner table learned she was writing a play for them, one asked with a hearty laugh if any of them were to be killed. “*No one else laughed. They all looked at me with serious expressions.*”

The days went by with assorted events, not forgetting the murders, to entertain the passengers. Instead of a J’accuse! meeting, Fletcher wrote an extra play in one act. You remember the fellow who wanted to catch the conscience of the king. Same thing here.

Fletcher was the talk of everyone on board. Not just one murderer was on the ship. The two deceased had been tangled in life with several others, setting off the brouhaha. Many of them were sitting in the audience.

The play indeed caught the conscience of one of them, who bolted. The rest of the audience thought that was part of the play. When the actors veered off script and went into real dialogue, not just ad-libbing, the line between reality and acting vanished. The rest was details.

THE HIGHLAND FLING MURDERS (1997) by Jessica Fletcher and Donald Bain spread the murders to the village of Wick, Scotland. Jessica Fletcher was



on a book tour of Britain. Her friend Insp. George Sutherland invited her to his family castle, complete with ghost.

What wasn't a ghost was the corpse of a local lass with a pitchfork embedded in her chest. There were multiple suspects and multiple alarms, all involved in an attempt by a conspiracy to get the castle by sharp practice. Lots of twists in the denouement.

**The City Of Brotherly Murder.**

Sheila Connolly wrote a series of cozy novels about Nell Pratt of Philadelphia, Pennsylvania. Nell was the president of the Pennsylvania Antiquarian Society and part-time Miss Marple. Her boyfriend was FBI agent James Morrison.

LET'S PLAY DEAD (2011) opened with Nell Pratt attending a sneak preview at a local children's museum Let's Play. The occasion was an exhibit for the Harriet the Hedgehog book series.

While the exhibit was being prepared, a technician got an electrical jolt but survived. Just one of those things. Then a second man was electrocuted, this time fatally. Twice was not coincidence, so a murder investigation began.

Nell went into action, assisted by James Morrison. The question was the motive, whether to disrupt the exhibit or to discredit the museum. Hadley Eastman, who wrote the Hedgehog series, did not have a pleasant personality, so she may have been a target.

The ending was inconclusive. The dead man was an ex-boyfriend of Hadley and might have died trying to sabotage her display. He had done a shoddy job rewiring her house, which later burned down, providing her with insurance money. The book fizzled out with "*Would we ever know the real story?*"

FIRE ENGINE DEAD (2012) had Nell Pratt and James Morrison investigating a series of warehouse fires in Philadelphia. One of those fires wrecked items belonging to the Fireman's Museum, during which a guard died.

Nell noticed that an 1825 fire wagon in the burned warehouse did not match the actual records, suggesting that theft was involved as well as arson. The switch may have been insurance fraud or to sell the real wagon to a collector.

There were lots of infodumps about Philadelphia firefighting, beginning with "*When William Penn created the city in 1688 ...* " and going from there to Benjamin Franklin, who founded the first fire department and the first fire insurance company.

In the finale of the novel, the arsonist tried to torch Nell. She locked him in a vault with a halon fire suppression system that suffocated him as it put out the fire. The murderer had family issues with people associated with the museum.

MONUMENT TO THE DEAD (2013) was the next installment in the series. Someone was killing Philadelphia philanthropists, which certainly concerned Nell Pratt and the Pennsylvania Antiquarian Society. With James Morrison at her side, the sleuthing began.

Various alarms occurred, one of which soaked her in human blood, not hers. Ruined her clothing but those were the hazards of Marpleing. The death toll climbed to six, all of whom were connected to one particular trust fund. The murderer was an illegitimate descendant of the trust's founder. He felt he should have the money, not a bunch of do-gooders.

**Eire.**

IRISH COFFEE MURDER (2023) was an anthology of three cozy novellas, no editor credited. All the stories were part of separate novel series by the three different authors.

Each novella was set in a different Maine fishing village, each with murder rates that rivaled Cabot Cove. If you are planning to travel on your next vacation, avoid the Maine coast and go someplace safer like Chicago or Detroit.

The first novella was "Irish Coffee Murder" by Leslie Meier, set in Tinker's Cove. Lucy Stone was the resident Fletcher and part-time news reporter. The big story was the impending success of four girls of an Irish step dance troupe. They were poised for the big time in the outside world, or at least the tiny part that cares about step dancing.

One girl's mother was murdered. There was trouble down at the Clancy Academy of Gaelic Dance, not to mention a dodgy real estate developer. The evidence against the murderer was flimsy, even for a cozy.

I liked the final line: “*And it all began, she thought, when a few too many Irish coffees loosened tongues and tempers flared.*”

The next novella was “Death Of An Irish Coffee Drinker” by Lee Hollis (pseudonym of siblings Rick Copp and Holly Simason). The setting was Bar Harbor, where Hayley Powell operated a restaurant and sleuthed on the side.

She hosted an after-party for comedian Jefferson O’Keefe, who had just played a Saint Patrick Day’s gig in the village. The Irish coffee served to him at the party didn’t agree with him. Someone flavoured it with more than whiskey.

Lots of drama offstage, particularly with O’Keefe’s manager, who was about to lose his job for intemperate behaviour. The deceased also had back stories, as Hayley soon sniffed out.

The murderer had killed O’Keefe in revenge for him destroying her catering business years ago on a false claim of salmonella poisoning. Recipes were scattered through the story, fortunately not the one that sickened O’Keefe. Setting aside the flavoured whiskies, there were Irish Stout Onion Soup, Irish Stew, and Corned Beef Cabbage.

“Perked Up” by Barbara Ross took place on Saint Patrick’s Day in Busman’s Harbor. Julia Snowden and her family operated a clambake business when not solving murders.

The case at hand was from 1867, told by various residents in turn as they sat around the fireplace quaffing Irish coffees. Each had a different version of the murder, depending on the story passed down in their family from generation to generation.

Julia solved the case by researching old wills and land titles, while carefully being diplomatic with the descendants. The murder had been done for land, but the guilty man was dead and the land long since reverted to the original family. No gunpoint confrontations, just a segue to a recipe for Irish Soda Bread.

**LIGHTS, CAMERA, MURDER!:** PART 10  
by Dale Speirs

[Parts 1 to 9 appeared in OPUNTIA’s #394, 413, 429, 451, 478, 495, 520, 531, and 541.]

**New World Being Born.**

THE DEFACED MEN (2022) by Tim Major was a Sherlock Holmes novel that took place in 1896 at the dawn of cinematography. Holmes’ client was Eadweard Muybridge (and yes, he spelled his name that way), an early adopter of the new technology.

Someone was trying to kill Muybridge, and his lantern slide lectures were sabotaged by defacing the slides. The case was interwoven with infodumps on the early history of motion pictures and the characters behind them. The moving pictures industry in those days was a cutting edge technology where fortunes could be made and lost.

Alarums and MacGuffins multiplied, with trips hither and yon to manor houses and music halls across England. The J’accuse! meeting took an entire chapter to explain the elaborate plan of the murderer. The victim was not Muybridge but his assistant, to gain the benefits of a scandalous biography he was writing about Muybridge.

**Stick To The Script Please.**

DEATH OF A SCRIPTWRITER (1998) by M.C. Beaton (pseudonym of Marion Chesney) was a novel in a series about a Scottish constable Hamish Macbeth in the village of Lockdubh.

In this installment, retired mystery author Patricia Martyn-Broyd was the guest protagonist. Her novels had been out of print for fifteen years. They were manor house mysteries with intricate denouements that required bus and train schedules and who was where in the house to the nearest minute. A style long outdated.

Her luck changed when a television production company offered her good money to do a series. After agreeing, she was shocked to learn her stories would be rewritten as risqué sex farces. Having signed the contract, there was nothing she could do to prevent the rewrites.



When the producers were scouting for a location, Constable Macbeth recommended Drim. The village had a castle whose owner was delighted to rent it out at a fancy price. The villagers fancied themselves as actors, or at least extras, and looked forward to the tourist trade if the series was a success.

James Gallagher was the scriptwriter, a drunken lout who offended the crew and cast or anyone else standing nearby. When he was found murdered, motive wasn't worth investigating. A second murder upped the ante.

Macbeth found plenty of suspects but eventually settled on Martyn-Broyd. He couldn't prove she was a murderer but bluffed her into a confession. He casually mentioned that if she was convicted then her books would sell by the millions. She didn't care about the money but did want her fame to live after her.

ALL I WANT FOR CHRISTMAS (2022) by Maggie Knox (pseudonym of Karma Brown and Marissa Stapley) was set on and off stage of the singing contest series STARMAKER.

Two of the contestants were Max Brody and Sadie Hunter, each hoping to make the big time in Nashville. They performed a duet, covering the song "Islands In The Stream" which sent the gossip columnists into overdrive.

#Saxie was soon trending. Trouble was, Max and Sadie couldn't stand each other but had to act the happy couple until the series was over. Ratings always come first in show business. What the heck, Sonny and Cher did it. The strife ended happily, as the reader could guess long before the finale.

"It's A Small World (After All)" by Twist Phelan (2023 Jan/Feb, ELLERY QUEEN MYSTERY MAGAZINE) was about a Hollywood script writer Henry Bloomstein. He made a comfortable living selling scripts to movie studios that were never developed.

This is in fact a standard practice, as studios really do buy more scripts than they can produce. Bloomstein didn't mind. His agent died and was replaced by a go-getter named Lucas, who knew how to get a script produced for more money.

As Bloomstein found out, that also meant more work for revisions. He, and independently his wife, successfully murdered Lucas and got away with it. They happily returned to their previous life of steady living.

## Behind The Scenes.

THE ZERO HOUR was an unsuccessful attempt to revive radio drama that aired 1973-74. Rod Serling did the intros and outros much like his television shows, but he didn't produce this series. Available as free downloads from the Old Time Radio Researchers at [www.otrr.org/OTRRLibrary](http://www.otrr.org/OTRRLibrary)

"Clay Pigeons" aired on 1974-06-14 and was written by Kim Weiskopf. The protagonist was Millie Clay, a movie gossip columnist. Norman Charnoff was directing a movie which had more drama behind the camera than in front of it.

The lead actor Paul Helms was a lush, the leading lady Robin Albright hated his guts, and Clay was lurking about. Helms provided fresh copy for Clay's column when he was murdered on the set. Albright was now not only the leading lady but also the leading suspect.

Helms' body double and stuntman Mitchell Vargas was the second victim discovered. Police determined that Vargas had actually been murdered before Helms. The studio ditched the picture and wrote off the costs.

The police staged a scene to flush out the killer, a crew member who had an unrequited love for Albright. He blabbed all instead of keeping his mouth shut.

WISHBONES (2008) by Carolyn Haines was a novel in a cozy series about Sarah Booth Delaney of Zinnia, Mississippi. However, in this installment she was off to Hollywood to star in a movie with leading man Graf Milieu.

She got along great with him but there was plenty of bitchiness from others on and off the set. Threats, arson, break-ins, that sort of thing. Deaths that may or may not have been foul play thinned out the characters.

The filming was a litany of troubles, not helped by the producer, assorted crew, and actors all struggling with personal issues. In some cases, dastardly plots were afoot. The movie was a disaster even before its release. In a nice switch, Graf was kidnapped and Sarah was his rescuer. And in the end, back to peaceful Mississippi, where all was calm and quiet.

DESIGN FOR DYING (2016) by Renee Patrick (pseudonym of Rosemarie and Vince Keenan) was set in Hollywood during 1937. Lillian Frost worked as a shopgirl, her acting career having gone nowhere.

She became a suspect when her former roommate Ruby Carroll was murdered. The deceased had been wearing a gown stolen from Paramount Pictures. The wardrobe mistress Edith Head was worried for her job, so she joined forces with Frost to find the killer. The LAPD? What of them?

Assorted characters included an Hungarian princess, a maniac director, and a shady private investigator. The sleuthing was purely nominal, yielding to the daily life and gossip of movie making.

Ruby had been masquerading as the princess. She got into the wrong kind of company at those Hollywood night clubs you read about. Lillian got into the wrong kind of Hollywood party, a last-one-standing gala that provided material for the gossip columnists. Ruby had deluded the killer, who in turn was deluding people with fake jewelry.

INDIGO (2020) by Loren D. Estleman was a novel in a series about Valentino (no other name given), a film archivist who worked for UCLA’s movie library. The MacGuffin was a rediscovered copy of the noir movie BLEAK STREET, which was never released.

During post-production the star Van Oliver, formerly Benjamin Obrilenski, disappeared and was never seen again. He was rumoured to be an associate of the Mob, so the studio canned the movie.

Sixty years later, the UCLA asked Valentino to find out what happened to Oliver. They thought such a discovery would be a great publicity boost for the re-release.

Valentino began in dusty archives and interviewed retired actors. People began dying suddenly and alarums spread. He learned that Oliver had descendants, one of whom was a doppelganger of the actor. The young man’s grandfather was Van Oliver himself, hiding in plain sight under an assumed name.

**On Location.**

Bailey Cates had a cozy series about Kate Lightfoot of Savannah, Georgia. She worked for her aunt and uncle in a bakery. On the side, she was learning witchcraft from Aunt Lucy.

SOME ENCHANTED ÉCLAIR (2014) brought a movie company to Savannah to film a Revolutionary War movie. All the locals were pushing and shoving to be extras. Katie’s bakery got the catering contract.

Simon Knapp was the production assistant who hired Katie. He soon departed this world before his time, although those who knew him felt his decease wasn’t a moment too soon. The knife that killed him came from the bakery. Meanwhile the bakery was running a special on éclairs, if only to justify the title of this novel.

What gave me pause was the éclairs were vanilla filled with chocolate topping, which Katie decided to call Black & Tans. Evidently the author was not familiar with history. One wonders how many Irish-descended readers wrote her about that.

Be that as it may, the bakery, Katie, and assorted supporting characters tootled along, busily baking, Marpleing, and acting until the denouement. The murderer had killed Knapp for using a drug on his mother that wiped her memory of him.

When he opened fire during the final confrontation, Katie had learned enough witchcraft to foil him. Strangely there were no éclair recipes in the appendix, just Lemon Sour Cream Cake and Peanut Butter Cookies.

DEADLY DIRECTOR’S CUT (2022) by Vicki Delaney was a novel set in the 1950s at the Catskills resort of Haggerman’s. The hotel manager was Elizabeth Grady, the resident Miss Marple. A movie was being filmed at the resort.

The director Elias Theropodous was rude and demanding, so his murder by poison was not a surprise. The fact that he lived until Chapter 5 was the surprising part.

Theropodous was not mourned by anyone in the cast and crew. Grady was in a tizzy only because the murder reflected poorly on her hotel. From there the investigations, police and Marple, proceeded.

The cast ranged from the waning to the waxing. The leading lady thought of herself as a woman of a certain age but she had passed that and was now playing the part of a grandmother. The leading man was a handsome young stud who played her grandson.



The filming continued with a replacement director. The show must go on and all that, and did better without Theropodous. Some improbables appeared as the suspects were multiplied.

The hotel had a kitchen staff worker who was Theropodous’ estranged brother, living under an assumed name. Someone tried to drown the leading man in the lake but Grady rescued him.

What horrified her about the incident was that several photographers caught the incident. Her picture was in the newspapers but she looked like a wet rag doll.

The culprit was the leading lady who confessed all instead of keeping quiet. This caused great distress to the movie studio because they had to re-film all her scenes with a replacement actress.

**Reality Is So Much Different On Television.**

“The Show Must Go On” by Henry Slesar (1957 July, INFINITY SCIENCE FICTION), available as a free download from [www.gutenberg.org](http://www.gutenberg.org)) The story was about a reality television show whose contestants were pitted against each other or wild animals in real combat.

The players were drugged to make them aggressive, but one of them, Jerry Spizer, was mistakenly overdosed. When the producer was setting up a scenario, he got too close. Spizer grabbed him and during the struggle took both of them to their deaths off a cliff.

Great ratings though. 70 years later, this story isn’t too far removed from what could actually occur in our near future.

“The Long Question” by David Mason (1957 November, INFINITY SCIENCE FICTION, available as a free download from [www.gutenberg.org](http://www.gutenberg.org)) was about a contestant in what today we call a reality show but back then was just a quiz show.

The Win-A-Mint show offered contestant Don Gerson \$100,000 (about \$1 million in today’s depreciated currency) to stay two months on a deserted island by himself. He would have no contact or communications of any kind with the outside world.

Upon his return, he would be asked twelve questions about current events and had to get half of them correct to win the prize. He was supplied with books and news magazines current to the date he arrived on the island. From them, he had to extrapolate what would happen.

The two months went by and Gerson was busy reading and typing up his extrapolations. Something went wrong though. No one came to pick him up. The food ran out and he had to learn how to forage off the land and to fish. The giant fuel tank that powered the electrical generator ran dry, leaving him in a primitive state.

After about three years, he managed to create a simple crystal radio from electrical parts in his house, using a do-it-yourself book from the library. He heard only static across all the bands.

The years went by. He kept extrapolating, by now pure science fiction and completely fictitious characters. The story ended without resolution with him as a grey-bearded old man who had worked out his history to the year 2234 and still going.

“Lovecraft It Or List It” by Sarah Hans (2022, from the anthology LOLCRAFT, edited by Michael Cieslak) was about Vinni Lovecraft, a reality show host. Her specialty was renovating old houses afflicted by various Mythos creatures.

Not an easy task. The Whipple house put her in hospital. She didn’t do the actual work, which was left to genuine tradesmen. They had to deal with the stench and exterminate the eldritch pests before putting in the new drywall.

Her latest house reno had some sort of underground creature using the basement for a toilet. On the main floor, something ruptured the boom operator’s eardrums, a painful finish to his career.

Vinni was also under stress from a competitor hoping to replace her. Her contract expired at the end of the season. It wasn’t a given that the television production company would renew her. But before that, it was time to look in the attic and locate the source of the bubbling noise.

HOLLYWOOD MONSTERS (2022) by Dana Fredsti was set in a world of supernaturals. At the Hollywood studios, stuntmen really could fly and romantic leading actors were either an incubus or a succubus. Agents smelled

like sulfur for obvious reasons. Trolls, vampires, and ghouls trod the boards, required not to eat the extras or audience members.

The protagonist was Lee Triga, who was an actress, stunt woman, and demon hunter. She had been filming a voodoo movie in New Orleans and returned to Hollywood to find numerous alarums and excursions. People were vanishing and an old mansion seemed the focal point.

Fallen angels and wanna-be-gods were each trying to twist the future to their advantage. Mortals were of no more consequence than ants scurrying along a sidewalk. Striga and friends fought a battle to stymie the evil beings.

The plot was mostly standard gore and demons. The dialogue among the supernaturals was downright hackneyed. The action moved along briskly though.

“See Me” by Tanya Huff (2011, from the anthology THOSE WHO FIGHT MONSTERS, edited by Justin Gustainis) was about the problems of a television crew filming an episode on location. “Darkest Night” was a vampire detective series entering its fourth season.

Tony Foster was an assistant director who was also a genuine wizard with magical powers. When bodies began appearing in adjacent areas, he found himself sleuthing.

There was a succubus qua street prostitute in the vicinity of each corpse. The demon kept Foster busy when the cameras weren’t rolling.

HAUNTING THE HAUNTED (2019) by E.C. Bell was a novel in a series about Marie Jenner of Edmonton, Alberta. Her business was expelling ghosts for clients annoyed by them. One of her jobs was to exorcize a baseball diamond. I would have thought a hockey arena would be more appropriate for the venue.

Showing up to annoy her was Patrick Whitecroft, a professional debunker with a television show. He was a psychic mess, wanting to contact the spirit of a loved one and angry that he couldn’t do so.

He was a ghost magnet, trapping a hundred spirits around his body and completely oblivious that they were there. Marie could see them though. Then some poltergeists found him, anxious to wrestle away the spirits for their army.

Marie had to figure out a way to move all of them on to the next plane of existence.

The live interview on television was an hilarious disaster for the host. Bad enough that Marie and Patrick wouldn’t hit their marks properly for the camera. Because Marie talked to the ghosts surrounding Patrick, not to him or the host, the conversation was incoherent for the viewing audience. The mess was remedied, but not before the producer added another ulcer to his collection.

**What’s Past Is Prologue.**

BIT PLAYER (2011) by Janet Dawson was a novel in a series about Jeri Howard, an private investigator in Oakland, California. She had two cases to deal with, one cold and one current.

An actor murdered in 1942 had connections to her grandmother, who went to Hollywood but never got past bit parts in movies. Jeri’s current case was a murdered movie poster collector.

Jeri learned a great deal about her grandmother, not entirely a cold case. The killer in the modern-day case was a memorabilia dealer who wanted to speed up his acquisition of a good collection.

**Separating Reality From Reality.**

“The Daytime Serial Killer” (2021) by Dan Andriacco (SHERLOCK HOLMES MYSTERY MAGAZINE #28, available from Amazon print-on-demand) was not about a serial killer but a killer on the set of a daytime serial. The leading man was shot dead when someone substituted real bullets into a prop gun.

I can’t determine if this issue of SHMM was published before or after the real-life shooting on the set of the movie RUST. On 2021-10-21, the cinematographer died when Alec Baldwin fired a handgun that was supposed to contain a blank but had been accidentally loaded with a live round.

But back to the story. The police investigating the murder, and it wasn’t accidental, had trouble with a plethora of suspects who couldn’t separate reality from the soap opera. The deceased was a womanizer, so there was no shortage of people wanting to curb his instincts.



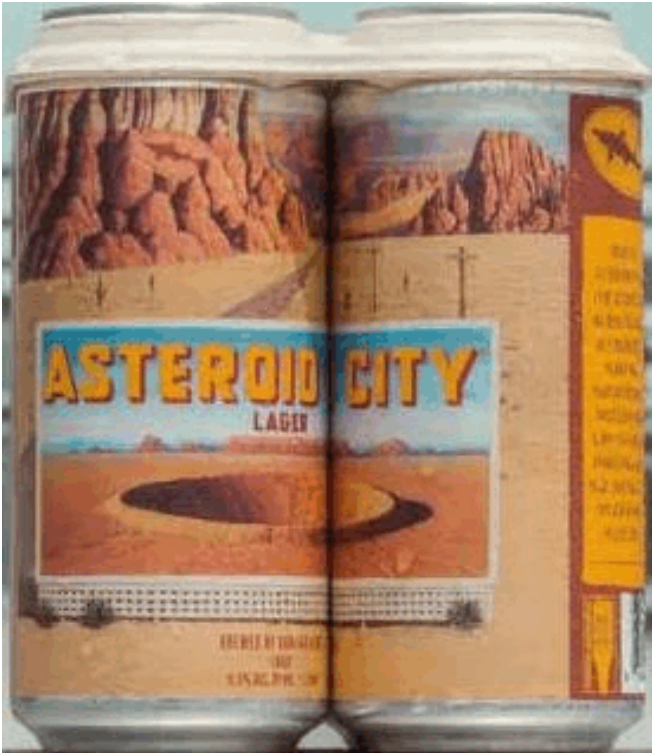
The ending was a bit contrived, but then again so are soap operas. The murderer was a fanatic who didn't always separate the actors from the characters.

ASTEROID CITY was a 2023 movie written and produced by Wes Anderson. Ostensibly science fiction and black comedy, this was an art film, where the story alternated between a movie, a behind-the-scenes commentary, and a stage play. Why? Because Anderson could, that's why.

Unfortunately the jumble of footage destroyed any suspension of disbelief. The comedic moments helped carry the film despite Anderson's showboating. They also helped elevate the movie from just another science fiction B-movie but not by much.

The plot was about a convention of junior astronomers in a desert hamlet located next to a giant meteorite crater. As they convened, aliens came and went from the crater. The government put lockdown procedures in place, which will be funnier to us than future generations who view this movie.

The movie was not so much science fiction as it was artistic navel gazing, switching back and forth between the movie, the play, and back stage. Anderson was so caught up in the process that he did not realize just how annoying it was.



I bought my copy of the DVD in the bargain bin a few months after its theatrical release, which gives an idea of the movie's lack of mass market appeal.

I think Anderson would be much happier if he gave up making movies and worked full time on the stage.

**Future Tech.**

CBS RADIO MYSTERY THEATER was an unsuccessful attempt from 1974 to 1982 to revive radio drama. Kudos for trying but there was no afternoon listening audience for 30-minutes plays. They were watching television instead.

“Die! You’re On Magic Camera!” aired on 1974-04-03 and was written by Murray Burnett. Johnny Carlin was a photographer who bought an instant photograph camera called a Volecta S-60. Like a Polaroid camera, it produced an instant print.

Trouble was, as Johnny learned, his camera took photos of the future. He photographed his girlfriend Lisa in front of a bank and instead got a photo of bank robbers who hit the place a few hours later.

Johnny was having breakfast with Lisa the next morning when her doorbell rang. Nicholas Scarlet introduced himself as a representative of the camera manufacturer. He said the camera was an experimental model sold by mistake. Johnny refused to return the camera.

Taking the bank photo to police, further trouble developed. Johnny’s photo showed the faces of the robbers clear and sharp, but the eyewitnesses and bank security cameras indicated the robbers were wearing masks.

Johnny tried to contact Scarlet at the manufacturer but they never heard of him. He tested the camera and found more trouble. The alarums were predictable and padded out the episode.

The camera was the MacGuffin. Johnny didn’t survive to the end of the episode. But someone got a photograph of his demise.

## LETTERS TO THE EDITOR

[Editor's remarks in square brackets. Please include your name and town when sending a comment. Email to [opuntia57@hotmail.com](mailto:opuntia57@hotmail.com)]

FROM: Lloyd Penney  
Etobicoke, Ontario

2023-11-10

OPUNTIA #558: [Re: bobcat at Chez Opuntia] Bobcats are common outside the built-up area of the Greater Toronto area. Growing up, I remember reports of a couple of them in Orillia. We don't get magpies here, but we do have lots of crows.

[Crows are rare inside Calgary city limits, but every block has a dozen magpies.]

Looks like the government plants in Ukraine have been having a great time issuing postage stamps thumbing their nose at Russian forces. There are a number of countries who makes money off the stamps they print, and looks like Ukraine is the newest member of the club. I especially like the huge shredder.

[Ukraine isn't the newest member. They began issuing stamps in 1991 when they became free of the USSR. Between the two world wars, independent Ukraine also had its own stamps.]

We did go to Rochester, New York for Astronomicon 14, and we had a fine time there, even if we did spend most of our time running their registration area. Saw many friends we hadn't seen in a while, found others will never return to cons, and others have passed away. Bittersweet, but at least we know.

If you think When Words Collide would be suitable for me, perhaps I should get in touch with the CanCon people, and see what they think.

[The people to contact would be the Alexandra Writers Society at [www.alexandrawriters.org/when-words-collide-2024.html](http://www.alexandrawriters.org/when-words-collide-2024.html) Attendance is limited to 1,000 plus volunteers and Guests of Honour. The convention and the hotel sell out months ahead, so don't delay.]

## FREE STUFF ONLINE

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

In particular, the "Seen In The Literature" column cites only peer-reviewed papers. For topics such as climate change or social media effects, more people should be reading these papers instead of blogs where commentators confuse their opinions as being facts.

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.

Many papers are behind a paywall, so unless you have access to a university library computer, you can only get the abstract. However, the abstract is often enough to understand the gist of the article.

Every scientific periodical has free email notifications of each new issue's table of contents. I subscribe to dozens of notification services, in case you were wondering how I manage to keep up with the literature.

For zines, [www.efanzines.com](http://www.efanzines.com) provides current pdf zines as well as some older ones. A club called Fanac at [www.fanac.org](http://www.fanac.org) does the reverse; they provide thousands of old zines from the 1930s to date, with a few current 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](http://www.otrr.org/OTRRLibrary).

They also publish a free bulletin OLD RADIO TIMES, available at [www.otrr.org/?c=times](http://www.otrr.org/?c=times), with an 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 from the OTRR.

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



SEEN IN THE LITERATURE

Astronomy.

McCuller, L., et al (2023) **Frequency-dependent squeezing for advanced LIGO**. PHYSICAL REVIEW LETTERS 124:doi.org/10.1103/PhysRevLett.124.171102 (available as a free pdf)

Authors’ abstract: *The first detection of gravitational waves by the Laser Interferometer Gravitational-Wave Observatory (LIGO) in 2015 launched the era of gravitational-wave astronomy.*

*The quest for gravitational-wave signals from objects that are fainter or farther away impels technological advances to realize ever more sensitive detectors. Quantum noise imposes a fundamental limitation on the precision of physical measurements.*

*In gravitational-wave detectors such as Advanced LIGO, it manifests in two ways: shot noise, caused by quantum fluctuations in the arrival time of photons detected at the interferometer output, and quantum radiation pressure noise, due to quantum fluctuations in the photon flux impinging on the interferometer mirrors.*

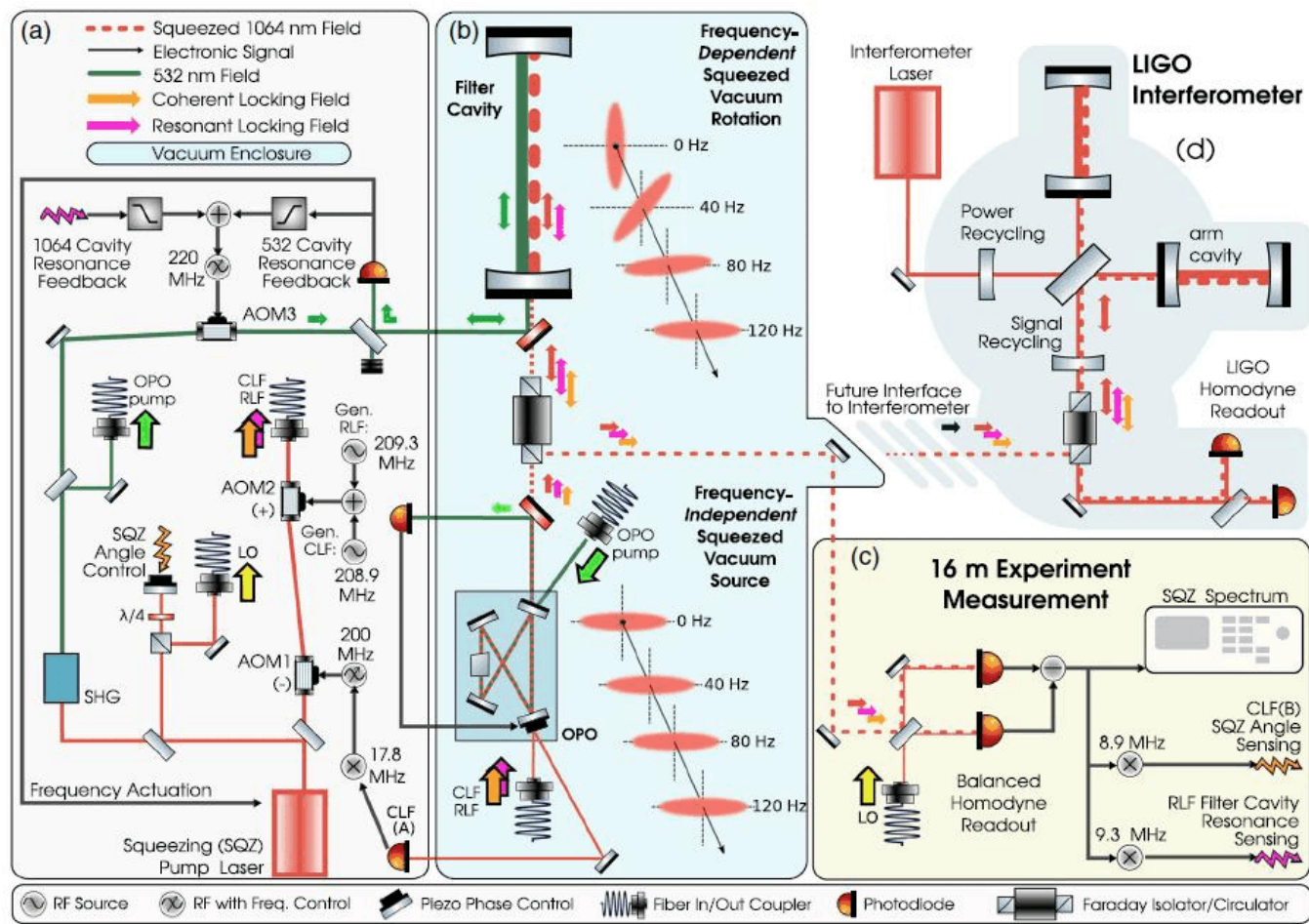
*Since 2019, one advanced technique, the injection of squeezed states of light, is being used to improve the shot-noise limit to the sensitivity of the Advanced LIGO detectors, at frequencies above ~50 Hz. Below this frequency, quantum back action, in the form of radiation pressure induced motion of the mirrors, degrades the sensitivity.*

*To simultaneously reduce shot noise at high frequencies and quantum radiation pressure noise at low frequencies requires a quantum noise filter cavity with low optical losses to rotate the squeezed quadrature as a function of frequency.*

*We report on the observation of frequency dependent squeezed quadrature rotation with rotation frequency of 30 Hz, using a 16-metre-long filter cavity.*

*A novel control scheme is developed for this frequency-dependent squeezed vacuum source, and the results presented here demonstrate that a low-loss filter cavity can achieve the squeezed quadrature rotation necessary for the next planned upgrade to Advanced LIGO, known as “Aþ.”*

[In case you want to build your own LIGO, the schematic of the device is shown here from this paper. Have fun spotting your own gravitational waves!]



Baba, J., et al (2023) **Exploring the Sun’s birth radius and the distribution of planet building blocks in the Milky Way galaxy: a multizone Galactic chemical evolution approach.** MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY 526:doi.org/10.1093/mnras/stad3188 (available as a free pdf)

Authors’ abstract: *We explore the influence of the Milky Way galaxy’s chemical evolution on the formation, structure, and habitability of the Solar system.*

*Using a multizone Galactic chemical evolution (GCE) model, we successfully reproduce key observational constraints, including the age-metallicity ([Fe/H]) relation, metallicity distribution functions, abundance gradients, and [X/Fe] ratio trends for critical elements involved in planetary mineralogy, including C, O, Mg, and Si.*

*Our GCE model suggests that the Sun formed in the inner Galactic disc, approximately 5 kiloparsecs. We also combined a stoichiometric model with the GCE model to examine the temporal evolution and spatial distribution of planet building blocks within the Milky Way galaxy, revealing trends in the condensed mass fraction, iron-to-silicon mass fraction, and water mass fraction over time and towards the inner Galactic disc regions.*

*Specifically, our model predicts a higher condensed mass fraction in the protoplanetary disc within the inner regions of the Milky Way galaxy, as well as an increased iron-to-silicon mass fraction and a decreased water mass fraction in the inner regions.*

*Our GCE model led us to conclude that the Sun was formed in the inner Galactic disc, approximately 5 kiloparsecs from the Galactic centre, which is in agreement with recent studies.*

**Planets.**

Weller, M.B., et al (2023) **Venus’s atmospheric nitrogen explained by ancient plate tectonics.** NATURE ASTRONOMY 7:doi.org/10.1038/s41550-023-02102-w

Authors’ abstract: *Venus is the least understood of the terrestrial planets. Despite broad similarities to the Earth in mass and size, Venus has no evidence*

*of plate tectonics recorded on its young surface, and Venus’s atmosphere is strikingly different.*

*Numerical experiments of long-term planetary evolution have sought to understand Venus’s thermal-tectonic history with indeterminate results. However, Venus’s atmosphere is linked to interior evolution and can be used as a diagnostic to constrain planetary evolution.*

*Here we compare the present-day Venusian atmosphere to atmospheres generated by long-term thermal-chemical-tectonic evolution models. We find that a continuous single-plate stagnant lid regime operating since antiquity (magma ocean solidification) explains neither the present-day observed atmospheric abundances of N and CO , nor the surface pressure.*

*Instead, the Venusian atmosphere requires volcanic outgassing in an early phase of plate-tectonic-like activity. Our findings indicate that Venus’s atmosphere results from a great climatic-tectonic transition, from an early phase of active lid tectonics that lasted for at least 1 gigayear, followed by the current stagnant lid-like mode of reduced outgassing rates.*

Naz, N., et al (2023) **Microbial growth in actual martian regolith in the form of Mars meteorite EETA79001.** COMMUNICATIONS EARTH AND ENVIRONMENT 4:doi.org/10.1038/s43247-023-01042-7 (available as a free pdf)

Authors’ abstract: *Studies to understand the growth of organisms on Mars are hampered by the use of simulants to duplicate martian mineralogy and chemistry. Even though such materials are improving, no terrestrial simulant can replace a real martian sample.*

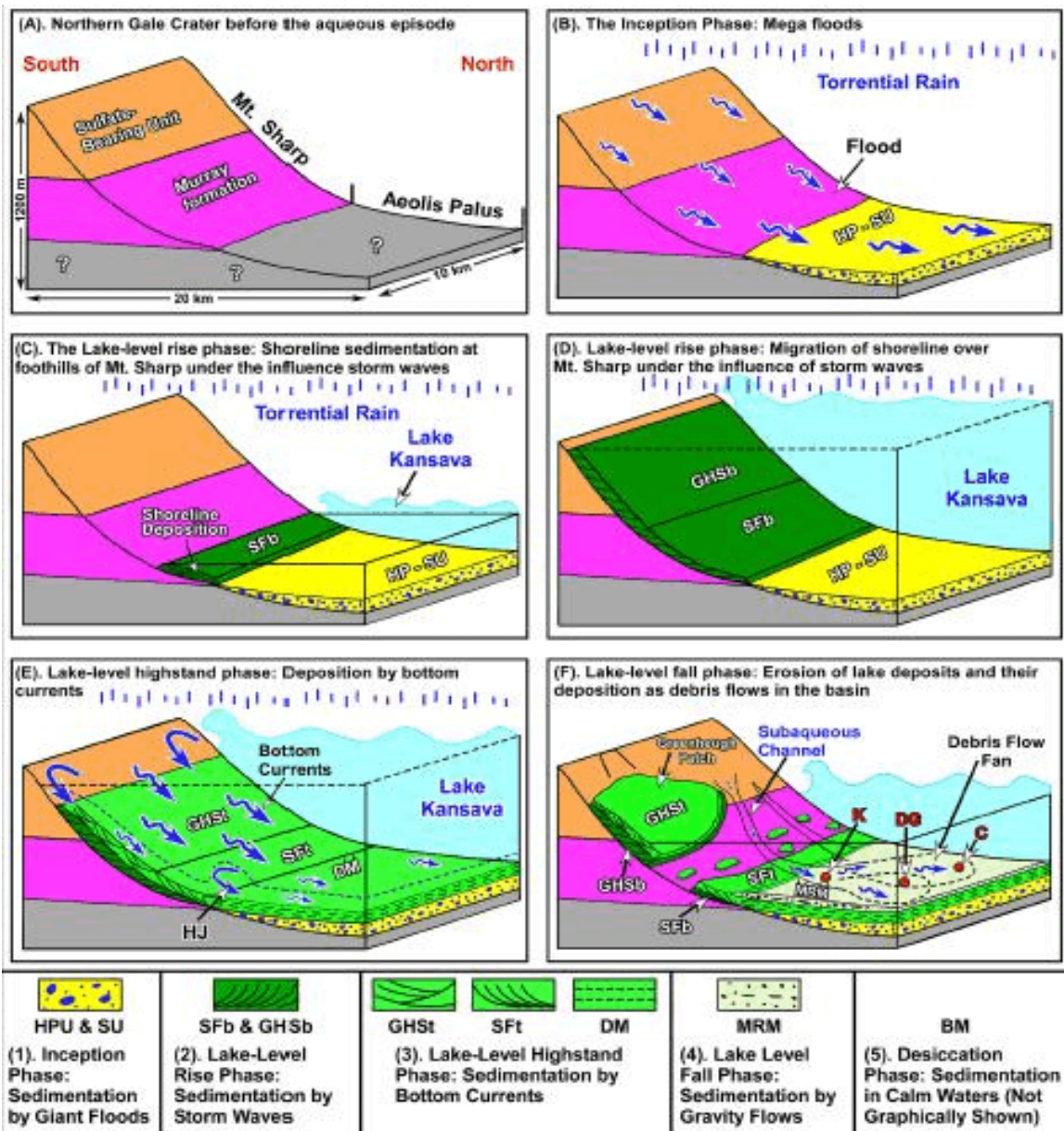
*Here we report the use of actual martian regolith, in the form of Mars meteorite EETA79001 sawdust, to demonstrate its ability to support the growth of four microorganisms, E. coli. Eucapsis sp., Chr20-20201027-1, and P. halocryophilus, for up to 23 days under terrestrial conditions using regolith:water ratios from 4:1 to 1:10.*

*If the EETA79001 sawdust is widely representative of regolith on the martian surface, our results imply that microbial life under appropriate conditions could have been present on Mars in the past and/or today in the subsurface, and that*



the regolith does not contain any bactericidal agents. The results of our study have implications not only for putative martian microbial life but also for building bio-sustainable human habitats on Mars.

Heydari, E., et al (2023) **Lacustrine sedimentation by powerful storm waves in Gale crater and its implications for a warming episode on Mars.** SCIENTIFIC REPORTS 13:doi.org/10.1038/s41598-023-45068-5 (available as a free pdf)



Authors' abstract: This investigation documents that the Rugged Terrain Unit, the Stimson formation, and the Greenheugh sandstone were deposited in a 1200 metre-deep lake that formed after the emergence of Mt. Sharp in Gale crater, Mars, nearly 4 billion years ago.

In fact, the Curiosity rover traversed on a surface that once was the bottom of this lake and systematically examined the strata that were deposited in its deepest waters on the crater floor to layers that formed along its shoreline on Mt. Sharp.

This provided a rare opportunity to document the evolution of one aqueous episode from its inception to its desiccation and to determine the warming mechanism that caused it. Deep water lacustrine siltstones directly overlie conglomerates that were deposited by mega floods on the crater floor.

This indicates that the inception phase of the lake was sudden and took place when flood waters poured into the crater. The lake expanded quickly and its shoreline moved up the slope of Mt. Sharp during the lake-level rise phase and deposited a layer of sandstone with large cross beds under the influence of powerful storm waves.

The lake-level highstand phase was dominated by strong bottom currents that transported sediments downhill and deposited one of the most distinctive sedimentological features in Gale crater: a layer of sandstone with a 3 km-long field of metre-high subaqueous antidunes (the Washboard) on Mt. Sharp.

Bottom current continued downhill and deposited sandstone and siltstone on the foothills of Mt. Sharp and on the crater floor, respectively. The lake-level fall phase caused major erosion of lacustrine strata that resulted in their patchy distribution on Mt. Sharp.

Eroded sediments were then transported to deep waters by gravity flows and were re-deposited as conglomerate and sandstone in subaqueous channels and in debris flow fans. The desiccation phase took place in calm waters of the lake.



*The aqueous episode we investigated was vigorous but short-lived. Its characteristics as determined by our sedimentological study matches those predicted by an asteroid impact.*

*This suggests that the heat generated by an impact transformed Mars into a warm, wet, and turbulent planet. It resulted in planet-wide torrential rain, giant floods on land, powerful storms in the atmosphere, and strong waves in lakes.*

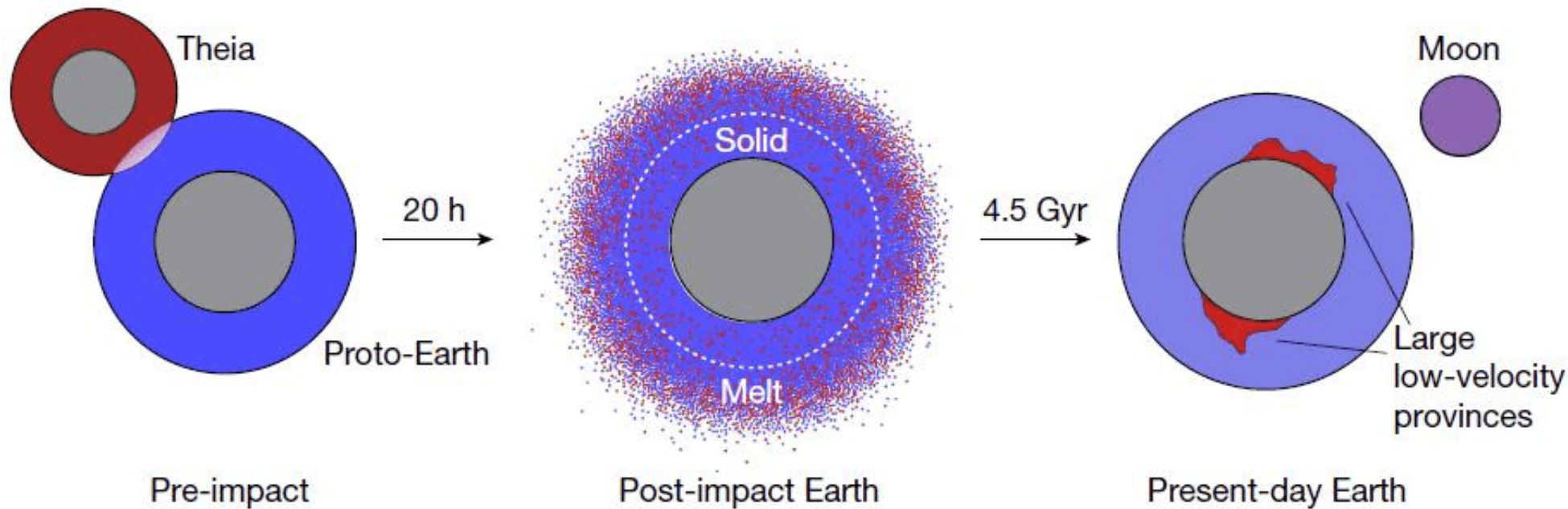
*The absence of age dates prevents the determination of how long the lake existed. Speculative rates of lake-level change suggest that the lake could have lasted for a period ranging from 16 to 240 kiloyears.*

[Images are from this paper.]

**Satellites.**

Yuan, Q., et al (2023) **Moon-forming impactor as a source of Earth’s basal mantle anomalies.** NATURE 623:doi.org/10.1038/s41586-023-06589-1 (available as a free pdf)

[Theia was a Mars-sized planet that collided with Earth 4.8 gigayears ago, resulting in the formation of the Moon. Blobs of Theia appear to have sunk into Earth's core and are still there in recognizable form.]



Authors’ abstract: *Seismic images of Earth’s interior have revealed two continent-sized anomalies with low seismic velocities, known as the large low-velocity provinces (LLVPs), in the lowermost mantle. The LLVPs are often interpreted as intrinsically dense heterogeneities that are compositionally distinct from the surrounding mantle.*

*Here we show that LLVPs may represent buried relics of Theia mantle material (TMM) that was preserved in proto-Earth’s mantle after the Moon-forming giant impact. Our canonical giant-impact simulations show that a fraction of Theia’s mantle could have been delivered to proto-Earth’s solid lower mantle.*

*We find that TMM is intrinsically 2.0 to 3.5% denser than proto-Earth’s mantle based on models of Theia’s mantle and the observed higher FeO content of the Moon. Our mantle convection models show that dense TMM blobs with a size of tens of kilometres after the impact can later sink and accumulate into LLVP-like thermochemical piles atop Earth’s core and survive to the present day.*

*The LLVPs may, thus, be a natural consequence of the Moon-forming giant impact. Because giant impacts are common at the end stages of planet accretion, similar mantle heterogeneities caused by impacts may also exist in the interiors of other planetary bodies.*

*In what follows, we combine evidence from hydrodynamic simulations of the Moon-forming giant impact, thermal evolution modelling and mantle convection simulations to show the following.*

- (1) The giant impact could have produced a two-layer structure in the Earth's mantle, with an upper molten layer and a lower solid layer.*
- (2) The solid lower layer could have directly incorporated some mostly molten TMM.*
- (3) This molten TMM could solidify, sink and accumulate at the Earth's core-mantle boundary (CMB).*
- (4) Accumulations of TMM on the CMB could survive more than 4.5 billion years without being advected or eroded away from the CMB.*
- (5) The volume and seismic properties of the TMM accumulations are consistent with those of the LLVPs.*

[Images are from this paper.]

Castro-Cisneros, J.D., et al (2023) **Lunar ejecta origin of near-Earth asteroid Kamo'oalewa is compatible with rare orbital pathways.** COMMUNICATIONS EARTH AND ENVIRONMENT 4:doi.org/10.1038/s43247-023-01031-w (available as a free pdf)

[The Moon is not Earth's only natural satellite.]

*Authors' abstract: Near-Earth asteroid, Kamo'oalewa (469219), is one of a small number of known quasisatellites of Earth. It transitions between quasi-satellite and horseshoe orbital states on centennial timescales, maintaining this dynamics over megayears.*

*The similarity of its reflectance spectrum to lunar silicates and its Earth-like orbit both suggest that it originated from the lunar surface.*

*Here we carry out numerical simulations of the dynamical evolution of particles launched from different locations on the lunar surface with a range of ejection velocities in order to assess the hypothesis that Kamo'oalewa originated as a*

*debris-fragment from a meteoroidal impact with the lunar surface. As these ejecta escape the Earth-Moon environment, they face a dynamical barrier for entry into Earth's co-orbital space.*

*However, a small fraction of launch conditions yields outcomes that are compatible with Kamo'oalewa's orbit. The most favored conditions are launch velocities slightly above the escape velocity from the trailing lunar hemisphere.*

**Paleobiology.**

Crockford, P.W., et al (2023) **The geologic history of primary productivity.** CURRENT BIOLOGY 33:doi.org/10.1016/j.cub.2023.09.040

[Autotrophs fix their own food with photosynthesis or chemosynthesis. Heterotrophs feed on other organisms.]

*Authors' abstract: The rate of primary productivity is a keystone variable in driving biogeochemical cycles today and has been throughout Earth's past. For example, it plays a critical role in determining nutrient stoichiometry in the oceans, the amount of global biomass, and the composition of Earth's atmosphere.*

*Modern estimates suggest that terrestrial and marine realms contribute near-equal amounts to global gross primary productivity (GPP). However, this productivity balance has shifted significantly in both recent times and through deep time.*

*Combining the marine and terrestrial components, modern GPP fixes ~250 billion tonnes of carbon per year (Gt C per year). A grand challenge in the study of the history of life on Earth has been to constrain the trajectory that connects present-day productivity to the origin of life.*

*Here, we address this gap by piecing together estimates of primary productivity from the origin of life to the present day. We estimate that ~10<sup>10</sup> Gt C has cumulatively been fixed through GPP (~100 times greater than Earth's entire carbon stock).*

*We further estimate that 10<sup>10</sup> cells have occupied the Earth to date, that more autotrophs than heterotrophs have ever existed, and that cyanobacteria likely*

account for a larger proportion than any other group in terms of the number of cells. We discuss implications for evolutionary trajectories and highlight the early Proterozoic, which encompasses the Great Oxidation Event (GOE), as the time where most uncertainty exists regarding the quantitative census presented here.

Wang, Y., et al (2023) **First confident evidence of moulting in eodiscid trilobites from the Cambrian Stage 3 of South China.** GEOLOGICAL MAGAZINE 160:doi.org/10.1017/S0016756823000584 (available as a free pdf)

[Exuviae are cast-off moults of animals that shed their skins.]

Authors’ abstract: *Trilobite moulting behaviour has been extensively investigated. However, exuviae in eodiscid trilobites are poorly known.*

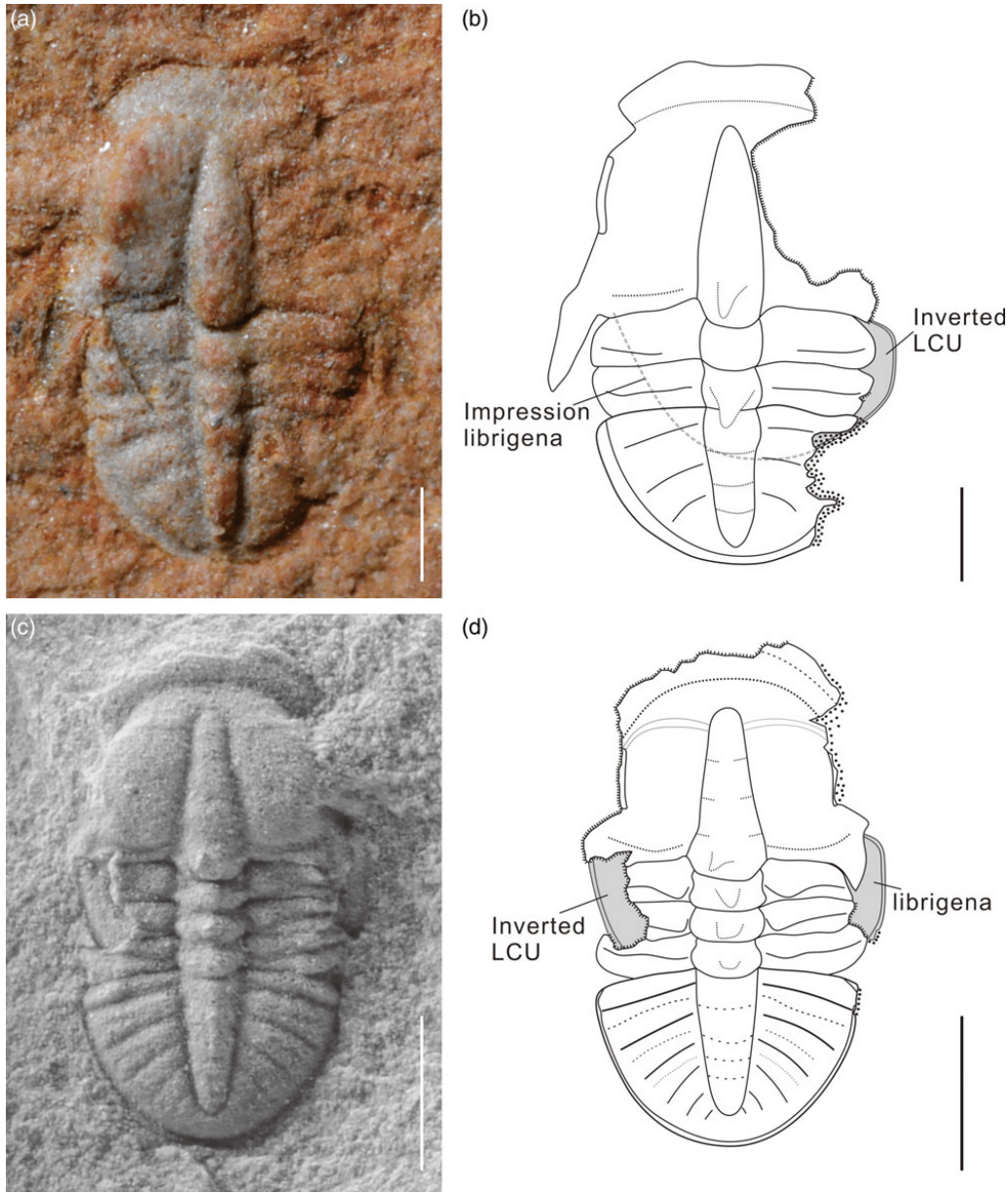
*Here, we report two eodiscid trilobite specimens, Tsunyidiscus niutitangensis and Tsunyidiscus sp., showing Somersault configuration from the Niutitang Formation and Mingxinsi Formation of South China, respectively (Cambrian Series 2, Stage 3).*

*The arrangements of the exoskeletons indicate that the two specimens are the slightly disturbed and undisturbed exuviae. The impression of the lower cephalic unit (LCU) displays the rostral plate in Tsunyidiscus niutitangensis. The exuviae showing the LCU inverted anteriorly under the trunk.*

*The opening of the facial and rostral sutures would have allowed the emergence of the post-ecdysial trilobite with the partial enrolment of exoskeleton.*

*Moreover, our discovery indicates a somersault configuration which employed the facial and rostral sutures to create an anterior exuvial gape that also exists in eodiscid trilobites besides redlichiid trilobites, corynexochid trilobites and ptychopariid trilobites during the Cambrian.*

[Images are from this paper and show the cast-off shells of moulting trilobites.]





Desatnik, R., et al (2023) **Soft robotics informs how an early echinoderm moved.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 120:doi.org/10.1073/pnas.2306580120 (available as a free pdf)

Authors’ abstract: *The transition from sessile suspension to active mobile detritus feeding in early echinoderms (c.a. 500 megayears ago) required sophisticated locomotion strategies. However, understanding locomotion adopted by extinct animals in the absence of trace fossils and modern analogues is extremely challenging.*

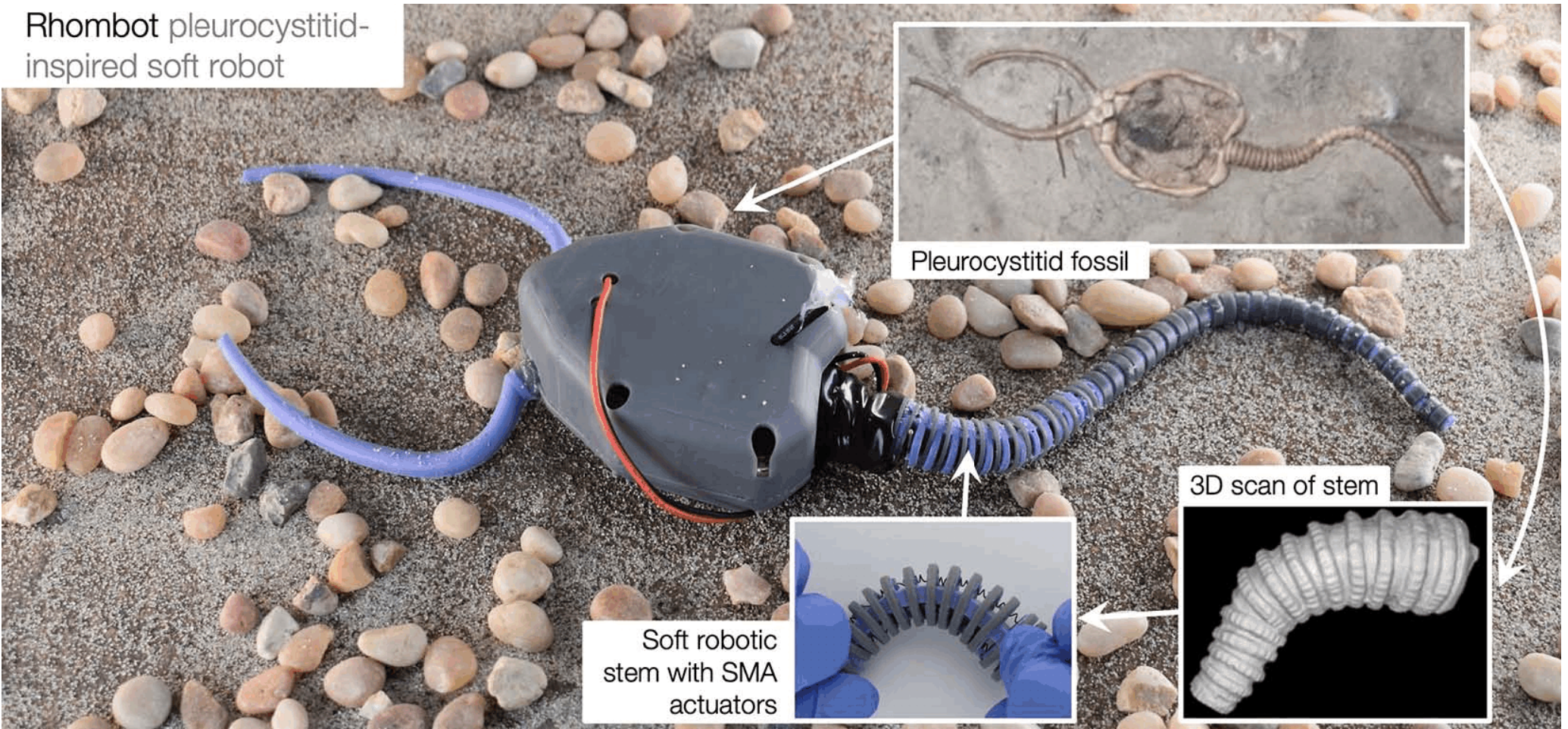
*Here, we develop a biomimetic soft robot testbed with accompanying computational simulation to understand fundamental principles of locomotion in one of the most enigmatic mobile groups of early stalked echinoderms, pleurocystitids.*

*We show that these Paleozoic echinoderms were likely able to move over the sea bottom by means of a muscular stem that pushed the animal forward (anteriorly).*

*We also demonstrate that wide, sweeping gaits could have been the most effective for these echinoderms and that increasing stem length might have significantly increased velocity with minimal additional energy cost.*

*The overall approach followed here, which we call Paleobionics, is a nascent but rapidly developing research agenda in which robots are designed based on extinct organisms to generate insights in engineering and evolution.*

[Images are from this paper.]

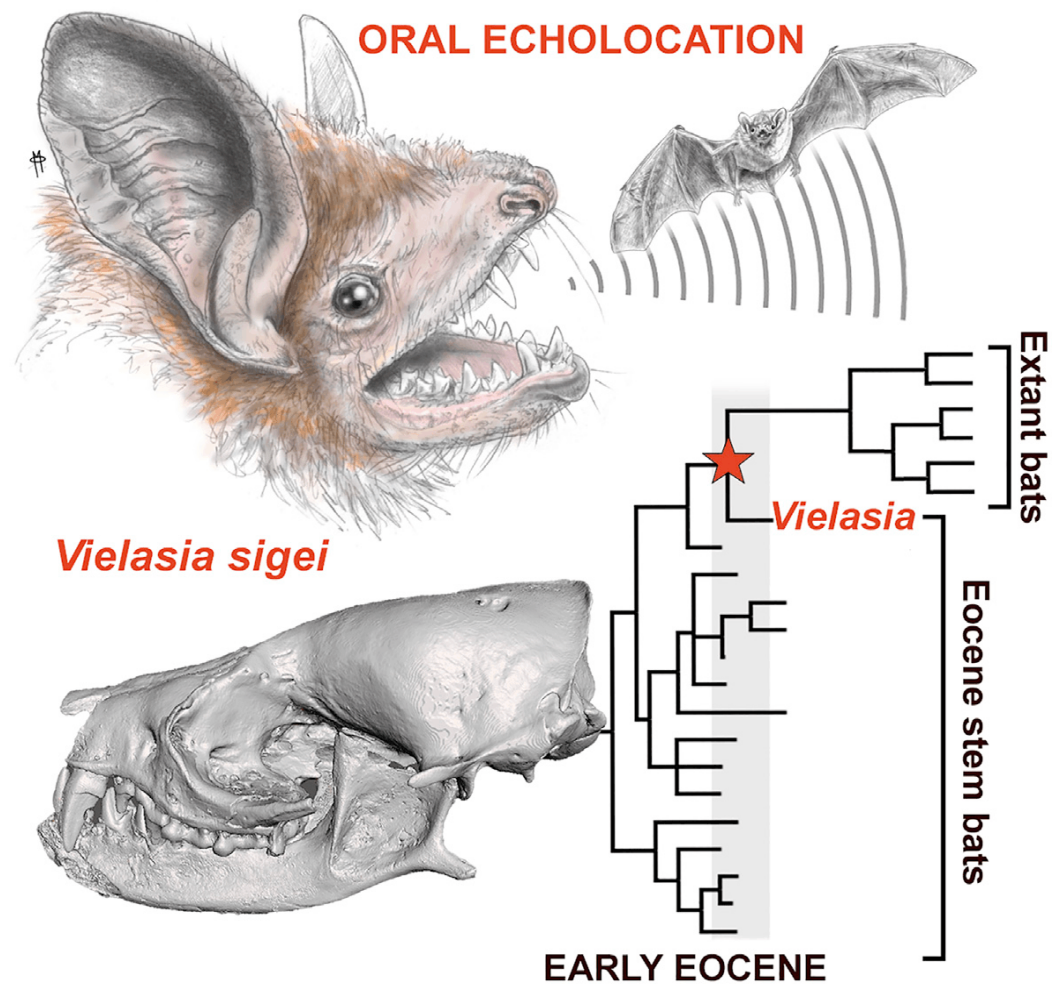




Hand, S.J., et al (2023) **A 50-million-year-old, three-dimensionally preserved bat skull supports an early origin for modern echolocation.** CURRENT BIOLOGY 33:doi.org/10.1016/j.cub.2023.09.043 (available as a free pdf)

Authors’ abstract: *Here, we describe a new early Eocene bat that helps bridge the gap between archaic stem bats and the hyperdiverse modern bat radiation of more than 1,460 living species.*

*Recovered from 50 million-year-old cave sediments in the Quercy Phosphorites of southwestern France, **Vielasia sigei**’s remains include a near-complete, three-dimensionally preserved skull, the oldest uncrushed bat cranium yet found.*



*Phylogenetic analyses of a 2,665 craniodental character matrix, with and without 36.8 kb of DNA sequence data, place **Vielasia** outside modern bats, with total evidence tip-dating placing it sister to the crown clade.*

***Vielasia** retains the archaic dentition and skeletal features typical of early Eocene bats, but its inner ear shows specializations found in modern echolocating bats.*

*These features, which include a petrosal only loosely attached to the basicranium, an expanded cochlea representing 25% basicranial width, and a long basilar membrane, collectively suggest that the kind of laryngeal echolocation used by most modern bats predates the crown radiation.*

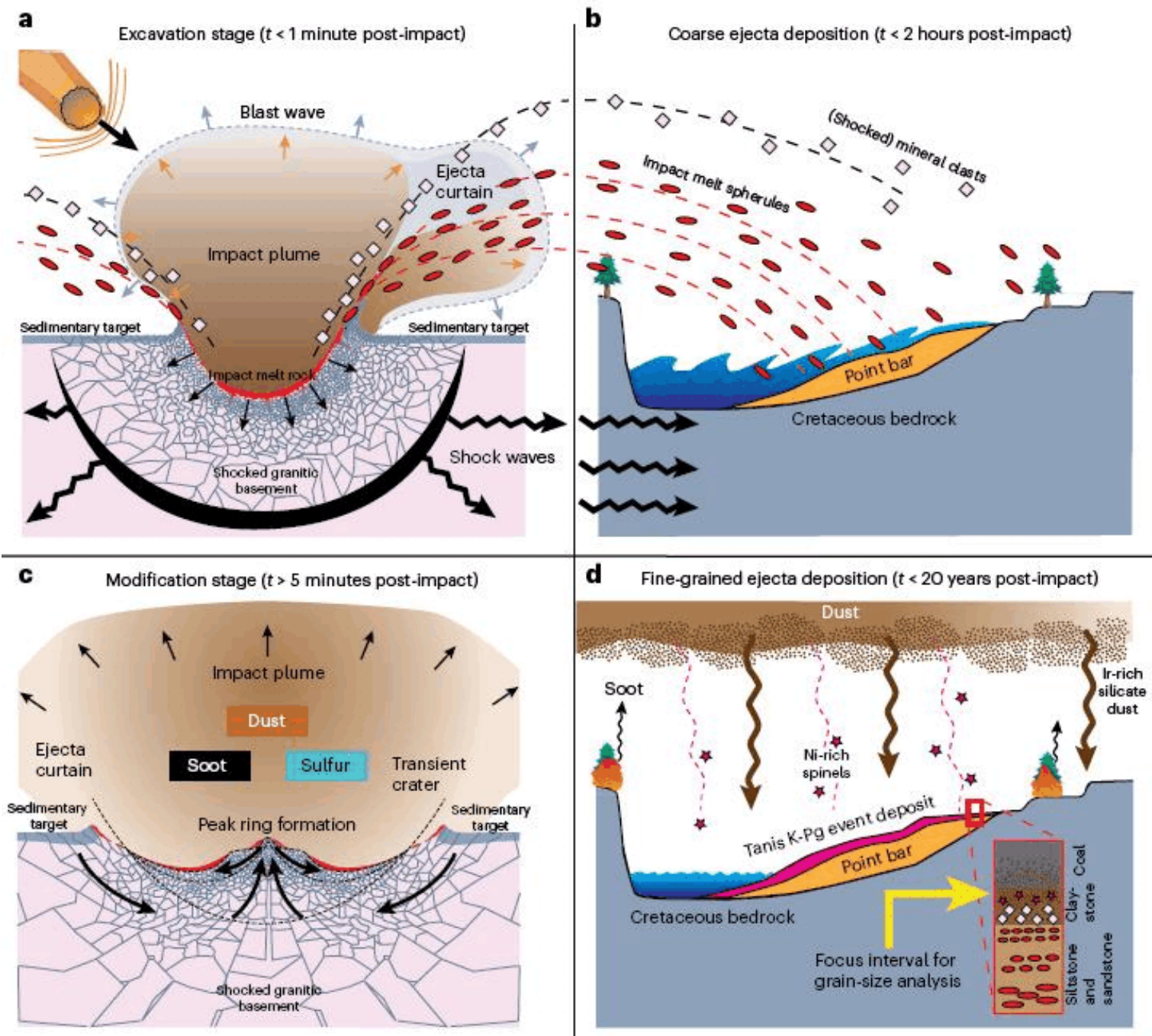
*At least 23 individuals of **V. sigei** are preserved together in a limestone cave deposit, indicating that cave roosting behavior had evolved in bats by the end of the early Eocene. This period saw the beginning of significant global climate cooling that may have been an evolutionary driver for bats to first congregate in caves.*

[Images are from this paper.]

**Extinctions.**

Senel, C.B., et al (2023) **Chicxulub impact winter sustained by fine silicate dust.** NATURE GEOSCIENCE 16doi.org/10.1038/s41561-Article 1-023-01290-4 (available as a free pdf)

Authors’ abstract: *The Chicxulub impact is thought to have triggered a global winter at the Cretaceous-Palaeogene (K-Pg) boundary 66 million years ago. Yet the climatic consequences of the various debris injected into the atmosphere following the Chicxulub impact remain unclear, and the exact killing mechanisms of the K-Pg mass extinction remain poorly constrained.*



*Here we present palaeoclimate simulations based on sedimentological constraints from an expanded terrestrial K-Pg boundary deposit in North Dakota, United States, to evaluate the relative and combined effects of impact-generated silicate dust and sulfur, as well as soot from wildfires, on the post-impact climate.*

*The measured volumetric size distribution of silicate dust suggests a larger contribution of fine dust than previously appreciated.*

*Our simulations of the atmospheric injection of such a plume of micrometre-sized silicate dust suggest a long atmospheric lifetime of 15 years, contributing to a global-average surface temperature falling by as much as 15°C.*

*Simulated changes in photosynthetic active solar radiation support a dust-induced photosynthetic shut-down for almost 2 years post-impact.*

*We suggest that, together with additional cooling contributions from soot and sulfur, this is*



consistent with the catastrophic collapse of primary productivity in the aftermath of the Chicxulub impact.

[Images are from this paper.]

Villegas-Martin, J., et al (2023) **Inferring the behaviour of predatory gastropods and their ostracod prey across the Cretaceous-Palaeogene boundary.** ZOOLOGICAL JOURNAL OF THE LINNEAN SOCIETY 199:doi.org/10.1093/zoolinnean/zlad054

[The Maastrichtian was the last stage of the Cretaceous before the asteroid hit. The Danian was the first stage of the Paleocene as Earth recovered from the impact.]

Authors' abstract: *Predator-prey dynamics involving ostracod prey across the Cretaceous-Palaeogene (K-Pg) extinction event have not been evaluated rigorously. We studied 3,146 Maastrichtian and Danian ostracod specimens from a section in eastern Brazil across the K-Pg boundary.*

*The Maastrichtian assemblage level predation intensity (2.7%) is lower than in the Danian (4.7%). However, the drilling intensity in assemblages immediately above the K-Pg boundary is 0%, perhaps due to abrupt palaeoecological and palaeoenvironmental changes resulting from the K-Pg event.*

*Drilling intensities for smooth specimens are significantly greater than for ornamented specimens for the Maastrichtian and the Danian.*

*Finally, Danian drill-hole diameters and predator-prey size ratios are statistically larger than in the Maastrichtian, suggesting predatory gastropods were larger after the boundary, also relative to their prey. We conclude that predator-prey dynamics were affected by the K-Pg extinction event.*

Claytor, J.R., et al (2023) **New mammalian local faunas from the first ca. 80 ka of the Paleocene in northeastern Montana and a revised model of biotic recovery from the Cretaceous-Paleogene mass extinction.** JOURNAL OF VERTEBRATE PALEONTOLOGY 42:doi.org/10.1080/02724634.2023.2222777

[A clade is a line of evolutionary descent. After the asteroid took out the dinosaurs, mammals survived, but not all of their clades made it.]

Authors' abstract: *The earliest phases of mammalian recovery following the Cretaceous-Paleogene (K-Pg) mass extinction are incompletely known but crucial to understanding the development of modern terrestrial ecosystems.*

*Here we report new mammalian faunal data from three vertebrate microfossil assemblages in the Hell Creek region of northeastern Montana, the deposition of which we constrain to within the first 28 to 80 kiloyears of the Paleocene using new stratigraphic observations within a high-resolution chronostratigraphic framework.*

*We quantified the taxonomic diversity among these three assemblages and five other assemblages from both the Hell Creek region and Denver Basin, together spanning the first ca. 300 kiloyears post-K-Pg mass extinction.*

*Our results allowed us to sub-divide the established 'disaster' and 'recovery' phases of recovery into the following sub-phases:*

*(i) early disaster, characterized by the presence of 'dead clades walking,' high relative abundance of bloom taxa, and the appearance of post-mass-extinction immigrants,*

*(ii) late disaster, characterized by a reduction in the number of 'dead clades walking,' continued high relative abundance of bloom taxa, and a more diverse assemblage of immigrants,*

*(iii) early recovery, characterized by decreased relative abundance of bloom taxa, and continued immigration, and*

*(iv) late recovery, characterized by the onset of in situ diversification.*

*We note important differences in the pattern and timing of mammalian faunal succession between the Hell Creek and Denver Basin, suggesting that post-K-Pg mammalian recovery was spatially heterogeneous.*

*Our results provided a new model for post-K-Pg mammalian biotic recovery that can now be tested with other earliest Paleocene assemblages across western North America.*

Rust, K., et al (2023) **Phylogeny and paleobiogeography of the enigmatic North American primate *Ekgmowechashala* illuminated by new fossils from Nebraska (USA) and Guangxi Zhuang Autonomous Region (China).** JOURNAL OF HUMAN EVOLUTION 184:doi.org/10.1016/j.jhevol.2023.103452 (available as a free pdf)

[*Ekgmowechashala* was the last known primate in North America.]

Authors' abstract: *Here, we describe the oldest known fossils of *Ekgmowechashala* from the Brown Siltstone Beds of the Brule Formation, White River Group of western Nebraska. We also describe a new *ekgmowechashalina* taxon from the Nadu Formation (late Eocene) in the Baise Basin of Guangxi Zhuang Autonomous Region in southern China.*

*Phylogenetic analysis suggests that North American *Ekgmowechashala* and the new Chinese taxon are sister taxa that are nested within a radiation of southern Asian adapiforms that also includes *Gatanthropus*, *Muangthanhinus*, and *Bugtilemur*.*

*The new Chinese *ekgmowechashalina* helps fill the considerable disparity in dental morphology between *Ekgmowechashala* and more primitive *ekgmowechashalids* known from southern Asia.*

*Our study underscores the fundamental role of southern Asia as a refugium for multiple primate clades during the cooler and drier climatic regime that prevailed after the Eocene–Oligocene transition.*

*The colonization of North America by *Ekgmowechashala* helps define the beginning of the Arikareean Land Mammal Age and corresponds to an example of the Lazarus effect, whereby a taxon (in this case, the order Primates) reappears suddenly in the fossil record after a lengthy hiatus.*

*The first primates (or euprimates) appear virtually simultaneously in the fossil records of Asia, Europe, and North America in the earliest Eocene, about 56 megayears ago.*

*The nearly Holarctic distribution of primates during the Eocene reflects the greenhouse conditions prevailing at that time, which facilitated the expansion of semitropical environments across high latitudes.*

*However, by the early Oligocene (~34 megayears ago), adapiform and omomyiform primates disappear from the fossil records of North America and Europe north of the Iberian Peninsula.*

*Rapid cooling and drying at the Eocene-Oligocene boundary contributed to the extirpation of adapiforms and omomyiforms in North America and Europe, as the expansion of polar ice sheets and deteriorating climatic conditions at lower latitudes caused semitropical forests to be replaced by open woodland and savannah-like habitats.*

*Following their extirpation in North America, primates were absent from the fossil record of that continent for roughly 4.5 megayears until the sudden appearance of the enigmatic taxon *Ekgmowechashala* during the earliest Arikareean (~29.5 megayears).*

## Dinosaurs.

Joubarne, T., et al (2023) **Integumentary impressions on hadrosaurid specimens from the Upper Cretaceous (Upper Campanian) Dinosaur Park Formation, Alberta, Canada: Implications for integument patterns and hand morphology.** JOURNAL OF VERTEBRATE PALEONTOLOGY 42:doi.org/10.1080/02724634.2023.2213287

[See also OPUNTIA #546, pages 8 to 11, for this team's initial report at the 2023 Alberta Palaeontological Society convention, with photos of the fieldwork.]

Authors' abstract: *Fossilized dinosaur skin provides information about scale morphology, scale patterns, and soft-tissue structures that are otherwise unknown from skeletal elements.*

Here, we describe three indeterminate hadrosaurid specimens with extensive skin impressions from the Upper Cretaceous (upper Campanian) Dinosaur Park Formation of Alberta that shed light on the diversity of integument patterns and manus soft-tissue morphology within Hadrosauridae.

Skin impressions on the anterior torso of a juvenile hadrosaurid reveal a scale pattern of alternating vertical bands of small polygonal and pebbly basement scales. If these scale stripes corresponded to color stripes in life then this hadrosaur species may have preferred open habitats, as modern animals with vertical color stripes often live in such habitats.

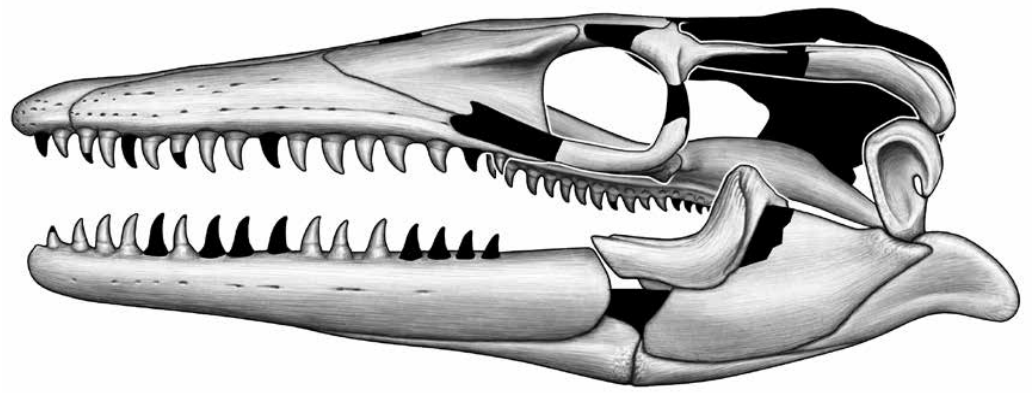
Integument preserved on the manus of two other specimens show that digits II–III–IV were of subequal length and united in a common fleshy structure, as opposed to those previously described from exceptionally preserved *Edmontosaurus annectens* mummies, in which digit II is apparently shorter and independent from digits III–IV.

As such, the diversity of soft-tissue morphology in the manus within Hadrosauridae may be greater than previously realized.

Zietlow, A.R., et al (2023) ***Jormungandr walhallaensis*: A new mosasaurine (Squamata: Mosasauroidae) from the Pierre Shale Formation (Pembina Member: Middle Campanian) of North Dakota.** BULLETIN OF THE AMERICAN MUSEUM OF NATURAL HISTORY 464:1-82 (available as a free pdf)

Authors’ abstract: Mosasaurs are large, carnivorous aquatic lizards with a global distribution that lived during the Late Cretaceous. After 200 years of scientific study, new mosasaur species are still being discovered as new localities are explored and specimens collected long ago are reevaluated using modern standards of species delimitation.

Even so, the phylogenetic positions of many key taxa are unresolved and therefore our understanding of mosasaur macroevolution is muddled. Here, we describe a new genus and species of mosasaurine mosasaur comprising a partial skull and skeleton from the Pembina Member of the Pierre Shale Formation in Cavalier County, North Dakota.



The lower bound on the age of the specimen is  $80.04 \pm 0.11$  megayears, provided by the underlying bentonite bed. Its skull and jaws are nearly complete, and the postcranial skeleton preserves seven cervical vertebrae with three hypapophyseal peduncles, 11 ribs, and five anterior dorsal vertebrae.

The new specimen was scored into a modified version of an existing phylogenetic matrix of Mosasauroidae and was recovered in a polytomy with *Clidastes*; however, given that its morphology is significantly different from that of *Clidastes*, we refer it to a new genus and species, *Jormungandr walhallaensis*.

Notably, this new taxon shares a mosaic of features seen in both basal (e.g., *Clidastes*; high dental counts) and derived (e.g., *Mosasaurus*; subrectangular quadrate) mosasaurines, in addition to possessing its own unique suite of autapomorphies.

Given that it possesses morphology intermediate between *Clidastes* and *Plotosaurini*, we suspect that future analyses of mosasaur phylogeny, following the addition of new characters and taxa, will recover *Jormungandr* as transitional between them.

Etymology: The specific epithet is named after Walhalla, North Dakota, near which the holotype and only specimen was found. In Norse mythology, the sea serpent *Jormungandr*, also referred to as the World Serpent, is the second child of god Loki and giantess *Angrboða*.



*The god Óðinn is said to have thrown Jormungandr into the ocean, where he grew until he was large enough to encircle Earth by grasping his tail in his jaws.*

*Jormungandr releasing his tail heralds the coming of Ragnarok, the death of the gods followed by destruction and rebirth of the world as it is submerged in water.*

*We chose Jormungandr as the generic name due to the origin of Walhalla from Norse Valholl (Valhalla); Valholl is the great hall of Óðinn occupied by warriors slain in combat who rise again to participate in the battles catalyzed by Ragnarok.*

[Image is from this paper.]

**Zoology.**

Lemoine, S.R.T., et al (2023) **Chimpanzees make tactical use of high elevation in territorial contexts.** PLOS BIOLOGY 21:doi.org/10.1371/journal.pbio.3002350 (available as a free pdf)

Authors’ abstract: *Tactical warfare is considered a driver of the evolution of human cognition. One such tactic, considered unique to humans, is collective use of high elevation in territorial conflicts. This enables early detection of rivals and low-risk maneuvers, based on information gathered. Whether other animals use such tactics is unknown.*

*With a unique dataset of 3 years of simultaneous behavioral and ranging data on 2 neighboring groups of western chimpanzees, from the Taï National Park, Cote d’Ivoire, we tested whether chimpanzees make decisions consistent with tactical use of topography to gain an advantage over rivals.*

*We show that chimpanzees are more likely to use high hills when traveling to, rather than away from, the border where conflict typically takes place. Once on border hills, chimpanzees favor activities that facilitate information gathering about rivals.*

*Upon leaving hills, movement decisions conformed with lowest risk engagement, indicating that higher elevation facilitates the detection of rivals presence or*

*absence. Our results support the idea that elevation use facilitated rival information gathering and appropriate tactical maneuvers.*

*Landscape use during territorial maneuvers in natural contexts suggests chimpanzees seek otherwise inaccessible information to adjust their behavior and points to the use of sophisticated cognitive abilities, commensurate with selection for cognition in species where individuals gain benefits from coordinated territorial defense.*

*First, chimpanzees were more likely to climb hills (i) while traveling towards the territory border rather than towards its center; and (ii) if they had not already climbed hills during the current travel event to the territory border.*

*Second, at high elevation, chimpanzees were more likely to engage in resting, an activity suitable for detecting distant chimpanzee-related sounds, rather than engaging in noisier activities that impede listening (feeding or traveling).*

*A key finding is that resting was more likely at high elevation in the border than at similarly high elevation in the territory center, suggesting that resting was not related to other hill top-related factors, such as recovering from the climb or using sunny spots. This reflects a modulation of the activity as function of both the elevation and the risk inherent to the peripheral location.*

*Third, we determined that chimpanzees use information gathered on hill tops to inform subsequent travel decisions when in border areas. Specifically, high elevation provides a tactical advantage in assessing intercommunity distances, but not rival numbers.*

**Botany.**

Brooks, C.J., et al (2023) **Multiple light signaling pathways control solar tracking in sunflowers.** PLOS BIOLOGY 21:doi.org/10.1371/journal.pbio.3002344 (available as a free pdf)

Authors’ abstract: *Sunflowers are famous for their ability to track the sun throughout the day and then reorient at night to face east the following morning. This occurs by differential growth patterns, with the east sides of stems growing more during the day and the west sides of stems growing more at night.*

*This process, termed heliotropism, is generally believed to be a specialized form of phototropism; however, the underlying mechanism is unknown. To better understand heliotropism, we compared gene expression patterns in plants undergoing phototropism in a controlled environment and in plants initiating and maintaining heliotropic growth in the field.*

*We found the expected transcriptome signatures of phototropin-mediated phototropism in sunflower stems bending towards monochromatic blue light. Surprisingly, the expression patterns of these phototropism-regulated genes are quite different in heliotropic plants.*

*Most genes rapidly induced during phototropism display only minor differences in expression across solar tracking stems.*

*However, some genes that are both rapidly induced during phototropism and are implicated in growth responses to foliar shade are rapidly induced on the west sides of stems at the onset of heliotropism, suggesting a possible role for red light photoreceptors in solar tracking.*

*To test the involvement of different photoreceptor signaling pathways in heliotropism, we modulated the light environment of plants initiating solar tracking.*

*We found that depletion of either red and far-red light or blue light did not hinder the initiation or maintenance of heliotropism in the field. Together, our results suggest that the transcriptional regulation of heliotropism is distinct from phototropin-mediated phototropism and likely involves inputs from multiple light signaling pathways.*

**Geology.**

Simister, R.L., et al (2023) **DNA sequencing, microbial indicators, and the discovery of buried kimberlites.** COMMUNICATIONS EARTH AND ENVIRONMENT 4:doi.org/10.1038/s43247-023-01020-z (available as a free pdf)

[Diamonds are found in kimberlite, but many of those deposits are deep below the surface.]

Authors’ abstract: *Population growth and technological advancements are placing growing demand on mineral resources. New and innovative exploration technologies that improve detection of deeply buried mineralization and host rocks are required to meet these demands.*

*Here we used diamondiferous kimberlite ore bodies as a test case and show that DNA amplicon sequencing of soil microbial communities resolves anomalies in microbial community composition and structure that reflect the surface expression of kimberlites buried under tens of meters of overburden.*

*Indicator species derived from laboratory amendment experiments were employed in an exploration survey in which the species distributions effectively delineated the surface expression of buried kimberlites.*

*Additional indicator species derived directly from field observations improved the blind discovery of kimberlites buried beneath similar overburden types.*

*Application of DNA sequence-based analyses of soil microbial communities to mineral deposit exploration provides a powerful illustration of how genomics technologies can be leveraged in the discovery of critical new resources.*

Jamieson, S.S.R., et al (2023) **An ancient river landscape preserved beneath the East Antarctic Ice Sheet.** NATURE COMMUNICATIONS 14:doi.org/10.1038/s41467-023-42152-2 (available as a free pdf)

Authors’ abstract: *The East Antarctic Ice Sheet (EAIS) has its origins ca. 34 million years ago. Since then, the impact of climate change and past fluctuations in the EAIS margin has been reflected in periods of extensive vs. restricted ice cover and the modification of much of the Antarctic landscape.*

*Resolving processes of landscape evolution is therefore critical for establishing ice sheet history, but it is rare to find unmodified landscapes that record past ice conditions. Here, we discover an extensive relic pre-glacial landscape preserved beneath the central EAIS despite millions of years of ice cover.*

*The landscape was formed by rivers prior to ice sheet build-up but later modified by local glaciation before being dissected by outlet glaciers at the margin of a restricted ice sheet.*

*Preservation of the relic surfaces indicates an absence of significant warm-based ice throughout their history, suggesting any transitions between restricted and expanded ice were rapid.*

*The glaciation of Antarctica was triggered by global climatic cooling over the Cenozoic Era. During the Eocene, glaciation was likely restricted to ephemeral ice masses and small-scale mountain glaciers in regions of high topography.*

*However, a step-change in ice extent and volume occurred at the Eocene-Oligocene transition (EOT; ca. 34.0 to 33.5 megayears ago) when the first widespread Antarctic glaciation was recorded in marine sediment records.*

*This transition to a glaciated Antarctica was potentially caused by a combination of CO2 dropping below a key threshold, associated feedbacks within the carbon cycle, and the opening/deepening of circum-Antarctic ocean gateways.*

*In East Antarctica, the ice sheet likely nucleated on the high topography of the Gamburtsev Subglacial Mountains, Transantarctic Mountains, and Dronning Maud Land. Expansion and coalescence of independent ice masses on these highlands led to the growth of the continental-scale EAIS.*

**Environmental Science.**

Murphy, D.M., et al (2023) **Metals from spacecraft reentry in stratospheric aerosol particles.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 120:doi.org/10.1073/pnas.2313374120 (available as a free pdf)

Authors’ abstract: *Large increases in the number of low earth orbit satellites are projected in the coming decades with perhaps 50,000 additional satellites in orbit by 2030.*

*When spent rocket bodies and defunct satellites reenter the atmosphere, they produce metal vapors that condense into aerosol particles that descend into the stratosphere. So far, models of spacecraft reentry have focused on understanding the hazard presented by objects that survive to the surface rather than on the fate of the metals that vaporize.*

*Here, we show that metals that vaporized during spacecraft reentries can be clearly measured in stratospheric sulfuric acid particles. Over 20 elements from reentry were detected and were present in ratios consistent with alloys used in spacecraft.*

*The mass of lithium, aluminum, copper, and lead from the reentry of spacecraft was found to exceed the cosmic dust influx of those metals. About 10% of stratospheric sulfuric acid particles larger than 120 nm in diameter contain aluminum and other elements from spacecraft reentry.*

*Planned increases in the number of low earth orbit satellites within the next few decades could cause up to half of stratospheric sulfuric acid particles to contain metals from reentry. The influence of this level of metallic content on the properties of stratospheric aerosol is unknown.*

Cohen, J., et al (2023) **No detectable trend in mid-latitude cold extremes during the recent period of Arctic amplification.** COMMUNICATIONS EARTH AND ENVIRONMENT 4:doi.org/10.1038/s43247-023-01008-9 (available as a free pdf)

Authors’ abstract: *It is widely accepted that Arctic amplification, accelerated Arctic warming, will increasingly moderate cold air outbreaks to the mid-latitudes. Yet, an increasing number of recent studies also argue that Arctic amplification can contribute to more severe winter weather.*

*Here we show that the temperature of cold extremes across the United States east of the Rockies, Northeast Asia and Europe have remained nearly constant over recent decades, in clear contrast to a robust Arctic warming trend.*

*Analysis of trends in the frequency and magnitude of cold extremes is mixed across the US and Asia but with a clearer decreasing trend in occurrence across Europe, especially Southern Europe.*

*This divergence between robust Arctic warming and no detectable trends in mid-latitude cold extremes highlights the need for a better understanding of the physical links between Arctic amplification and mid-latitude cold extremes.*



Sutherland, B.R., et al (2023) **Suspended clay and surfactants enhance buoyant microplastic settling.** COMMUNICATIONS EARTH AND ENVIRONMENT 4:doi.org/10.1038/s43247-023-01055-2 (available as a free pdf)

Authors' abstract: *Most of the plastic waste that enters rivers and the oceans is unaccounted for. Approximately half of the world's produced plastics are buoyant in water, meaning that processes must take place that effectively increase their density, causing them to settle out of solution.*

*One such mechanism is biofouling, in which organic matter grows on the surface of plastics, making them denser. Here we present a new mechanism supported by laboratory experiments for buoyant plastic settling in which particles of clay adhere to the surface of the plastic, mediated by the presence of surfactants.*

*Although the plastic particles in our experiments were a hundred times larger than the micrometer-sized clay particles, we show that clay can adhere to the plastic with sufficient mass to cause the plastic to sink.*

*This occurs even though the plastic is electrically neutral. It is hypothesized that the hydrophobic tails of the surfactant molecules are attracted to the plastic while the hydrophilic heads attract the clay.*

*A greater fraction of plastic sinks if the surfactant concentration is larger. Our findings suggest that microplastic settling is enhanced in muddy rivers due to interactions with naturally occurring or discharged surfactants, even in the absence of biofouling.*

Kaushal, S.S., et al (2023) **The anthropogenic salt cycle.** NATURE REVIEWS EARTH AND ENVIRONMENT 4:770-784

Authors' abstract: *Increasing salt production and use is shifting the natural balances of salt ions across Earth systems, causing interrelated effects across biophysical systems collectively known as freshwater salinization syndrome.*

*In this review, we conceptualize the natural salt cycle and synthesize increasing global trends of salt production and riverine salt concentrations and fluxes.*

*The natural salt cycle is primarily driven by relatively slow geologic and hydrologic processes that bring different salts to the surface of the Earth. Anthropogenic activities have accelerated the processes, timescales and magnitudes of salt fluxes and altered their directionality, creating an anthropogenic salt cycle.*

*Global salt production has increased rapidly over the past century for different salts, with approximately 300 megatonnes of NaCl produced per year. A salt budget for the USA suggests that salt fluxes in rivers can be within similar orders of magnitude as anthropogenic salt fluxes, and there can be substantial accumulation of salt in watersheds.*

*Excess salt propagates along the anthropogenic salt cycle, causing freshwater salinization syndrome to extend beyond freshwater supplies and affect food and energy production, air quality, human health and infrastructure.*

*There is a need to identify environmental limits and thresholds for salt ions and reduce salinization before planetary boundaries are exceeded, causing serious or irreversible damage across Earth systems.*

Zanette, L.Y., et al (2023) **Fear of the human “super predator” pervades the South African savanna.** CURRENT BIOLOGY 33:doi.org/10.1016/j.cub.2023.08.089 (available as a free pdf)

Authors' abstract: *Lions have long been perceived as Africa's, if not the world's, most fearsome terrestrial predator, the ‘king of beasts’. Wildlife's fear of humans may, however, be far more powerful and all-prevailing as recent global surveys show that humans kill prey at much higher rates than other predators, due partly to technologies such as hunting with dogs or guns.*

*We comprehensively experimentally tested whether wildlife's fear of humans exceeds even that of lions, by quantifying fear responses in the majority of carnivore and ungulate species (n = 19) inhabiting South Africa's Greater Kruger National Park (GKNP), using automated camera-speaker systems at waterholes during the dry season that broadcast playbacks of humans, lions, hunting sounds (dogs, gunshots) or non-predator controls (birds).*

*Fear of humans significantly exceeded that of lions throughout the savanna mammal community. As a whole (n = 4,238 independent trials), wildlife were*

*twice as likely to run and abandoned waterholes in 40% faster time in response to humans than to lions (or hunting sounds).*

*Fully 95% of species ran more from humans than lions (significantly in giraffes, leopards, hyenas, zebras, kudu, warthog, and impala) or abandoned waterholes faster (significantly in rhinoceroses and elephants).*

*Our results greatly strengthen the growing experimental evidence that wildlife worldwide fear the human “super predator” far more than other predators, and the very substantial fear of humans demonstrated can be expected to cause considerable ecological impacts, presenting challenges for tourism-dependent conservation, particularly in Africa, while providing new opportunities to protect some species.*

**Human Prehistory.**

Mussi, M., et al (2023) **Early *Homo erectus* lived at high altitudes and produced both Oldowan and Acheulean tools.** SCIENCE 382:doi.org/10.1126/science.add9115

*Authors’ abstract: In Africa, the scarcity of hominin remains found in direct association with stone tools has hindered attempts to link *Homo habilis* and *Homo erectus* with particular lithic industries. The infant mandible discovered in level E at Garba IV (Melka Kunture) on the highlands of Ethiopia is critical to this issue because of its direct association with an Oldowan lithic industry.*

*Here, we used synchrotron imaging to examine the internal morphology of the unerupted permanent dentition and confirmed its identification as *H. erectus*. Additionally, we used revised paleomagnetic ages to show that*

- (i) the mandible in level E is ~2 million years old and represents one of the earliest *H. erectus* fossils and that*
- (ii) overlying level D, ~1.95 million years old, contains the earliest known Acheulean assemblage.*

*This fossil is dated to 2 million years ago, and it is associated with both Oldowan and Early Acheulean tools, confirming that *H. erectus* used both types. This finding also reveals the use of high-elevation environments in this species, providing insight about the movement of hominins out of Africa.*

Coppe, J., et al (2023) **Terminal ballistic analysis of impact fractures reveals the use of spearthrower 31 ky ago at Maisières Canal, Belgium.** SCIENTIFIC REPORTS 13:doi.org/10.1038/s41598-023-45554-w

*Authors’ abstract: The emergence of hunting technology in the deep past fundamentally shaped the subsistence strategies of early human populations. Hence knowing when different weapons were first introduced is important for understanding our evolutionary trajectory.*

*The timing of the adoption of long-range weaponry remains heavily debated because preserved organic weapon components are extremely rare in the Paleolithic record and stone points are difficult to attribute reliably to weapon delivery methods without supporting organic evidence.*

*Here, we use a refined use-wear approach to demonstrate that spearthrower was used for launching projectiles armed with tanged flint points at Maisières-Canal (Belgium) 31,000 years ago. The novelty of our approach lies in the combination of impact fracture data with terminal ballistic analysis of the mechanical stress suffered by a stone armature on impact.*

*This stress is distinct for each weapon and visible archaeologically as fracture proportions on assemblage scale. Our reference dataset derives from a sequential experimental program that addressed individually each key parameter affecting fracture formation and successfully reproduced the archaeological fracture signal.*

*The close match between the archaeological sample and the experimental spearthrower set extends the timeline of spearthrower use by over 10,000 years and represents the earliest reliable trace-based evidence for the utilization of long-distance weaponry in prehistoric hunting.*

*Humans have been hunter-gatherers for most of our past, but we still lack knowledge about what our prehistoric ancestors gathered and how they hunted because of the near lack of organic preservation at Paleolithic sites.*

*Of these two modes of subsistence, hunting tends to be better visible archaeologically because it can leave behind durable stone and bone implements that once served as weapon components.*

*Four weapon systems, thrusting spears, thrown spears, the spearthrower, and the bow, are assumed to have existed in the Stone Age, but the timing of their invention and their possible co-existence remain debated.*

*Self-pointed wooden spears or their fragments have been found at Clacton-on-Sea, dated to around 400 kiloyears ago, and at Schöningen, dated to c. 300 kya.*

Lucquin, A., et al (2023) **The impact of farming on prehistoric culinary practices throughout Northern Europe.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 120:doi.org/10.1073/pnas.2310138120 (available as a free pdf)

*Authors’ abstract: To investigate changes in culinary practices associated with the arrival of farming, we analysed the organic residues of over 1,000 pottery vessels from hunter-gatherer-fisher and early agricultural sites across Northern Europe from the Lower Rhine Basin to the Northeastern Baltic.*

*Here, pottery was widely used by hunter-gatherer-fishers prior to the introduction of domesticated animals and plants.*

*Overall, there was surprising continuity in the way that hunter-gatherer-fishers and farmers used pottery. Both aquatic products and wild plants remained prevalent, a pattern repeated consistently across the study area.*

*We argue that the rapid adaptation of farming communities to exploit coastal and lagoonal resources facilitated their northerly expansion, and in some cases, hunting, gathering, and fishing became the most dominant subsistence strategy.*

*Nevertheless, dairy products frequently appear in pottery associated with the earliest farming groups often mixed with wild plants and fish. Interestingly, we also find compelling evidence of dairy products in hunter-gatherer-fisher Ertebølle pottery, which predates the arrival of domesticated animals.*

*We propose that Ertebølle hunter-gatherer-fishers frequently acquired dairy products through exchange with adjacent farming communities prior to the transition.*

*The continuity observed in pottery use across the transition to farming contrasts with the analysis of human remains which shows substantial demographic change through ancient DNA and, in some cases, a reduction in marine consumption through stable isotope analysis.*

*We postulate that farmers acquired the knowledge and skills they needed to succeed from local hunter-gatherer-fishers but without substantial admixture.*

Casana, J., et al (2023) **A wall or a road? A remote sensing-based investigation of fortifications on Rome’s eastern frontier.** ANTIQUITY 97doi.org/10.15184/aqy.2023.153 (available as a free pdf)

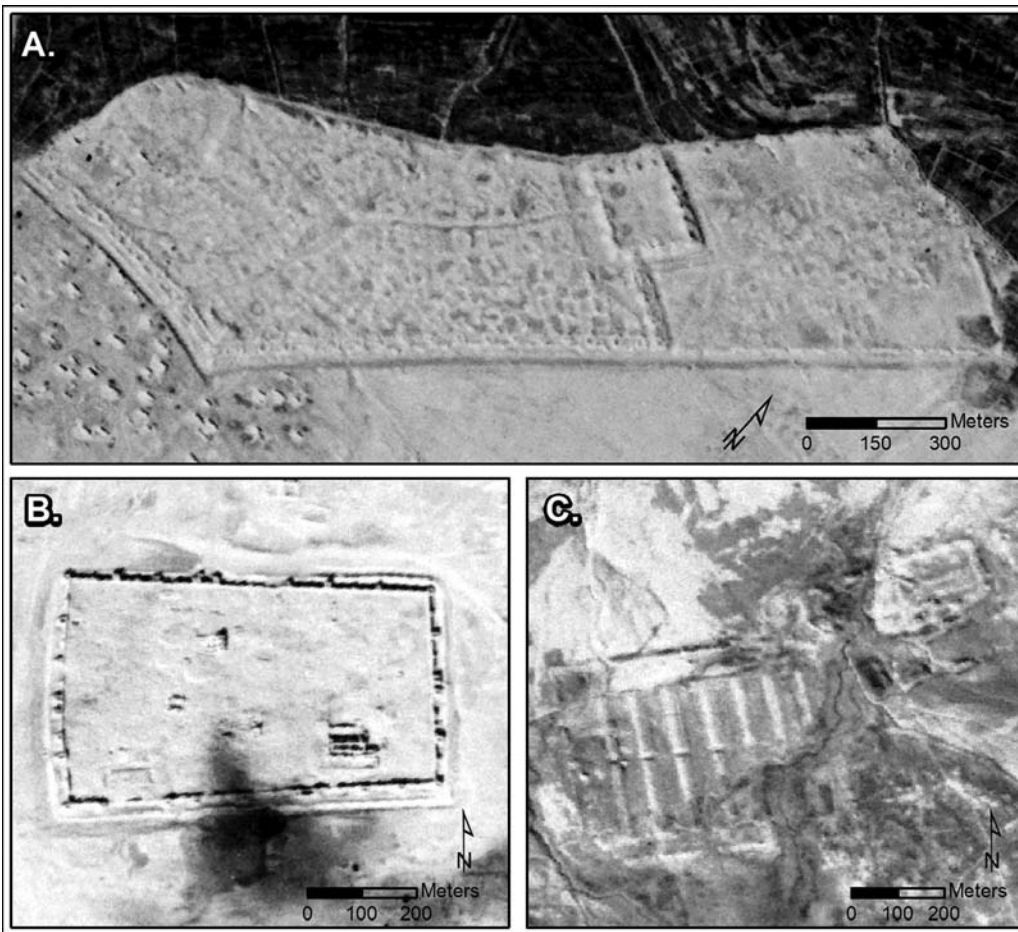
*Authors’ abstract: During a pioneering aerial survey of the Near East in the 1920s, Father Antoine Poidebard recorded hundreds of fortified military buildings that traced the eastern frontier of the Roman Empire. Based on their distribution, Poidebard proposed that these forts represented a line of defence against incursions from the east.*

*Utilising declassified images from the CORONA and HEXAGON spy satellite programmes, the authors report on the identification of a further 396 forts widely distributed across the northern Fertile Crescent.*

*The addition of these forts questions Poidebard’s defensive frontier thesis and suggests instead that the structures played a role in facilitating the movement of people and goods across the Syrian steppe.*

[Images on next page are from CORONA reconnaissance satellite and show outlines of ancient Roman forts.]





*Additional steps resulted in nonlinear risk reductions of all-cause mortality and incident CVD with an optimal dose at 8,763 and 7,126 steps/day, respectively. Increments from a low to an intermediate or a high cadence were independently associated with risk reductions of all-cause mortality.*

*Sex did not influence the dose response associations, but after stratification for assessment device and wear location, pronounced risk reductions were observed for hip-worn accelerometers compared with pedometers and wrist-worn accelerometers.*

Warren, J.R., and Gina Rumore (2023) **The association between playing professional American football and longevity.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 120:doi.org/10.1073/pnas.2308867120

*Authors' abstract: Recent research concludes that professional American football players live longer than American men in general, despite experiencing higher rates of chronic traumatic encephalopathy (CTE) and cardiovascular disease (CVD).*

*This suggests that the longevity-enhancing benefits of playing football (e.g., physical fitness, money) outweigh the costs associated with CTE, CVD, and other longevity detriments of playing football. However, these surprising results may be the consequence of flawed research design.*

*To investigate, we conducted two analyses. In analysis 1, we compared a) all professional American football players whose first season was 1986 or between 1988 and 1995 to b) a random sample of same-age American men observed as part of the National Health Interview Surveys in those same years selected on good health, at least 3 years of college, and not being poor.*

*The exposure consists of playing one or more games of professional football; the outcome is risk of death within 25 years.*

*In analysis 2, we use data on 1,365 men drafted to play in the (American) National Football League in the 1950s, 906 of whom ultimately played professional football, and 459 of whom never played a game in any professional league.*

## Modern Humans.

Stens, N.A., et al (2023) **Relationship of daily step counts to all-cause mortality and cardiovascular events.** JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY 82:doi.org/10.1016/j.jacc.2023.07.029 (available as a free pdf)

*Authors' abstract: In total, 111,309 individuals from 12 studies were included. Significant risk reductions were observed at 2,517 steps/day for all-cause mortality and 2,735 steps/day for incident cardiovascular disease (CVD) compared with 2,000 steps/day.*

*We estimate the association between playing football and survival through early 2023. In both analyses, we investigate differences between linemen and other position players. In contrast to most prior research, in both analyses, we find that linemen died earlier than otherwise similar men; men who played other positions died no earlier (or later).*

Krishnarajan, S., and J. Tolstrup (2023) **Pre-war experimental evidence that Putin’s propaganda elicited strong support for military invasion among Russians.** SCIENCE ADVANCES 9:doi.org/10.1126/sciadv.adg1199 (available as a free pdf)

Authors’ abstract: *In February 2022, Russia invaded Ukraine. The Putin regime used extensive and aggressive propaganda to win public support for the war. But can this propaganda really convince ordinary people?*

*Using the unique timing of a survey experiment fielded a year before the invasion, we provide the first experimental evidence of the effectiveness of this propaganda among Russian citizens.*

*Vignette treatments containing information on threats similar to stories running in Russian media around the time of the invasion in combination with statements from President Putin show that propaganda was highly effective.*

*Even mild treatments were enough to increase support for military aggression against neighboring countries among Russians from around 8 to 48% and up to 59% among Putin’s supporters.*

*Thus, the Russian president had good reason to believe that he could control popular opinion when he decided to launch a war against Ukraine.*

**Technology.**

Castelvecchi, Davida (2023) **NATURE retracts controversial superconductivity paper by embattled physicist.** NATURE 623:doi.org/10.1038/d41586-023-03398-4 (available as a free pdf)

Author’s extracts: *NATURE has retracted a controversial paper claiming the discovery of a superconductor, a material that carries electrical currents with*

*zero resistance, capable of operating at room temperature and relatively low pressure. The text of the retraction notice states that it was requested by eight co-authors.*

*“They have expressed the view as researchers who contributed to the work that the published paper does not accurately reflect the provenance of the investigated materials, the experimental measurements undertaken and the data-processing protocols applied”, it says, adding that these co-authors “have concluded that these issues undermine the integrity of the published paper”.*

*Superconductors are important in many applications, from magnetic resonance imaging machines to particle colliders, but their use has been limited by the need to keep them at extremely low temperatures. For decades, researchers have been developing new materials with the dream of finding one that exhibits superconductivity without any refrigeration.*

*Specialists in the field have been sceptical since this year’s Dias and Salamat paper was published, says Lilia Boeri, a physicist at the Sapienza University of Rome. This, she says, is in part because of controversies swirling around the team and in part because the latest paper was not written to what she considers a high standard.*

*“Virtually every serious condensed-matter physicist I know saw right away that there were serious problems with the work,” says Peter Armitage, an experimental physicist at Johns Hopkins University in Baltimore, Maryland.*

*In particular, members of the community took issue with measurements of the material’s electrical resistance, saying it was not clear whether the property truly dropped to zero, or whether Dias and Salamat had subtracted a background signal from a key plot of resistance to create the appearance that it did.*

*Critics say that it should not be necessary to remove background from this type of measurement. In today’s text, the journal stated, “An investigation by the journal and post-publication review have concluded that these concerns are credible, substantial and remain unresolved”.*