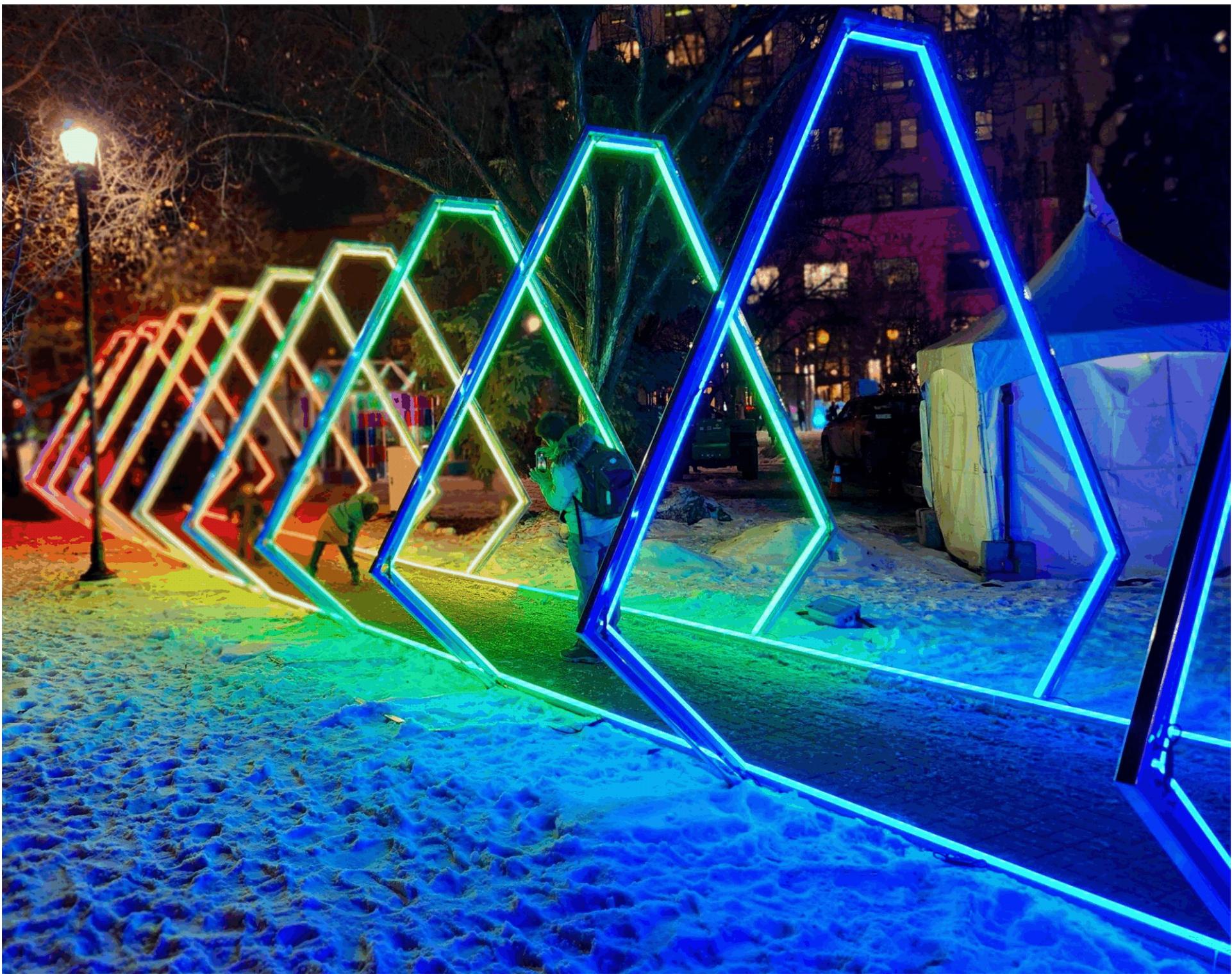


OPUNTIA 543



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

CHINOOK BLAST 2023

photos by Dale Speirs

[Reports of previous winter festivals appeared in OPUNTIA's #368, 436, 467, 495, 518, and 519.]

Calgary's annual winter festival was held during the first two weeks of February. We actually did get a chinook blast, as the warm winds arrived the day before and kept temperatures slightly above freezing. The installations and street performers were downtown, while many restaurants throughout the city used the occasion to bring in special performers and menus.



These two women were doing acrobatics on the Stephen Avenue pedestrian mall.



Olympic Plaza skating rink.



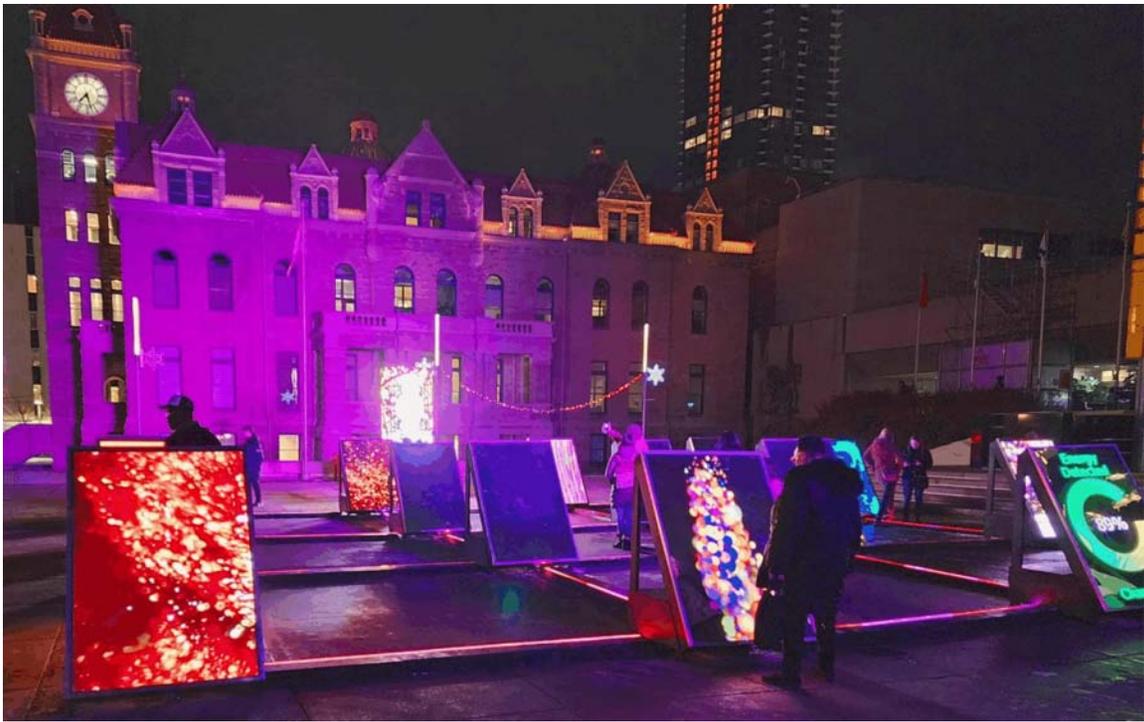
Installations on Olympic Plaza, also seen on the cover of this issue.



Below: Stilt walkers on the Olympic Plaza.

At right: Always a popular attraction at every street festival.





City Hall Plaza across the street from Olympic Plaza.





ON THE CUTTING EDGE OF TECHNOLOGY: PART 7

by Dale Speirs

[Parts 1 to 6 appeared in OPUNTIA #258, 346, 360, 404, 456, and 480.]

The ability to record sounds and moving images that can be played back decades later is a miraculous technology when you think about it. Old-time radio fans listen to 90-year-old shows. Phonograph disks allow you to get up and dance to a song that was a hit before your mother was born.

Performers who lived before acetate and vinyl disks, wire or tape recorders, and videotapes are long forgotten, no matter how great their talents may have been.

Novels.

LOW ACTION (2020) by Andrew Cartmel was the fifth volume in a series about the Vinyl Detective. His name was never mentioned. Assisted by his girlfriend Nevada, he earned his living dealing in rare vinyl records. I reviewed previous novels in this series in OPUNTIA #480.

The Vinyl Detective's latest client was retired rock musician Erik Make Loud, formerly Eric McCloud. His girlfriend was Howlin' Hellbitch, the former Helene Hilditch. She had played in an all-girl punk band The Blue Tits and was trying to find a rare pressing of their first album.

Of more pressing concern to her (pun intended) was that several attempts had been made on her life. She thought the Vinyl Detective could use the search for her record as a cover to investigate the threats to her.

Off the Vinyl Detective and Nevada went, collecting plot coupons. Along the way, they found a music fanzine publisher who only produced print copies and was not on the Internet. He specialized in scandals in the music world, so had a respectable subscriber list.

The other band members had their problems. The killer was the zinester's wife, who was jealous that he followed the lives of The Blue Tits so closely. She was very good at engineering accidents but frustrated because Hilditch had the luck of angels on her side and kept surviving the mishaps.

Gimme That Old Time Radio.

Shows mentioned here are available as free mp3s from www.otrr.org/OTRRLibrary

THE SHADOW, as the opening blurb put it, was in reality Lamont Cranston, wealthy young man about town. He had traveled to Tibet where he learned how to cloud minds so that people could not see him, only hear him.

The lovely Margo Lane was the only one who knew his real identity. Her main functions were to scream every time she saw a corpse, be frequently kidnapped or trapped with a killer, and to have the loose threads explained to her in the denouement. The series lasted until 1954.

Faking videos is nothing new. The technology existed by the 1930s. "The Phantom Voice" aired on 1938-02-06, no writer credited. The episode began with an honest politician (yes, yes, an oxymoron) on trial for taking a bribe.

The prosecutor Anthony Vogel was the corrupt man, ambitious and wanting the senator's job. He introduced perjured witnesses and faked hidden camera footage. The film had the senator's voice agreeing to take payment.

The Shadow investigated Vogel and his henchmen, and learned that the faked film was produced by a audiovideo technician Hugh Wilson, who was a good mimic. The race was on to reach Wilson first, one to kill him and the other to bring him over to the defence.

Initially it was a tie, but Vogel shot Wilson dead, bwah-ha!-ha!-ed at The Shadow, then fled. What he didn't know was that Wilson had a hidden recorder capturing the conversation and gunshots on a dictaphone disk.

Not only that, Wilson gasped a dying confession about the frame-up. The organist played a crescendo as Vogel went up in the river to sit in Old Sparky.

THE ADVENTURES OF SAM SPADE, based on the character created by Dashiell Hammett, aired from 1946 to 1951. It went off the air shortly after both Hammett and Howard Duff, the actor who played Sam Spade, were named as Communist sympathizers during the Red Scare.

Spade worked in San Francisco. His secretary was Effie Perrine, a scatterbrained young woman who took down his narration in the form of a report.

Each episode began with Spade telephoning Effie and telling her to rush down to the office to meet him there and transcribe a report on the case he had just solved. The report was a letter to a local police officer keeping him informed of criminal matters or occasionally addressed to the client.

“The Biddle Riddle Caper” aired on 1951-01-05 and was written by Harold Swanton. The client was Tracy Adams of Olympic Radio Productions. He was producing a series “Killer At Large”, which offered \$50,000 to listeners who could help solve a current or cold crime case.

The show was transcribed and relied heavily on tape recorders. Witnesses to crimes were interviewed separately and recorded, after which the announcer and music were added in and a master tape prepared.

The current episode concerned the murder three years prior of Carol Stevens, a burlesque queen. Spade was hired to locate Jimmy Biddle, who had been the doorman at the burlesque theatre. A prominent lawyer Joseph Norguard had given Biddle an alibi.

Norguard was irritated to see Spade, who was the fourth private detective to visit him. He said he was going to mimeograph his information as a booklet titled “*What I know about the Stevens case, or, You too can make \$50,000*”.

From there, Spade went to the boarding house where Biddle last lived. The landlady didn’t know where Biddle was but said his last girlfriend was a taxi dancer named Rosalie at the Pacific Ballroom. Off for a dance, where Rosalie told him that Biddle was probably at the bottom of San Francisco Bay or unidentified in the morgue.

Spade tricked her into chasing after Biddle. Tracking her, Spade found where Biddle was living. Or had been living, as Biddle’s body was in his apartment, sitting dead at a tape recorder. The message was his testimony that he had murdered Stevens, then shot himself.

There was a wall clock in his room, which was also heard chiming three times in the background of the tape. Spade noticed that someone, the killer probably,

had set the clock ahead four hours. A variety of excursions, alarms, and gunshots occurred.

Norguard became the suspect and got shot. Searching an office produced a piece of tape hidden in a typewriter where the ribbon would be. The plot filled in. Biddle had been blackmailing Norguard.

He prepared a recording explaining the details of the murder and sent it to Norguard to boost the blackmail. What he didn’t realize was that the tape could be spliced and rearranged to make it into a confession by Biddle.

Adams was upset because the case had apparently been solved. Spade met him and Norguard at the radio studio where the typewriter tape was added in to complete Norguard’s ruin. The additional tape had the missing clock chimes that identified when Biddle had been killed.

Hidden Microphones.

The Boomer generation will remember the television show CANDID CAMERA, produced by Allen Funt. He would roam about with a hidden camera and put innocent bystanders into ridiculous situations.

The predecessor to that show was THE CANDID MICROPHONE, which aired for a season in 1947-48. Available as free mp3s from the Old Time Radio Researchers at www.otrr.org/OTRRLibrary

The reactions of the hoodwinked were so successful that listeners assumed it was a staged show with actors, not ordinary passersby. It wasn’t until television came along that Funt was able to make the concept work.

“Collecting For The OFCFFNE” aired on 1947-08-10. The episode began with Alan Funt poking fun at street corner charity solicitors. After being ignored by a score of pedestrians, Funt finally cornered a passerby and asked him for a contribution to the OFCFFNE.

Naturally the man wanted to know what the initials stood for, and was told the charity was the Organization For Collecting Funds For Needy Eskimos. Funt went into a heart-breaking story about how a warm winter had disrupted the Arctic economy, melting igloos everywhere. The Eskimos had clothes for cold weather but nothing they could wear in warm weather.

“*Any little thing you can spare; they really need it*”, said Funt. The pedestrian said there were better charities to contribute money. He had never heard of this one. Funt said the OFCFFNE didn’t have money for publicity campaigns or mail solicitations, which was why they were collecting on street corners.

“*You can imagine what a warm winter would do. It’s like a hurricane down here*”, pleaded Funt. The man finally gave in and dropped a coin into the pot. The announcer then told the radio audience that if this appeal had melted their hearts, then they could contribute their ice cubes to any branch office of the OFCFFNE.

The next stunt dealt with letters from listeners. One angry letter from a woman said the show was a bunch of dirty sneaking spies. So Funt visited her apartment. She was rather inarticulate. More importantly, it never occurred to her that Funt might actually be recording her.

When pressed for details, she felt that participants should receive payment like actors, especially if Funt was barging into homes. She disagreed that a visible microphone would change people’s behaviour. Funt then told her that he was in fact recording her.

She had the good grace to laugh. Funt asked if she would be willing to let him broadcast their conversation on the nation-wide show. Much to his surprise, she said yes. She wanted the whole world to know of her opinion. He gave her \$15, which was more money in those days.

The next stunt was “How do you divide $7/8$ by $3/4$?”. I’ll be honest and say I had to Google the method. I’ve never had to divide two fractions for any reason since I was a schoolboy. The people Funt asked weren’t sure either but they didn’t have Google in those days.

They (and I) realized the $3/4$ had to be converted to a common denominator, that is, to $6/8$. From there, no one was certain. One woman insisted that dividing a fraction into another was impossible.

BWAH HA! HA!: PART 17

by Dale Speirs

[Parts 1 to 16 appeared in OPUNTIAAs #371, 372, 378, 388, 391, 393, 397, 409, 422, 427, 434, 451, 475, 491, 502, and 522.]

Transporters And Matter Duplicators.

Transporter beams a la Star Trek (which didn’t invent them) and matter duplicators are two sides of the same coin. The ability to dissolve someone and transmit to a distant point could easily be converted to duplication by doubling the beam or vice versa.

THEATER FIVE was a short-lived attempt at reviving drama shows on radio. It aired for the 1964-65 season but the war against television was lost a decade prior, so it failed. The episodes were a mixture of science fiction, fantasy, murder, and sometimes plain drama. The title referred to the fact that the series was aired five times per week.

The episodes were generally well written and produced. The free mp3s are worth downloading from the Old Time Radio Researchers at www.otrr.org/OTRRLibrary. The 2022 March issue of OLD RADIO TIMES discussed the history of this series in great detail. Available as a free pdf from www.otrr.org/?c=times

“Molecule Masquerade” was written by Sherman Dreyer and aired on 1964-08-21. An American intelligence agent Scott Douglas was arrested for murder in Egypt. The real Douglas, was in New York City at the time.

The two men were brought together and found to be identical down to fingerprints. The Egyptian one had different memories from four days ago. The investigation tracked down a device in New York City that could duplicate matter.

The machine was being used to copy artworks for illicit sale but could duplicate life forms. The duplicate paintings, however, dissolved a few days later. The episode cut off at that point as the two Douglases looked at each other and wondered who was going to die.

Brains R Us.

Brain transplants have long been a staple of science fiction, but considering how medical technology is advancing, the idea isn't as preposterous as once thought. Perhaps not in my lifetime but certainly within the next century.

DARK FANTASY was an old-time radio anthology series with 31 episodes which aired 1941-42. Unusual for the times, it was a national show on the NBC network aired out of Oklahoma City. All the episodes were written by Scott Bishop. They were a mixture of science fiction, fantasy, weird, and twist mysteries.

"I Am Your Brother" aired on 1942-06-05. The brain of surgeon Dr Stefan Hamblyn was preserved for experiments by a mad scientist named Julius Sameck. "*It's alive!*", and yes, those words were actually spoken.

After the intro, the episode went to an extended flashback about Hamblyn's childhood. Much punctuation by a berserk organist as Sameck told the story.

Hamblyn could see and hear events far away. He became a brilliant surgeon. "*There is nothing I don't know*", he modestly said. He was however, lonely, and said he was searching for his spiritual brother.

He ranted that he had been born 10,000 years too early. He could foresee everything except the date of his death. So he shot himself through the heart. Sameck was no slouch in mad science business and preserved Hamblyn's brain. At that point the story cut off. Just like that.

THE AVENGER radio series was a carbon-copy of The Shadow, produced by the same people. The market for such heroes was saturated and the show never succeeded.

Jim Brandon was the alter-ego of The Avenger or perhaps vice versa. His lovely companion was Fern Collier, who was the only person who knew the true identity of The Avenger.

Brandon didn't learn any strange and mysterious powers in the Orient but instead relied on superscience devices. His two main gizmos were the Telepathic Indicator, a mind-reading device, and the Secret Diffusion Capsule, which made him invisible.

"The Mystery Of The Giant Brain" aired on 1945-06-15. The story began with mad scientist Professor Rodano arguing with his laboratory assistant Miss Sinclair, who had packed her bags and was leaving him.

She was upset because he had been stealing animals from the local zoo and farms for their brains. She didn't think that was the sort of thing a reputable scientist would do. "*I am a great scientist*", Rodano indignantly boomed. His ego was certainly giant enough.

Sinclair demanded to know what happened to Rodano's colleague Dr Giles. The answer was that Giles was locked up in the secret basement laboratory. Suddenly realizing what her fate was about to be, she tried to run. Rodano had created three robots, controlled by, his description, magneto-electric batteries. He summoned one of them to capture her and take her downstairs.

The Telepathic Indicator picked up traces of that contretemps, which brought Jim Brandon and Fern Collier into the case. They arrived at a farm in time for gunshots and murder, with a robot in there somewhere. Brandon sent Collier to find a farmhouse and call the police while he guarded the crime scene.

She got herself caught by Robot #2 and was put in a cage with Sinclair and Giles. Their brains were to be extracted and wired together with the mass of 14 animal brains Rodano had previously stolen. The melange would then be inserted into a giant super robot, with which to rule the world. Rodano didn't actually bwah-ha!-ha! but it was implied.

Brandon and a farmhand named Harry arrived, the former having given up on Collier. Using a Secret Diffusion Capsule to enter Rodano's house, The Avenger made his way into the basement. He was in time to stop the brain removals.

Pause for a sidetrack. The use of the capsules was always announced by the sound of glass breaking and the hissing of gas under pressure. The Avenger deployed a capsule the moment the front door was answered. Rodano saw no one, shrugged, and went back to the basement, unaware The Avenger was following him.

Even if the capsule was fist-sized, about the biggest that could be conveniently carried in a jacket pocket, it is difficult to believe the gas could permeate an entire house in seconds. No further capsules were used, yet The Avenger was

invisible down in the basement. This suggested that once the gas was inhaled, the effects lingered for quite sometime. But why was only The Avenger invisible and not the butler?

Rodano set the robots after the invisible voice. Giles got free and turned the robots on their master to kill him. The rest was details to be wrapped up in the epilogue. The giant brain's enclosure was smashed during the fracas, killing it. The robots became scrap metal.

Just Plain Mad.

“The Third Drug” (1908) by Edith Nesbit was from the anthology WEIRD WOMEN (2020), edited by Lisa Morton and Leslie S. Klinger. A mad scientist, never named, sought to test his Elixir of Life on the protagonist Roger Wroxham.

For the substance to work, two other drugs had to be injected in sequence prior. The method seemed to work on Wroxham. Without waiting for the full effect to complete, the doctor tried it on himself. Unfortunately the third drug had a glitch in the later part of its effect.

“Fessenden's Worlds” by Edmond Hamilton (1937 April, WEIRD TALES, available as a free pdf on www.archive.org) was narrated by a visitor named Bradley to the laboratory of Arnold Fessenden. He had managed to create a micro-galaxy seeded with life-bearing planets in a wide variety of habitats.

From there Fessenden liked to play God, altering conditions of the world such that the civilizations were inevitably destroyed. Bradley objected to such sadism and there was a struggle. Fessenden fell into the apparatus. Both he and the micro-galaxy were destroyed.

THE VAMPIRE BAT was a 1933 movie written by Edward Lowe. My copy was on the 50-movie DVD boxed set “Horror Classics” from Mill Creek Entertainment.

Kleinschloss was a Bavarian village in a tizzy about citizens dying, it was supposed, from vampire bats. Six victims had died in their beds, drained of blood. Police inspector Karl Brettschneider not only had to investigate but calm down the village folk. They settled on a scapegoat, the village idiot and hounded him to death. When the killings continued they were deeply sorry.

The local mad scientist Dr Otto von Niemann was using his servant to grab and drain the victims. He needed the blood for his experiments in creating artificial life, which was a football-shaped chunk of ground meat in an aquarium. One wondered why he couldn't just buy livestock blood from the local abattoir.

The denouement was a confrontation in the dungeon laboratory. Brettschneider rescued the damsel in distress and von Niemann was shot dead. The movie then ended without stating what happened to the artificial life. Perhaps it starved to death, or the police threw it in the trash after the crime scene analysis was done.

Madness On The Radio.

THE SHADOW, as the opening blurb put it, was in reality Lamont Cranston, wealthy young man about town. He had traveled to Tibet where he learned how to cloud minds so that people could not see him, only hear him.

Lamont Cranston and The Shadow both dealt with Police Commissioner Weston but not simultaneously of course. Weston was usually the arresting officer and frequently worked without any uniformed officers present.

The lovely Margo Lane was the only one who knew Cranston's real identity. Her main functions were to scream every time she saw a corpse, be frequently kidnapped or trapped with a killer, and to have the loose threads explained to her in the denouement.

“The Laughing Corpse” aired on 1940-03-10. The episode opened with a monologue by an alcoholic homeless person who had been picked up by a mad scientist on the promise of a drink back at the lab. The scientist remained silent.

Obviously the alcoholic was not long for this world. The mad scientist gave him an injection causing him to laugh hysterically before dying. An unusual twist because normally the mad scientist was the one who went bwah-ha!-ha!

Jump cut to Lamont Cranston and Margo Lane, taking Shrevie's taxi to the same address. At this point the listener learned that Lane was apartment hunting and wanted Cranston's opinion about the place.

They arrived just before midnight. The building superintendent Lascomb was not happy at being bothered so late at night but Lane sweet-talked him into viewing the suite. The apartment was terrible, with holes in the walls.

Lascomb explained the previous tenant Dr Deskoff was a chemist who used the place as a laboratory. Just then they heard strange laughter.

Rushing across the hallway they found a dead man, Dr Lorenz, his face all twisted into a grimace. When Cranston first checked the body he found a threatening note inside a tiny box, which he pocketed.

The police had no evidence to open a murder investigation. Cranston said nothing about the note. Lascomb mentioned that Deskoff and Lorenz had been business partners until a few weeks ago when they broke up.

The Shadow decided to track down Deskoff at his new laboratory, who pleaded innocence. He said there had been a third partner who had been dismissed several years prior. That man was the writer of the note.

Suddenly Deskoff noticed a small package on his desk. Deus ex machina, it certainly was. The Shadow warned him not to open the box, but Deskoff opened it anyway. There was a push button on the side to open the box. He pushed it and died a laughing death.

Meanwhile Cranston and Lane moved into her new apartment. She suddenly had misgivings about living there. Cranston asked her to stay there so he could investigate further. He showed her the little box and pressed the button to demonstrate. It pricked his finger but the poison needle was empty, having been used on Deskoff.

Cranston departed, leaving the little box behind. Lascomb then arrived to tell Lane the decorators would come tomorrow morning. Spotting the little box, he became agitated. He demanded she tell him where she got the box. He was the third partner, living in disguise. He was about to administer the laughing death to her in his basement laboratory.

As he prepared the solution, The Shadow interfered. Lascomb having been trapped, he administered the poison to himself, saying that he would have the last laugh.

In the aftermath, Cranston explained the poison caused the diaphragm to convulse erratically, causing the laughter. Lane moved out of the apartment. I wonder if she got her deposit back?

INNER SANCTUM MYSTERIES was an old-time radio anthology series which aired from 1941 to 1952 and is available as free mp3s from www.otrr.org/OTRRLibrary.

“The Dark Chamber” was written by Robert Newman and aired on 1945-12-11. “*Pull up a tombstone and sit down*”, said the host. The sponsor was Lipton Tea, whose spokeswoman was Mary Bennet. Her cheerful perkiness was a contrast to the morbid host.

Joe Watson, deliveryman and war veteran, was kidnapped by mad scientist Dr John Hellman and confined to a darkened room. The mad doctor said he was conducting experiments in fear. He had chosen Watson because he had been a decorated soldier with combat medals, so presumably he knew real fear.

Watson managed to telephone the police but wasn't able to complete the call. Sometime later he was joined by another victim, Betty Grant. Hellman returned, but before he could speak, Bennet broke in to tell the audience that Lipton Tea could cheer up anyone.

Back at the prison, Hellman lectured them about how he was their master. He knew everything they would do and anticipate their reactions. When a police officer arrived in response to Watson's call, Hellman was easily convinced the officer that Watson and Grant were patients in the sanitarium. The officer left.

Hellman came back to shoot them dead. Watson jumped him. In the struggle for the handgun, Hellman was mortally wounded. As he died, he expressed shock that his predictions about their behaviour were wrong. Gang aft agley, etcetera.

Aliens.

MORONS FROM OUTER SPACE was a 1985 comedy movie written by Griff Rhys Jones and Mel Smith. My copy was in the “Sci-Fi Invasion” boxed DVD set from Mill Creek Entertainment. The gags and slapstick are not easily described but the comedy was enjoyable.

The premise was a group of white-trash humanoid aliens crash-landing their spaceship on Earth. The M1 motorway in England to be exact. The news media went berserk and the populace went berserk in a different manner. However, the Home Secretary was able to explain it away as the crash of an experimental hovercraft during routine training maneuvers.

The American military tussled with the Home Secretary for control of the aliens and spaceship. Trouble was, the aliens knew nothing about their spacecraft, just as few humans can diagnose and repair their cars. The military were greatly disappointed..

Incompetence abounded on all sides. The aliens knew nothing and the humans knew less. There being nothing else to do with the aliens, they became celebrities and rock-and-roll singers. As their manager said, “*They come in peace, to do a bit of shopping.*”

While they were performing a concert in a stadium, a mothership arrived. The audience thought it was part of the act, as well they might. The crashed spaceship had been a rental and was supposed to have been returned five weeks prior.

The clerk on board the mothership was most annoyed to learn the rental had crashed. Fortunately the insurance would cover the damage. He was kind enough to take the aliens back to their home planet.

FELINE COZIES: PART 2

by Dale Speirs

[Part 1 appeared in OPUNTIA #537.]

When I was a boy back on the ranch, we had all kinds of barn cats but none of them ever investigated crimes. The only time they meowed at us was when their food dishes were empty, not to draw attention to clues. Mostly they just ate, slept, or went out hunting mice in the fields.

In The Beginning.

Agatha Christie is acknowledged as the inventor of cozy mysteries, although the term didn't come into widespread use until the 1980s or so. The stories of Miss Marple hardly need comment for readers of this zine. The first cat cozy was part of a series by Dolores Hitchens, who originally published them under her pseudonym D.B. Olsen

The first novel in that series was THE CAT SAW MURDER (1939), re-issued in 2021 by Otto Penzler, which was the edition I read. The significance of this novel was that it was the progenitor of the cat cozy subgenre.

The series protagonist was spinster Rachel Murdock, who lived with her sister Jennifer, also a spinster, and their cat Samantha, whose previous owner had endowed it with a trust fund. The Murdocks' niece was Lily Sticklemann, who lived and died in nearby Breakers Beach, California.

Lily was in deep trouble, owing thousands in gambling debts, which cost her life. Lieutenant Stephen Mayhew was the investigating officer and Rachel was the Miss Marple.

Someone also tried to kill Samantha, not once but several times. To complicate the plot further, a decomposed body washed up on the beach of a man who may have been a tenant of Lily's boarding house.

Rachel began wondering if Samantha was the real heiress to that trust fund or if she had been substituted by an imposter and the real one taken elsewhere. Or was she the real Samantha, who had been in the room when Lily was beaten to death.

If the cat was splattered by blood, she might have followed the killer home with her fur dripping blood on the floor. The murderer didn't mind killing humans but was kind to cats, and bathed her to prevent her tracking blood throughout the boarding house.

In later cat cozies, the standard denouement was for Miss Marples to be trapped at gunpoint with the killer. In the case it was Lieutenant Mayhew, at the top of a cliff with the murderer, who had been blackmailing Lily. There are no prizes for guessing which of the two fell off the cliff.

Midnight Louie: The Original Series.

Carole Nelson Douglas (1944-2021) was a prolific novelist with several book series. The best known was the Midnight Louie cat cozies. There were 26 novels in alphabetical order plus two volumes that bookended the series.

Midnight Louie roamed about the Strip in Las Vegas but deigned to consider Miss Temple Barr's apartment as his home base. She was a freelance publicist

and murder magnet. Her name will be an in-joke for lawyers. Midnight Louie was a fat cat, feral in his upbringing but becoming more domesticated as the series evolved.

In the later books he came across another feral cat who told him she was his daughter Midnight Louise. Midnight Louie narrated his own adventures from a cat's point of view down on ground level. With his daughter, the two felines snooped about the hotels along the Strip.

CAT IN A SAPPHIRE SLIPPER (2008) began when Temple Barr's aunt Kit celebrated her engagement to Aldo Fontana, the eldest of 10 brothers. The bachelor party was hijacked in their limousine and taken out to the desert. Midnight Louie snuck into the limo and went along for the ride.

Instead of a strip club, the party found themselves at the Sapphire Slipper brothel (legal in Nevada). They were held at gunpoint by a gang of women who resented the brothers having trifled with their affections in the past. So in other words, not a standard gangster rumble.

The Fontanas, used to the gangland way of life, were stunned by nasty tricks such as being handcuffed and then ordered to talk about relationships. That's not a guy thing. Neither was the murder of a prostitute upstairs.

Temple Barr went out to the brothel after some Marpleing. She raced to discover the killer before the police arrived, assuming someone would notify them. There were some off-stage flashbacks to slow down the novel.

The dead woman had been hiding from the Mob, although not successfully as it turned out. The Fontanas made their way back to Las Vegas, sadder but not wiser men.

CAT IN A TOPAZ TANGO (2009) followed in the book series. Temple Barr and her fiancé Matt Devine were on the dance floor. Matt was competing in a week-long Las Vegas event "Dancing With The Celebs", and Temple revived her teenaged persona Zoe Chloe Ozone.

The competition was a barnburner, if Las Vegas has barns. Alarums on the stage were almost as plentiful as those off stage. Shots were fired on stage, which would boost ratings, assuming the network censor would pass the action.

Everything ended in a tangle of loose threads, many of them left dangling for the next novel.

Coastal Cats.

Darlene Ryan wrote several series of cat cozies under the name Sofie Kelly or Sofie Ryan. See also under Magical Moggies further on in this column. The series I'll mention here was published with the pseudonym Sofie Ryan.

THE WHOLE CAT AND CABOODLE (2014) was the first novel in a series about Sarah Grayson of North Harbor, Maine. She operated the Second Chance shop, which dealt in secondhand goods. Jessica Fletcher was busy elsewhere on the blood-drenched coast of Maine, so Sarah substituted for her. Assisting was a big black cat named Elvis, no relation to Midnight Louie.

An elderly woman named Maddie found a dead man in her garden. The Deppity Dawg suspected that Maddie dunnit, operating on the principle that whoever had it last was responsible. The deceased was Arthur Fenety, an elderly con man who had at least four wives and had been courting Maddie.

Sarah and Elvis went digging for the truth. Elvis mostly concentrated on sniffing out edible foods. She used him as a portable lie detector, as the look on his face changed when someone told a lie.

The murderer confronted Sarah but Elvis walked in with a semi-live mouse he had caught and distracted the killer enough to allow a save by the police. Said the Deppity Dawg: "*You think Elvis is Lassie and you're Timmy stuck down a well?*" Replied Sarah, "*Elvis is much smarter than Lassie.*"

BUY A WHISKER (2015) had the town of North Harbor in an uproar over the redevelopment of the waterfront. Sarah Grayson and most townfolk favoured the project but local baker Lily Carter held out. Her obstruction ended after someone murdered her in the bakery.

Sarah drove around town busily Fletchering, assisted by Elvis. To quote: "*He'd look both ways at an intersection or a stop sign, and he'd even turn to check over his shoulder when I backed up. Once he'd meowed loudly at me when I'd run a yellow light.*" (page 37, mass market paperback) Someone should tell Elon Musk about using cats for self-driving cars. But I digress.

Other townsfolk got into the Fletcherer business as well, calling themselves Charlotte's Angels. They didn't have a cat who knew the traffic code though. Five Fletchers in one town, all told. I felt sorry for the Deppity Dawgs.

Between them all, the scandals and back stories were slowly dragged out. This time the killer was smart during the final confrontation. He put a gun to Elvis's head and told Sarah that if she didn't cooperate then the cat would use up all of its nine lives at once. There was escape though for both, since Sarah and Elvis were continuing characters.

Magical Moggies.

Sofie Kelly (pseudonym of Darlene Ryan) wrote a cozy series about librarian Kathleen Paulson of Mayville Heights, Minnesota. She was the resident Miss Marple, assisted by her two cats Owen and Hercules, who had magical powers to sniff out clues.

THE CATS CAME BACK (2018) took place during the Wild Rose Summer Music Festival in late August. One of the singers was Emme Finley, whose assistant Miranda Moore had a remarkable resemblance to her.

Kathleen Paulson was out for a stroll on yon shady banks of a river when one of her cats sniffed out a body. At first, all and sundry thought Emme had died, but police soon established that Miranda was the dead woman. The question arose as to which woman had been the intended target.

This was the tenth novel in the series. By now Kathleen's reputation as a Miss Marple was well established. Those close to the deceased relied on her to investigate, a good way to annoy the local constabulary. The sleuthing was complicated by the uncertainty as to who the murderer had been aiming at.

Kathleen therefore had to snoop into several lines of enquiry. Meanwhile, she couldn't neglect her day job as a librarian. The library was planning a Banned Books display in a few weeks.

Emme had a sister Nora, who was jealous of Miranda, which eventually set up the usual trapped-with-the-killer routine for Kathleen. Except the finale turned out to be a trapped-with-Miss-Marple routine. One of the cats set up a distraction by meowing, enabling Kathleen to sneak up behind Nora and slug her unconscious with a roll of wallpaper.

After the loose threads were tied off, onward to the final performance at the festival, with Emme live on stage.

A NIGHT'S TAIL (2019) carried on the mayhem when Kathleen Paulson's brother Ethan arrived in town with his band The Flaming Gerbils. To set the stage in a different way, the band's lead guitarist Derek Hanson got into a fight with local businessman Lewis Wallace. The former was in trouble when the latter was murdered a few days later.

Wallace was a sharp-practice man who did not lack for enemies. Ethan asked his sister to help clear Hanson's name, her reputation as a Miss Marple by now being well established. She had little difficulty digging up dirt on Wallace, enough to landscape a cemetery.

The problem was to thin down the list of suspects. Every so often the cats helpfully pointed out a clue. Hanson and Wallace had not been strangers and had a past. When they met again in the present, Hanson decided to get even.

The death happened in the heat of the moment and was inadvertent. Kathleen got Hanson's confession during a J'accuse! meeting without much help from the cats. However, given the unusual method by which Wallace died, one suspects the case might not succeed in court.

Carolina Cats.

The Cats In Trouble Mysteries was a cozy series written by Leann Sweeney. The protagonist and Miss Marple was Jillian Hart of Mercy, South Carolina. Recently widowed, she had a shop specializing in quilts for cats, adhering to the proclivity of Miss Marples to have ridiculous businesses.

To be fair, the novels mentioned she toured frequently to cat shows. Presumably she also sold on the Internet. They also mentioned her using smartphones and laptops, so unlike many cozy heroines in the 2010s, she actually acknowledged the real world economics.

Jillian sleuthed with the help of her three cats Merlot, Chablis, and Syrah. Her best friend was Deputy Sheriff Candace Carson, who helped with the Marpleing, or vice versa depending on viewpoint.

The first novel in the series was *THE CAT, THE QUILT, AND THE CORPSE* (2009). Jillian came home from an overnight trip to a cat show to discover her house had been burgled. One of her cats had been stolen but nothing else. Yes, that's right, she was afflicted by a cat burglar.

The Deppity Dawgs didn't put the cat theft on their priority list, so Jillian took up the fine art of Marpleing. The alarums accumulated. Her house was broken into a second time. She tracked down the cat thief and found his corpse with a knife in it.

She was the idiot in a complicated idiot plot involving life insurance policies and family quarrels. Few Miss Marples ever contaminated crime scenes the way she did. For once, the reader will be on the side of the Deppity Dawgs.

The denouement was a complicated timetable of who did what to whom, when and where. A spreadsheet might have helped. The good news was that Jillian got her cat back.

THE CAT, THE PROFESSOR, AND THE POISON (2010) began after first solving a missing cow case (she came home on her own). From there, the plot progressed to the murder of the said thief. He had needed the milk for his collection of 50 cats.

His sudden exit from this world set off numerous complications. He was doing research on the cats, trying to develop a better cat food. More deaths and alarums ensued.

There was a nod to the modern era, as Jillian got a new smartphone, mainly so she could take cat photos. Most cozies didn't acknowledge electronic devices until several years later. Someone had to explain to Jillian what the word "tweeting" meant. But at least she was trying.

The denouement was messy, with cats, Marples, and deputies all under siege from the killer. His father had lost big money in the cat food scheme, so he was taking revenge, plus clearing out anyone who got in his way. The cats all found good homes, so that made for a happy ending.

Next in the series was *THE CAT, THE LADY, AND THE LIAR* (2011), which began with Jillian returning a stray cat to wealthy grande dame Ritaestelle Longworth. The corpse, and there was one, soon appeared behind Jillian's

house, with Ritaestelle standing over it in a dazed condition. Once more unto the breach, with alarums and decades-old past stories to scatter suspicion about like kitty litter. The finale was a gathering of lunatics, suspects, Marples, cats, and Deppity Dawgs in the Longworth mansion.

The murderer was a woman scorned, acting out on a long-ago failed romance. Some of the cats were at risk but managed to survive. Jillian got wet cat hair on her new blouse but you can't have everything.

Black Cats Other Than Poe.

BLACK CAT CROSSING (2015) by Kay Finch was the first novel in a series about Sabrina Tate of Lavender, Texas. She was writing her first mystery novel, in between helping her Aunt Rowena Flowers manage vacation rental cottages.

A stray black cat led Sabrina to the body of Bobby Joe Flowers, cousin to Auntie. The two had recently quarreled, putting Rowena at the top of the list of suspects.

Sabrina went Marpleing, assisted by the cat. She named him Hitchcock, but some of the other locals called him El Gato Diablo, for his trespasses. She kept plugging away at her novel, still no further than a synopsis.

Bobby Joe was a womanizer and fraud operator, so there was no shortage of people wishing him dead. Sabrina stumbled onto a second death, which occurred some time before and was covered up.

From there to the usual gunpoint confrontation which Hitchcock solved with the old claws-in-the-back routine. The two murders were tied together when it was learned that Bobby Joe had been a blackmailer.

As for Hitchcock, he settled down into domesticity. Keep your claws sharp and your food dish closer.

THE BLACK CAT KNOCKS ON WOOD (2016) was the sequel. Sabrina Tate's work on her novel was distracted by Aunt Rowena and her friends deciding to enter the Texas Hill Country Senior Pro Rodeo. They weren't dissuaded by being women in their 60s and 70s with little or no experience.

Sabrina was volunteering with the local humane society, which was staging a Love A Black Cat weekend. Apparently they had a surplus of black cats. Hitchcock was not included in the deal.

More seriously, a local businesswoman Crystal Devlin was murdered just after a black cat had been seen in the office. As Sabrina went Marpleing, the back stories she uncovered linked the murder and the rodeo.

She herself learned she was the centre of many rumours. A Miss Marple with a black cat stood a good chance of being burned as a witch. Hitchcock helped by pointing out clues. For example (Chapter 30), jumping up on the desk of a suspect and nosing out an envelope stamped "Insufficient Funds Notice". Back on the ranch where I grew up, the only thing the barn cats nosed out were mice.

The denouement wasn't the usual gunpoint confrontation. Instead the murderer threw Sabrina into a pen with an angry rodeo bull. Didn't work because she was booked for the series.

The ending was muted as most of the sinners forgave each other and declined to press charges. Except of course the police went after the murderer. The rodeo went on but whether Aunt Rowena won the bronco event wasn't specified.

Nasty Cats.

Not a cozy, but I'll jam it in here, was an old-time radio episode about cats. THE MYSTERIOUS TRAVELER aired from 1943 to 1952, available as free mp3s from the Old Time Radio Researchers at www.otrr.org/OTRRLibrary.

"The Queen Of The Cats" was written by Robert A. Arthur and David Kogan, and aired on 1944-07-02. Chris Arnold took up with an Egyptian woman Rana Faruk, who had a thing for cats. A black-haired beauty with green eyes, she was vain, possessive, and put Chris under his spell. Plus five cats, who were her spies.

Chris tried to break off the relationship. She refused a divorce and things got nasty from there. They were quarreling while he drove along a mountain road. Thinking to solve the problem with a murder-suicide, he swerved the car off a cliff. She died but he barely survived, spending eight months in hospital.

Everyone thought the tragedy was an automobile accident. Chris thought he was free. He became engaged to Jane. Then he noticed that wherever he went he was followed by a cat.

Different cats each time but always stalking him. They disrupted his sleep by yowling outside his bedroom window. One of them had green eyes like Rana, and harassed him in his house. He fired shots but the cat just vanished.

Chris asked Jane to postpone the wedding. The cats disappeared that night. After a few weeks, he bought the marriage licence. The cats immediately reappeared. Chris and Jane were married. The ceremony was crashed by yowling cats. Chris pulled a gun and chased after them, firing continuously.

The others followed and later found his body. He had been clawed to death and his eyes scratched out. At the funeral, as the coffin was lowered into the grave, mourners noticed a green-eyed cat sitting at the edge of the hole.

ZINE LISTINGS

[I only list zines I receive from the Papernet. If the zine is posted on www.efanzines.com or www.fanac.org, then I don't mention it since you can read it directly.]

THE FOSSIL #394 (US\$10 per year from The Fossils, c/o Tom Parson, 157 South Logan Street, Denver, Colorado 80209) Clubzine of a group interested in the history of zines since the formation of the first amateur press association in 1876.

This issue has a report by David Schultz on his research work at the zines collection of the University of Wisconsin at Madison. He was compiling H.P. Lovecraft's writings in zines, of which the university has a great number of rarities. For those interested in zine history, there is a treasure trove at UWM.

Also mentioned, by Dave Tribby, is a smaller collection of rare zines at the University of Iowa in Iowa City.

SEEN IN THE LITERATURE

Astronomy.

Richardson, N.D., et al (2023) **A high-mass X-ray binary descended from an ultra-stripped supernova.** NATURE 614:45-47

Authors' abstract: *Ultra-stripped supernovae are different from other terminal explosions of massive stars, as they show little or no ejecta from the actual supernova event. They are thought to occur in massive binary systems after the exploding star has lost its surface through interactions with its companion.*

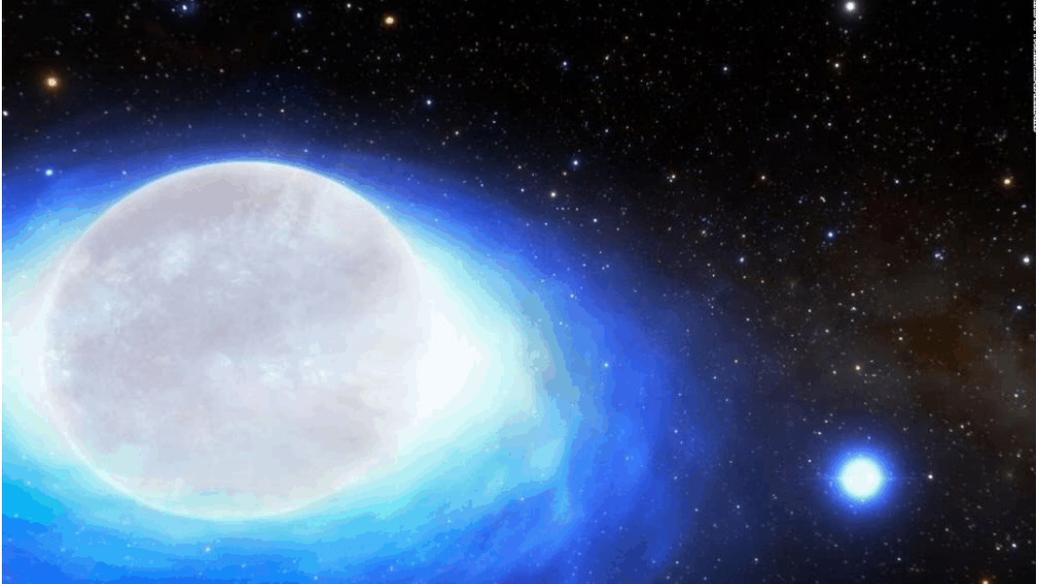
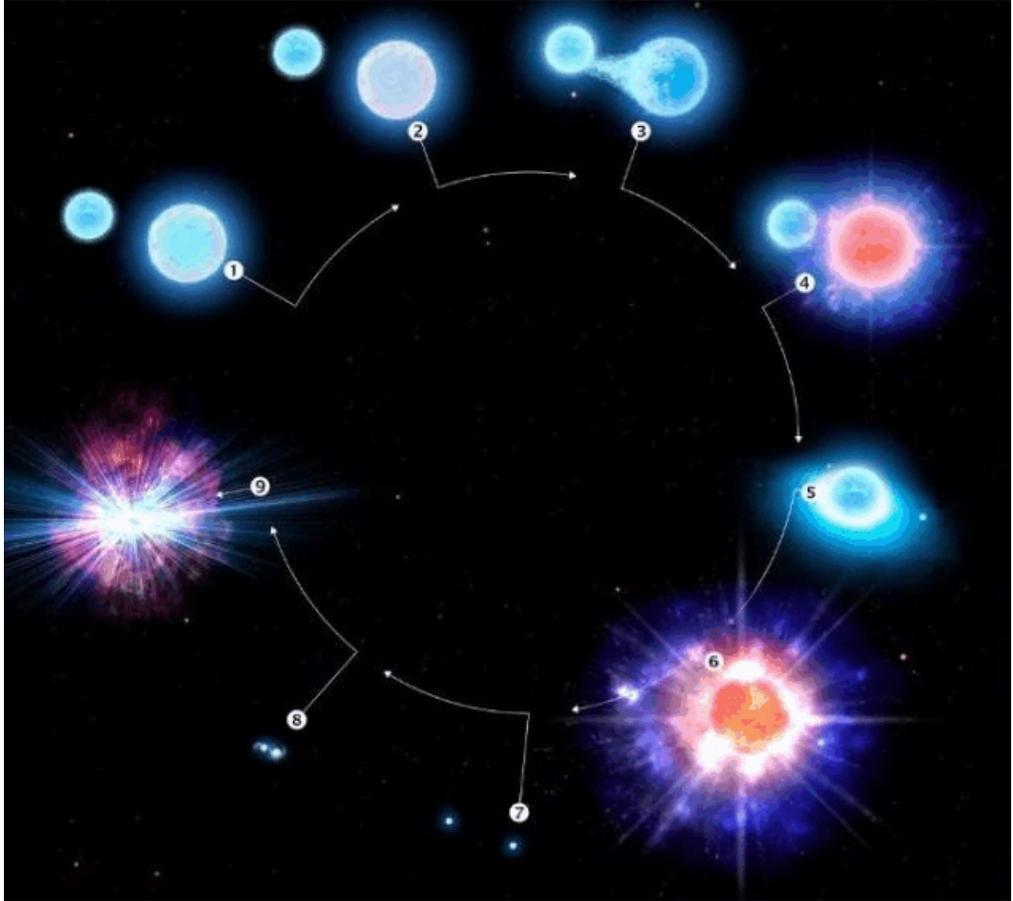
Such supernovae produce little to no kick, leading to the formation of a neutron star without loss of the binary companion, which itself may also evolve into another neutron star.

Here we show that a recently discovered high-mass X-ray binary, CPD -29 2176 (CD -29 5159; SGR 0755-2933), has an evolutionary history that shows the neutron star component formed during an ultra-stripped supernova.

The binary has orbital elements that are similar both in period and in eccentricity to 1 of 14 Be X-ray binaries that have known orbital periods and eccentricities. The identification of the progenitors systems for ultra-stripped supernovae is necessary as their evolution pathways lead to the formation of binary neutron star systems.

Binary neutron stars, such as the system that produced the kilonova GW170817 that was observed with both electromagnetic and gravitational energy, are known to produce a large quantity of heavy elements.

[Images show the evolution of a binary supernova and a close-up of the midpoint.]



Chakraborty, A., and N. Roy (2023) **Detection of H I 21 cm emission from a strongly lensed galaxy at $z \sim 1.3$** . MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY 519:doi.org/10.1093/mnras/stac3696 (available as a free pdf)

[H I is neutral hydrogen gas, from which all other elements were ultimately formed. The current estimate of the universe's age is 13.787 billion years, so this galaxy is the oldest known.]

Authors' abstract: *We report the first detection of H I 21 cm emission from a star-forming galaxy at redshift $z \sim 1.3$ (nearly 9 billion years ago) using upgraded Giant Metrewave Radio Telescope (uGMRT).*

This is the highest redshift H I detection in emission from an individual galaxy to date. The emission is strongly boosted by the gravitational lens, an early-type elliptical galaxy, at redshift $z \sim 0.13$.

The measured H I mass of the galaxy is almost twice the inferred stellar mass of the galaxy, indicating an extended structure of the H I gas inside the galaxy.

Asteroids.

Jourdan, F., et al (2023) **Rubble pile asteroids are forever**. EARTH, ATMOSPHERIC, AND PLANETARY SCIENCES 120:doi.org/10.1073/pnas.2214353120

Authors' abstract: *Rubble pile asteroids consist of reassembled fragments from shattered monolithic asteroids and are much more abundant than previously thought in the solar system.*

Although monolithic asteroids that are a kilometer in diameter have been predicted to have a lifespan of few 100 million years, it is currently not known how durable rubble pile asteroids are.

Here, we show that rubble pile asteroids can survive ambient solar system bombardment processes for extremely long periods and potentially 10 times longer than their monolith counterparts.

We studied three regolith dust particles recovered by the Hayabusa space probe from the rubble pile asteroid 25143 Itokawa using electron backscatter diffraction, time-of-flight secondary ion mass spectrometry, atom probe tomography, and $^{40}\text{Ar}/^{39}\text{Ar}$ dating techniques.

Our results show that the particles have only been affected by shock pressure of ca. 5 to 15 GPa. Two particles have $^{40}\text{Ar}/^{39}\text{Ar}$ ages of $4,219 \pm 35$ and $4,149 \pm 41$ megayears and when combined with thermal and diffusion models; these results constrain the formation age of the rubble pile structure to about 4.2 billion years ago.

Such a long survival time for an asteroid is attributed to the shock-absorbent nature of rubble pile material and suggests that rubble piles are hard to destroy once they are created.

Our results suggest that rubble piles are probably more abundant in the asteroid belt than previously thought and provide constrain to help develop mitigation strategies to prevent asteroid collisions with Earth.

Morgado, B.E., et al (2023) **A dense ring of the trans-Neptunian object Quaoar outside its Roche limit**. NATURE 614:239-243

[The Roche limit is the orbit below which a satellite will break up into a ring and beyond which it will be a solid moon. The limit varies with the size and density of the planet and the satellite.]

Authors' abstract: *Planetary rings are observed not only around giant planets, but also around small bodies such as the Centaur Chariklo and the dwarf planet Haumea.*

Up to now, all known dense rings were located close enough to their parent bodies, being inside the Roche limit, where tidal forces prevent material with reasonable densities from aggregating into a satellite.

Here we report observations of an inhomogeneous ring around the trans-Neptunian body (50000) Quaoar. This trans-Neptunian object has an estimated radius of 555 km and possesses a roughly 80-km satellite (Weywot) that orbits at 24 Quaoar radii.

The detected ring orbits at 7.4 radii from the central body, which is well outside Quaoar's classical Roche limit, thus indicating that this limit does not always determine where ring material can survive. Our local collisional simulations show that elastic collisions, based on laboratory experiments, can maintain a ring far away from the body.

Moreover, Quaoar's ring orbits close to the 1/3 spin-orbit resonance with Quaoar, a property shared by Chariklo's and Haumea's rings, suggesting that this resonance plays a key role in ring confinement for small bodies.

Paleobiology.

Fonseca, C., et al (2023) **First putative occurrence in the fossil record of choanoflagellates, the sister group of Metazoa.** SCIENTIFIC REPORTS 13:doi.org/10.1038/s41598-022-26972-8 (available as a free pdf)

[Metazoa are multi-celled animals with integrated cell systems, not just aggregates or colonies of single-celled animals clumped together. Choanoflagellates are single-celled microbes that resemble algae but are not photosynthetic. Eukaryotes have cells with nuclei, as opposed to prokaryotes which do not have nuclei and are more primitive.]

Authors' abstract: *Choanoflagellates are microeukaryotes that inhabit freshwater and marine environments and have long been regarded as the closest living relatives of Metazoa.*

Knowledge on the evolution of choanoflagellates is key for the understanding of the ancestry of animals, and although molecular clock evidence suggests the appearance of choanoflagellates by late Neoproterozoic, no specimens of choanoflagellates are known to occur in the fossil record.

Here the first putative occurrence of choanoflagellates in sediments from the Cretaceous (Cenomanian-Turonian) is described by means of several cutting-edge petrographic techniques, and a discussion of its paleoenvironmental significance is performed.

Furthermore, their placement in the organic matter classification systems is argued, with a placement in the Zoomorph Subgroup (Palynomorph Group) of the dispersed organic matter classification system being proposed.

Regarding the ICCP System 1994, incorporation of choanoflagellates is, at a first glance, straightforward within the liptinite group, but the definition of a new maceral may be necessary to accommodate the genetic origin of these organisms.

While modern choanoflagellates may bring light to the cellular foundations of animal origins, this discovery may provide an older term of comparison to their extant specimens and provide guidelines for possible identification of these organic components in other locations and ages throughout the geological record.

The structural and morphological resemblance between sponges and choanoflagellates choanocytes has been used since the nineteenth century as evidence of a close relationship between animals and these microeukaryotes.

Nevertheless, only modern molecular phylogenetic analyses provided conclusive evidence that sponges are members of the animal kingdom, and that choanoflagellates are indeed the sister group of animals.

Gishlick, A.D. and R.A. Fortey (2023) **Trilobite tridents demonstrate sexual combat at 400 Mya.** EARTH, ATMOSPHERIC, AND PLANETARY SCIENCES 120:doi.org/10.1073/pnas.2119970120 335

Authors' abstract: *The Devonian trilobite Walliserops carries a remarkable anterior cephalic trident posing a challenge to functional interpretation.*

A unique teratological specimen of Walliserops trifurcatus showing four, rather than three tines, is inconsistent with possible hypotheses connecting the trident to feeding techniques and suggests a sexually selected function. Malformations in a variety of living organisms support this conclusion.

Morphometric comparisons to similar structures used for intraspecific combat in dynastine beetles show that the trident occupies a comparable shape space consistent with the hypothesis that it was a sexual combat weapon, the oldest reported example of its kind.

This lends further credibility to the idea that some trilobites may have been strongly sexually dimorphic. Sexual selection and intraspecific combat is

known to be an important aspect of the evolutionary process and was almost certainly pervasive in the history of life.

However, examples of anatomical weapons and their associated behaviors pose a particular challenge to recognize in fossil organisms.

*Here we identify one such morphology suggesting combat behavior in the trilobite *Walliserops*.*

This represents the oldest identified example of sexual combat in the fossil record. “Jousting” to gain female favors is 400 million years old.

[Image is from Wikipedia.]



Laibl, L. et al (2023) **Drifting with trilobites: The invasion of early post-embryonic trilobite stages to the pelagic realm.** PALAEOGEOGRAPHY, PALAEOCLIMATOLOGY, PALAEOECOLOGY 613:doi.org/10.1016/j.palaeo.2023.111403

[Benthic means bottom dwellers on the ocean floor. Planktic means swimming or floating up in the water column.]

Authors’ abstract: *The Ordovician Radiation shaped Paleozoic marine ecosystems and led to an increase in the biodiversity of marine organisms. The onset of the Plankton Revolution in the late Cambrian is an important step within the Ordovician Radiation.*

During this revolution, various organisms invaded pelagic realms, which affected the marine trophic web through the introduction of phytoplankton, zooplankton, as well as plankton- and suspension-feeding animals. Trilobites, a main Paleozoic group of marine metazoans, played a major role during the Ordovician Radiation. Previous studies showed that some trilobites evolved planktic larvae during the Furongian and Early Ordovician.

Herein, we quantify the appearance of trilobite planktic larvae by providing highly resolved Cambrian and Ordovician data on 144 trilobite species with well-known developmental sequences. We show that Cambrian trilobites were dominated by species and families with exclusively benthic early post-embryonic stages. On the contrary, Ordovician seas comprised a remarkable number of trilobites with one or more planktic stages.

However, species and families with exclusively benthic early stages still constituted about half of the Ordovician trilobite diversity. The first trilobites with planktic larvae might have been present in the Miaolingian, but their earliest fossil record is from the mid-Furongian.

The appearance of planktic forms was accentuated later in the Ordovician with many trilobite lineages adapting a multi-staged planktic mode of life, more than one developmental stage colonizing the water column during ontogeny.

Between the Miaolingian and the Middle Ordovician, both species- and family-level data show a progressive increase in the number of taxa incorporating planktic larvae in their development, highlighting a gradual transition in the structure of marine ecosystems during the early Paleozoic.

[Images are from this paper.]

Schachat, S.R., et al (2023) **Illusion of flight? Absence, evidence and the age of winged insects.** BIOLOGICAL JOURNAL OF THE LINNEAN SOCIETY 138:143-168 (available as a free pdf)

Authors' abstract: *The earliest fossils of winged insects (Pterygota) are mid-Carboniferous (latest Mississippian, 328 to 324 megayears ago), but estimates of their age based on fossil-calibrated molecular phylogenetic studies place their origin at 440 to 370 Mya during the Silurian or Devonian.*

This discrepancy would require that winged insects evaded fossilization for at least the first ~50 Myr of their history.

Here, we examine the plausibility of such a gap in the fossil record, and possible explanations for it, based on comparisons with the fossil records of other arthropod groups, the distribution of first occurrence dates of pterygote families, phylogenetically informed simulations of the fossilization of Palaeozoic insects, and re-analysis of data presented by Misof and colleagues using updated fossil calibrations under a variety of prior probability settings.

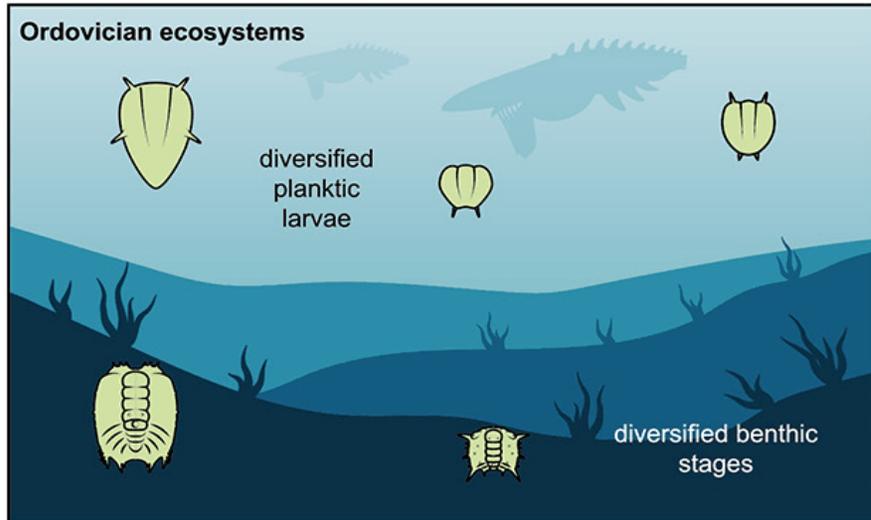
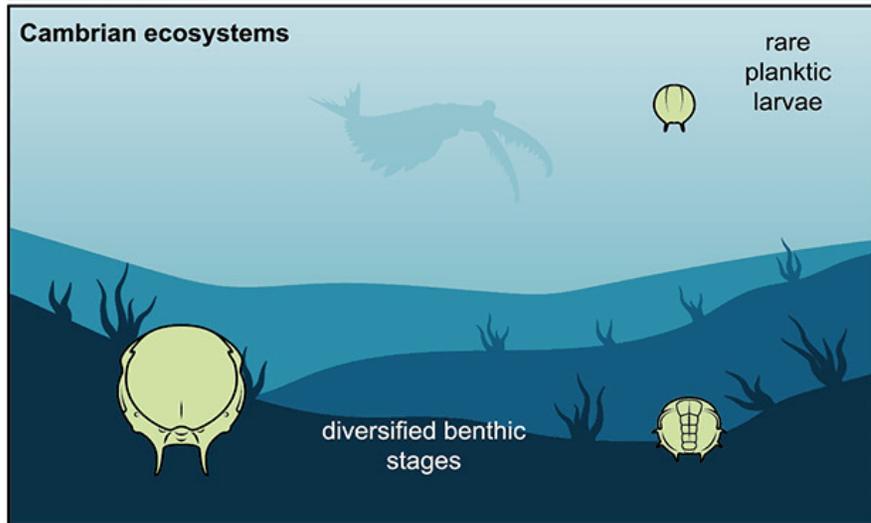
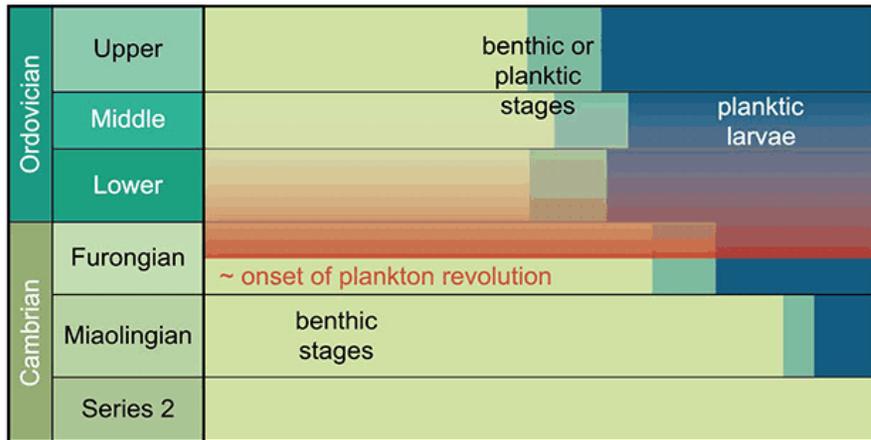
We do not find support for the mechanisms previously suggested to account for such an extended gap in the pterygote fossil record, including sampling bias, preservation bias, and body size.

We suggest that inference of an early origin of Pterygota long prior to their first appearance in the fossil record is probably an analytical artefact of taxon sampling and choice of fossil calibration points, possibly compounded by heterogeneity in rates of sequence evolution or speciation, including radiations or 'bursts' during their early history.

Brownstein, C.D., and T.J. Near (2023) **Phylogenetics and the Cenozoic radiation of lampreys.** CURRENT BIOLOGY 33:doi.org/10.1016/j.cub.2022.12.018

Authors' abstract: *The development of a movable jaw is one of the most important transitions in the evolutionary history of animals. Jawed vertebrates rapidly diversified after appearing approximately 470 million years ago.*

Today, only lampreys and hagfishes represent the once dominant jawless grade and comprise less than 1% of living vertebrate species. Their relationship to



other vertebrates ranks among the more contentious problems in animal phylogenetics.

Further, the phylogenetic relationships within lampreys and hagfishes remain unclear, and the ages of their living lineages are largely unexplored. Because of their importance for the genomic and developmental changes that prefigured jawed vertebrate diversity, the evolutionary history of lampreys and hagfishes is a major frontier of organismal biology.

Of these two clades, lampreys are more ecologically diverse, exhibiting freshwater, anadromous, and fully marine forms, as well as parasitic and nonparasitic species.

Here, we present a new phylogeny and historical biogeographic reconstruction of all living lampreys. Whereas the early diversification of this clade tracks Pangaean fragmentation, lampreys also rapidly radiated in the northern hemisphere during the mid-Cretaceous and directly after the Cretaceous-Paleogene extinction.

These radiations mirrored concurrent ones in other animals and plants and coincided with changes to lamprey ecology and feeding behavior. Our results suggest that 80% of living lamprey clades appeared in the last 20 million years of Earth history.

Rather than gradually accumulating since the oldest stem-group forms appeared in the early Paleozoic, living lamprey biodiversity results from diversifications extending from the Cretaceous to present.

Dearden, R.P., et al (2023) **Evidence for high-performance suction feeding in the Pennsylvanian stem-group holocephalan *Iniopera*.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 120:doi.org/10.1073/pnas.2207854119 (available as a free pdf)

[Modern fish use suction to catch their prey by suddenly expanding their mouthparts to create a vacuum inside their mouths, which then sucks in water. The only modern fish not using this method are the chimaeras.]

Authors' abstract: *Suction is an especially effective way of feeding underwater, and adaptations to enhance it have evolved numerous times in jawed*

vertebrates. The only major living jawed vertebrate group including no specialist suction feeders is chimaeras, a handful of anatomically conservative fish species that feed on hard-shelled prey.

Contrastingly, in the Carboniferous (359 to 299 megayears ago), diverse chimaeras formed a prominent part of aquatic ecosystems. The Carboniferous saw the emergence of marine ecosystems dominated by modern vertebrate groups, including abundant stem-group holocephalans (chimaeras and relatives).

Compared with the handful of anatomically conservative holocephalan genera alive today, demersal durophages all, these animals were astonishingly morphologically diverse, and bizarre anatomies in groups such as iniopterygians hint at specialized ecological roles foreshadowing those of the later, suction-feeding neopterygians.

However, flattened fossils usually obscure these animals' functional morphologies and how they fitted into these important early ecosystems.

*Here, we use three-dimensional (3D) methods to show that the musculoskeletal anatomy of the uniquely 3D-preserved iniopterygian *Iniopera* can be best interpreted as being similar to that of living holocephalans rather than elasmobranchs but that it was mechanically unsuited to durophagy.*

*Rather, *Iniopera* had a small, anteriorly oriented mouth aperture, expandable pharynx, and strong muscular links among the pectoral girdle, neurocranium, and ventral pharynx consistent with high-performance suction feeding, something exhibited by no living holocephalan and never clearly characterized in any of the extinct members of the holocephalan stem-group.*

*Remarkably, in adapting a distinctly holocephalan anatomy to suction feeding, *Iniopera* is more comparable to modern tetrapod suction feeders than to the more closely related high-performance suction-feeding elasmobranchs.*

This raises questions about the assumed role of durophagy in the evolution of holocephalans' distinctive anatomy and offers a rare glimpse into the breadth of ecological niches filled by holocephalans in a pre-neopterygian world.

Miller, K., et al (2023) **Basal Primatomorpha colonized Ellesmere Island (Arctic Canada) during the hyperthermal conditions of the early Eocene climatic optimum.** PLOS ONE 18:doi.org/10.1371/journal.pone.0280114

Authors' abstract: *Anthropogenically induced warming is transforming Arctic ecosystems across a geologically short timescale, but earlier episodes of Earth history provide insights on the nature and limitations of biotic change in a rapidly warming Arctic.*

Late early Eocene strata (~52 megayears ago) of the Margaret Formation on Ellesmere Island, Nunavut, Canada sample a warm temperate ecosystem with a polar light regime situated at ~77° N paleolatitude.

This extinct boreal ecosystem hosted a diversity of early Cenozoic vertebrates, including thermophilic taxa such as crocodylians and tapiroid perissodactyls.

Here we describe two new species of the early primatomorphan Ignacius from Ellesmere, which are by far the northernmost known records for Paleogene Primatomorpha.

Ellesmere species of Ignacius are sister taxa, indicating a single colonization of Ellesmere from farther south in North America coincident with the onset of the hyperthermal Early Eocene Climatic Optimum (EECO).

The Ellesmere Ignacius clade differs from closely related taxa inhabiting mid-latitudes in being larger (thereby conforming to Bergmann's rule) and having modified dentition and muscles of mastication for a dietary regime emphasizing hard objects, possibly reflecting an increased reliance on fallback foods during long polar winters.

The late early Eocene mammalian fauna of Ellesmere indicates that its unique paleoenvironment rendered it uninhabitable to some clades, including euprimates, while selected taxa were able to adapt to its challenging conditions and diversify.

During the greenhouse conditions of the early Eocene, Ellesmere hosted a warm temperate ecosystem comparable to modern cypress swamps of the southeastern United States, in tandem with a polar light regime consisting of roughly six months of winter darkness.

[Map is from this paper and shows what the northern hemisphere looked like during the Eocene.]



Dinosaurs.

Sander, P.M. (2023) **Primer: Sauropods.** CURRENT BIOLOGY 33:R41-R60 (available as a free pdf)

Author's extracts: *Sauropod dinosaurs were the largest animals to ever walk the Earth, by far. The largest sauropods were easily four times heavier than the largest land mammals (and the largest other dinosaur species, for that matter).*

The iconic body plan of sauropods is dominated by their very long neck, in some species exceeding 14 meters in length, provided with a relatively small head.

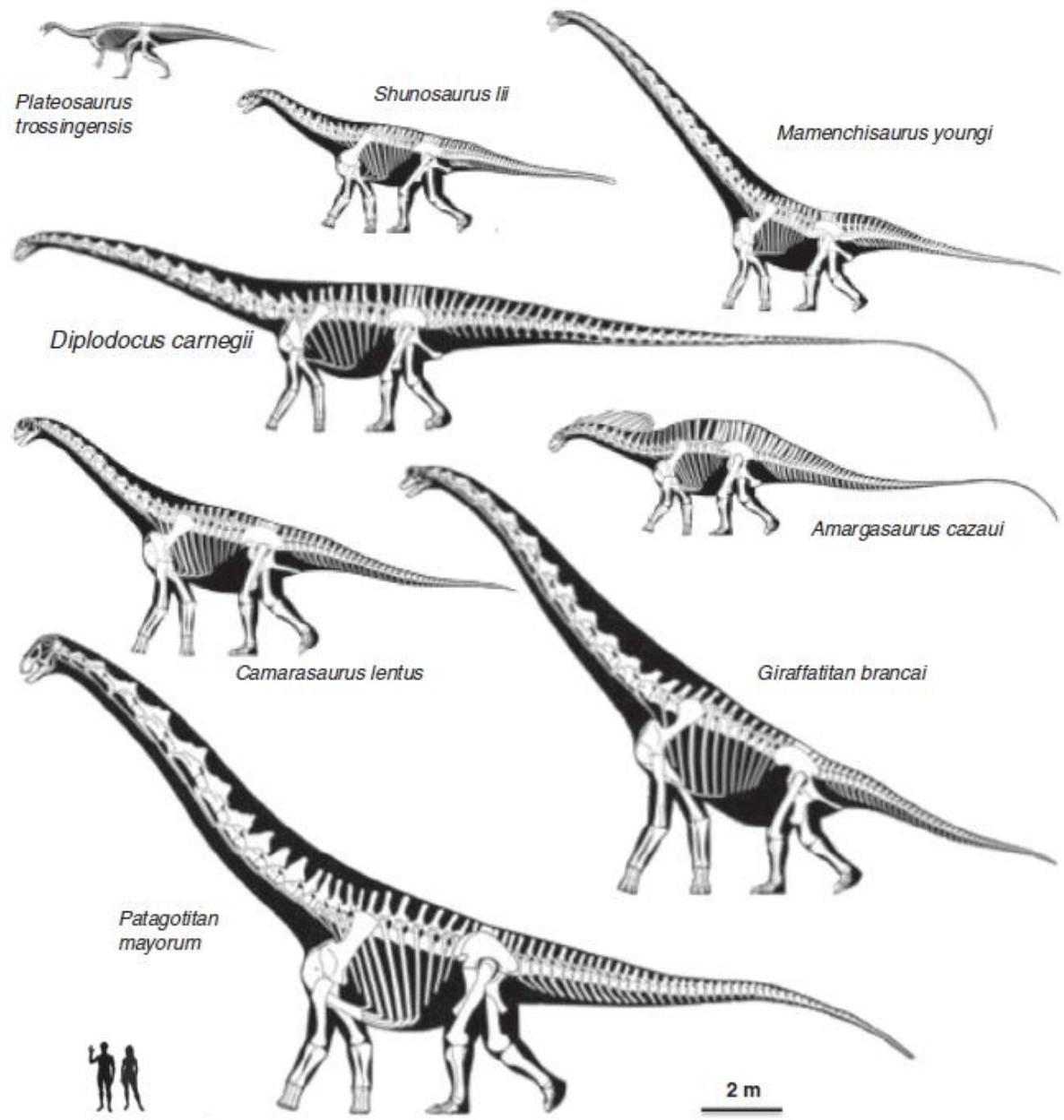
Whereas in popular culture sauropods are often depicted as the ultimate failure in evolution, exactly the opposite is the case. No other herbivore in the history of land animals was equally successful, by a wide margin and by any measure.

Sauropods existed for a minimum of 135 million years, from the beginning of the Jurassic 201 million years ago to the end of the Cretaceous, 66 million years ago.

Sauropods were the dominant herbivores on all continents for most of this time, only being rivalled during the Late Cretaceous on some landmasses by hadrosaurs.

Speirs: An excellent non-technical review of sauropods. Well recommended.

[Images are from this paper.]



Henderson, D.M. (2023) **Growth constraints set an upper limit to theropod dinosaur body size.** SCIENCE OF NATURE 110:doi.org/10.1007/s00114-023-01832-1

Author's abstract: *Despite nearly 200 years of scientific collecting and study, none of the extinct, bipedal, predatory, theropod dinosaurs have been reliably shown to exceed 12 metres in length.*

Using digital 3D models of theropods with lengths spanning 80 cm to 12 m, their body masses were found to scale to the 3.5 power of body lengths.

The lateral area of the pelvis and the cross-sectional area of the tail base of these animals corresponds to the cross-sectional areas of key muscle groups important for balance and locomotion, and both scale to the 2.4 power of body length.

Body accelerations in the lateral and forward directions are, using $F = ma$, given by dividing muscle area (force proxy) by body mass. Plotting these acceleration estimates against body length shows them to decrease exponentially.

The largest theropods with body lengths of 10 to 12 m have less than 10% of the acceleration capacity of the smaller forms.

The distinct lack of fossil remains of theropods demonstrably longer than 12 m suggests that the theropod body plan had an upper size limit based on a minimum acceleration threshold.

Rotational inertia of the theropod body was found to be proportional to body length raised to the 5.5 power, and with increasing length, the capacity for agility would rapidly diminish.

The tight relationship between theropod pelvic area and body length allows for the estimation of body lengths of specimens lacking complete axial skeletons, and this is done for four, large, well-preserved pelvises.

Zoology.

Rosenberg, Y., et al (2023) **The global biomass and number of terrestrial arthropods.** SCIENCE ADVANCES 9:doi.org/10.1126/sciadv.abq4049 (available as a free pdf)

Authors' abstract: Insects and other arthropods are central to terrestrial ecosystems. However, data are lacking regarding their global population abundance.

We synthesized thousands of evaluations from around 500 sites worldwide, estimating the absolute biomass and abundance of terrestrial arthropods across different taxa and habitats.

We found that there are $\sim 1 \times 10^{19}$ (twofold uncertainty range) soil arthropods on Earth, $\sim 95\%$ of which are soil mites and springtails. The soil contains ~ 200 (twofold uncertainty range) million metric tons (Mt) of dry biomass. Termites contribute $\sim 40\%$ of the soil biomass, much more than ants at $\sim 10\%$.

Our estimate for the global biomass of above-ground arthropods is more uncertain, highlighting a knowledge gap that future research should aim to close. We estimate the combined dry biomass of all terrestrial arthropods at ~ 300 Mt (uncertainty range, 100 to 500), similar to the mass of humanity and its livestock.

These estimates enhance the quantitative understanding of arthropods in terrestrial ecosystems and provide an initial holistic benchmark on their decline.

Zhu, P., et al (2023) **Correlated evolution of social organization and lifespan in mammals.** NATURE COMMUNICATIONS 14:doi.org/10.1038/s41467-023-35869-7 (available as a free pdf)

Authors' abstract: Discerning the relationship between sociality and longevity would permit a deeper understanding of how animal life history evolved.

Here, we perform a phylogenetic comparative analysis of $\sim 1,000$ mammalian species on three states of social organization (solitary, pair-living, and group-living) and longevity.

We show that group-living species generally live longer than solitary species, and that the transition rate from a short-lived state to a long-lived state is higher in group-living than non-group-living species, altogether supporting the correlated evolution of social organization and longevity.

The comparative brain transcriptomes of 94 mammalian species identify 31 genes, hormones and immunity-related pathways broadly involved in the association between social organization and longevity.

Further selection features reveal twenty overlapping pathways under selection for both social organization and longevity. These results underscore a molecular basis for the influence of the social organization on longevity.

Environmental Science.

He, G., et al (2023) **Survival in desert: Extreme water adaptations and bioinspired structural designs.** iSCIENCE 26:doi.org/10.1016/j.isci.2022.105819 (available as a free pdf)

Authors' abstract: Deserts are the driest places in the world, desert creatures have evolved special adaptations to survive in this extreme water shortage environment.

The collection and transport of condensed water have been of particular interest regarding the potential transfer of the underlying mechanisms to technical applications.

In this review, the mechanisms of water capture and transport were first summarized. Secondly, an introduction of four typical desert creatures including cactus, desert beetles, lizards, and snakes which have special adaptations to manage water was elaborated.

Thirdly, the recent progress of biomimetic water-collecting structures including cactus, desert beetles, and lizards inspired designs and the influence of overflow on water collection was demonstrated.

Speirs: This paper showed how water collection methods by cacti and desert animals could be duplicated by fabricating artificial duplicates. Too complicated to explain here but the paper has many illustrations of devices that can gather water out of the air.

Wang, W., et al (2022) **Abandonment of ancient cities near the Salawusu River valley, China, triggered by stream capture.** COMMUNICATIONS EARTH AND ENVIRONMENT 3:doi.org/10.1038/s43247-022-00657-6 (available as a free pdf)

[When a stream erodes back into another stream's headwaters, it will divert the course of the water, drying up the other stream and boosting the flow in the stream doing the capture.]

Authors' abstract: *Several cities in the Salawusu River basin in the western Mu Su Desert of China were abandoned after the Yuan Dynasty (1271 to 1368 CE). Incisions of rivers caused by earth uplift coupled with a drier climate after the Yuan Dynasty have previously been attributed to such irreversible abandonments.*

Here we use geomorphological analyses, coupled with hydrological reconstructions to investigate the ancient stream patterns in the period leading up to the abandonments.

We find that the abandonment of wells, the thermoluminescence age of which is about 640 years before present, in these cities coincided with a stream capture event that led to rapid river valley incision of up to 95 mm/year. We suggest that this stream piracy event lowered the water table in the area and triggered the abandonment of settlements, rather than a change to a drier climate as previously believed.

Metz, H.C., et al (2023) **Evolution of a mosquito's hatching behavior to match its human-provided habitat.** AMERICAN NATURALIST 201:doi.org/10.1086/722481 (available as a free pdf)

Authors' abstract: *A subspecies of the yellow fever mosquito, Aedes aegypti, has recently evolved to specialize in biting and living alongside humans. It prefers human odor over the odor of nonhuman animals and breeds in human-provided artificial containers rather than the forest tree holes of its ancestors.*

Here, we report one way this human specialist has adapted to the distinct ecology of human environments. While eggs of the ancestral subspecies rarely hatch in pure water, those of the derived human specialist do so readily.

We trace this novel behavior to a shift in how eggs respond to dissolved oxygen, low levels of which may signal food abundance. Moreover, we show that while tree holes are consistently low in dissolved oxygen, artificial containers often have much higher levels.

There is thus a concordance between the hatching behavior of each subspecies and the aquatic habitat it uses in the wild. We find this behavioral variation is heritable, with both maternal and zygotic effects.

The zygotic effect depends on dissolved oxygen concentration (i.e., a genotype-environment interaction), pointing to potential changes in oxygen-sensitive circuits.

Together, our results suggest that a shift in hatching response contributed to the pernicious success of this human-specialist mosquito and illustrate how animals may rapidly adapt to human-driven changes in the environment.

Botany.

Capel, E., et al (2023) **New insights into Silurian-Devonian palaeophytogeography.** PALAEOGEOGRAPHY, PALAEOCLIMATOLOGY, PALAEOECOLOGY 613:doi.org/10.1016/j.palaeo.2023.111393 (available as a free pdf)

[The Silurian era was 443.7 to 416.0 megayears ago, followed by the Devonian era of 416.0 to 358.9 megayears ago. The earliest land plants evolved during the Devonian.]

Authors' abstract: *The Silurian-Devonian plant radiation was an event triggered by the progressive colonization of subaerial habitats. Nevertheless, it is still unclear whether this radiation was globally uniform or whether alternative diversification scenarios emerged depending on the geographical context.*

Here, we report on early land plant diversity patterns across different previously defined palaeogeographical units (i.e., Laurussia, Siberia, Kazakhstania, NE, NW and South Gondwana).

Results reveal apparent diachronous events of diversification and extinction partly resulting from uneven sampling effort, especially in Gondwana. Global diversity patterns are most similar to the Laurussian curve suggesting that the observed global dynamics are mostly controlled by the historically best-sampled continents.

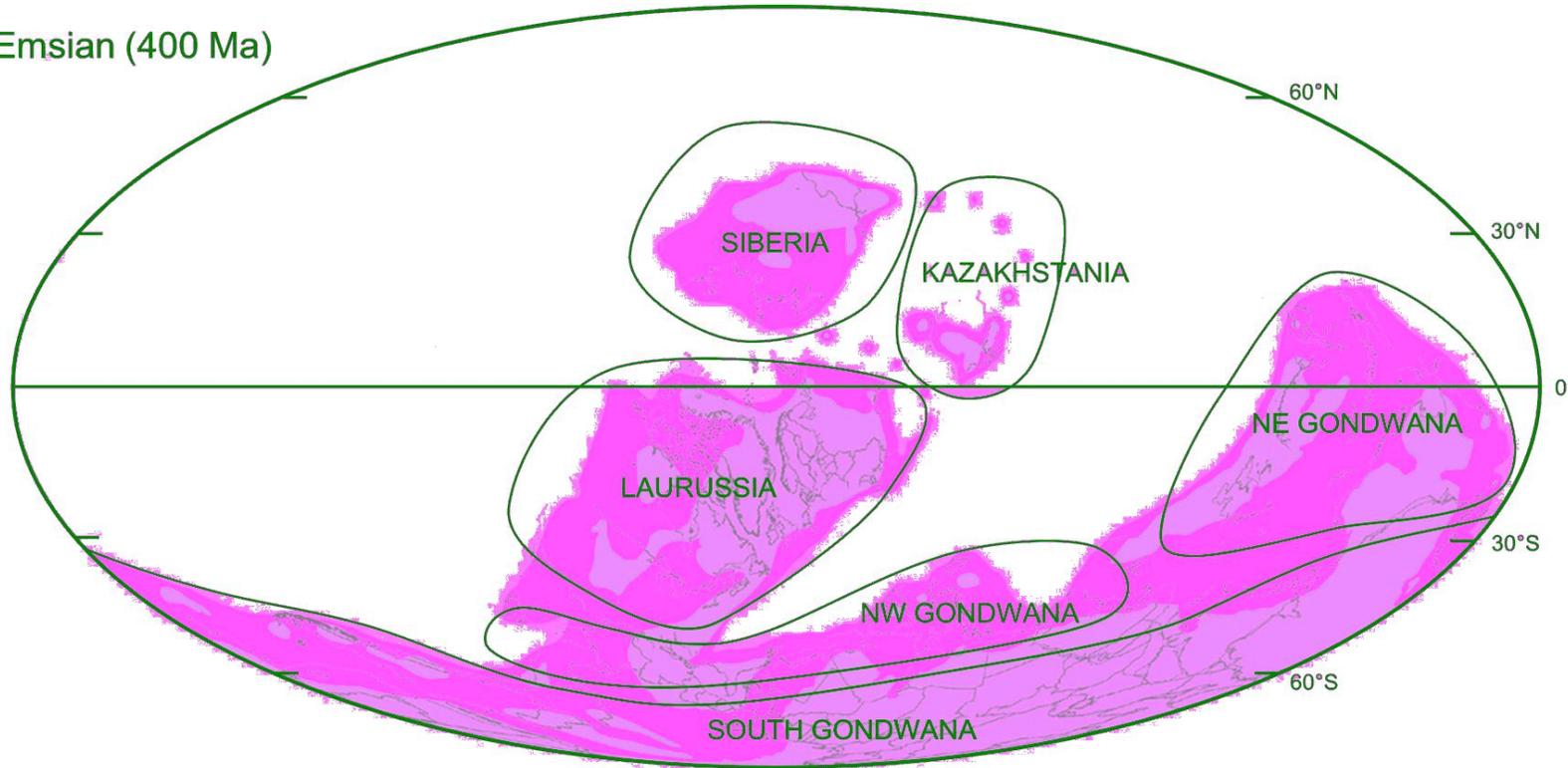
Nevertheless, changes in floral composition through time become less prone to sampling biases, and reveal geographical disparities that indicate a non-random distribution of the Silurian-Devonian vegetation.

Consequently, we further performed a set of multivariate analyses to revisit the palaeophytogeographical signal through four time-intervals, which revealed that spatial differentiation of vegetation was mainly controlled by climatic conditions and to a lesser extent geographical barriers.

Most importantly, we find the maximum provincialism during cooler periods such as during the Silurian-Lochkovian and Middle Devonian, whilst warmer periods (Pragian-Emsian and Late Devonian) coincided with increased cosmopolitanism among early land plants.

[The map is from this paper and shows Earth during the early Devonian.]

Emsian (400 Ma)



Carvalho, C.S., et al (2023) **The discovery of a new giant legume tree species in a severely fragmented landscape underscores the alarming threats to the biodiversity of the Brazilian Atlantic Forest.** BOTANICAL JOURNAL OF THE LINNEAN SOCIETY 201:doi.org/10.1093/botlinnean/boac034

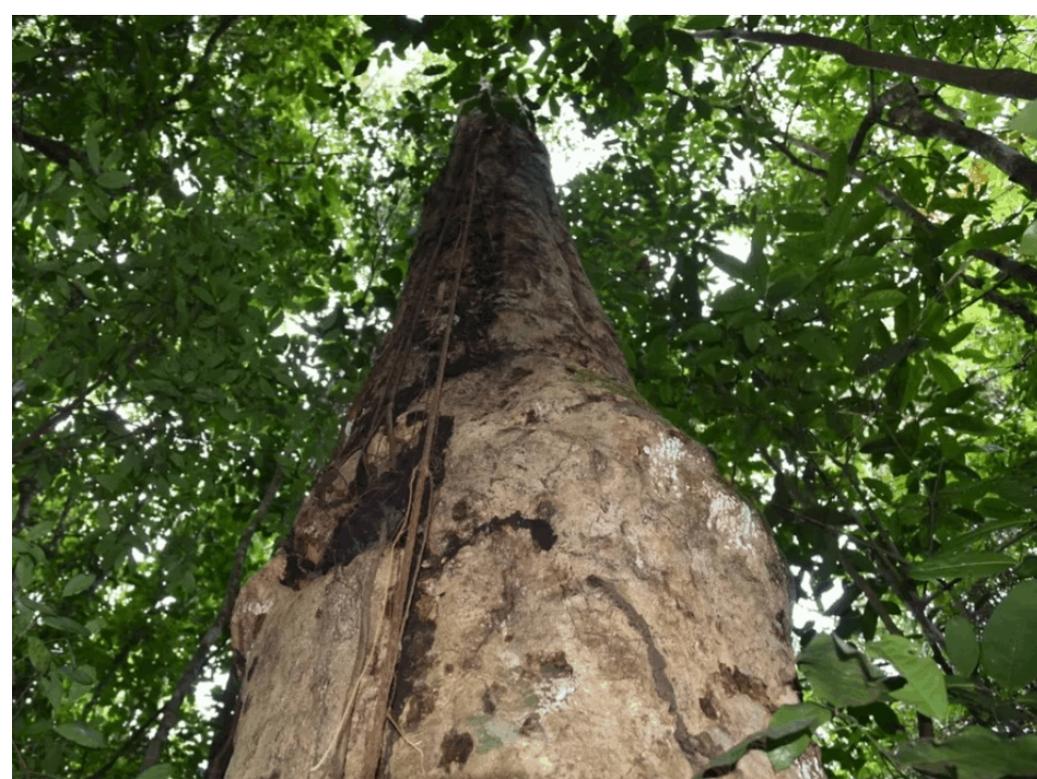
Authors' abstract: *The Brazilian Atlantic Forest domain has one of the highest levels of plant species endemism, but the intense historical fragmentation across the coastal Atlantic tropical rain forest has reduced the original vegetation to < 10% and an island-like, patchy landscape.*

Despite such unprecedented vegetation loss, biogeographically and phylogenetically interesting discoveries in different angiosperm families have been newly reported for the Atlantic Forest in recent years.

Here, we show that species discovery in the legume family (Fabaceae) across the Atlantic Forest has counter-intuitively been increasing.

Since 1850, more than half of the legume species described for the domain are endemic, and the total number of endemic species has since increased almost four-fold, resulting in the current record of 442 endemic legumes.

*One such endemic is a new papilionoid legume, only known from a few giant trees that remained misidentified for 70 years since it was first collected. This new species, described here under the name *Dipteryx hermetopascoaliana*, based on morphological, geographical and molecular evidence, represents the first endemic species to the genus in the Atlantic Forest.*



*The phylogenetic isolation of *D. hermetopascoaliana* as sister to all other species of the genus and its restricted distribution in a severely fragmented landscape isolated by sugarcane monocultures in north-eastern Brazil are a signature of how critically endangered the biodiversity of the Atlantic Forest is.*

[Images show the giant legume *Dipteryx hermetopascoaliana*.]

Karremans, A.P., et al (2023) **First evidence for multimodal animal seed dispersal in orchids.** CURRENT BIOLOGY 33:doi.org/10.1016/j.cub.2022.11.041

Authors' abstract: *Seed dispersal by animals is an essential form of dissemination in many plant communities, including seeds of over 66% of neotropical canopy tree species. Besides physical dispersal, animals influence seed germination probabilities through scarification, breaking dormancy, and preventing rotting, so plants often invest important resources in attracting them.*



Orchids are predominantly adapted to wind dispersal, having dust-like seeds that are easily uplifted. Exceptions include bird-, cricket-, and mammal-dispersed species, featuring fleshy fruits with hard seeds that germinate after passing the animal's digestive system.

*Given the similarity in fruit and seed morphology, zoochory has also been suggested in *Vanilla*, a pantropical genus of 118 species with vine-like growth.*

*We test this prediction through in situ and ex situ experimentation using fruits of *Vanilla planifolia*, and wild relatives, from which vanillin, a widely used natural aroma and flavoring, is obtained.*

Seeds from dehiscent fruits are removed by male Euglossini collecting fragrances, a unique case in plants, and female Meliponini bees gathering nest-building materials, a first among monocots.

By contrast, mammals, mostly rodents, consume the nutritious indehiscent fruits, passing the seeds up to 18 hours after consumption. Protocorm formation in digested and undigested seeds proves that scarification in the gut is not strictly required for germination.

*Multimodal seed dispersal mechanisms are proven for the first time in Orchidaceae, with ectozoochory and endozoochory playing crucial roles in the unusually broad distribution of *Vanilla*.*

Iosip, A.L., et al (2023) **DYSCALCULIA, a Venus flytrap mutant without the ability to count action potentials.** CURRENT BIOLOGY 33:doi.org/10.1016/j.cub.2022.12.058

*Authors' abstract: The Venus flytrap *Dionaea muscipula* estimates prey nutrient content by counting trigger hair contacts initiating action potentials (APs) and calcium waves traveling all over the trap.*

*The *Dionaea* mutant DYSC fires action potentials but does not snap close its traps. A first AP is associated with a subcritical rise in cytosolic calcium concentration, but when the second AP arrives in time, calcium levels pass the threshold required for fast trap closure.*

Consequently, memory function and decision-making are timed via a calcium clock. For higher numbers of APs elicited by the struggling prey, the Ca clock connects to the networks governed by the touch hormone jasmonic acid (JA), which initiates slow, hermetic trap sealing and mining of the animal food stock.

*Two distinct phases of trap closure can be distinguished within *Dionaea*'s hunting cycle: (1) very fast trap snapping requiring two APs and crossing of a critical cytosolic Ca level and (2) JA-dependent slow trap sealing and prey processing induced by more than five APs.*

*The *Dionaea* mutant DYSC is still able to fire touch-induced APs but does not snap close its traps and fails to enter the hunting cycle after prolonged mechanostimulation.*

Transcriptomic analyses revealed that upon trigger hair touch/AP stimulation, activation of calcium signaling is largely suppressed in DYSC traps.

The observation that external JA application restored hunting cycle progression together with the DYSC phenotype and its transcriptional landscape indicates that DYSC cannot properly read, count, and decode touch/AP-induced calcium signals that are key in prey capture and processing.

Lichter-Marcka, I.H., and B.G. Baldwin (2023) **Edaphic specialization onto bare, rocky outcrops as a factor in the evolution of desert angiosperms.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 120:doi.org/10.1073/pnas.2214729120 (available as a free pdf)

Authors' abstract: The environmentally stressful conditions found in desert regions have often been implicated as the main factor in the evolution of drought tolerance in desert plants.

Yet, many iconic desert plant lineages evolved prior to the recent emergence of widespread arid climates, suggesting an important role for preadaptation (exaptation).

*We provide empirical support for this view by showing that life-history evolution associated with ecological specialization onto rock outcrops was a precursor to establishment and extensive diversification in North American deserts in the desert rock daisies (*Perityleae*).*

We caution against assuming the presence of ancient dry biomes based on time-calibrated phylogenies and we emphasize the potentially limited responses of organisms to increasing aridity caused by global climate change.

In a comprehensive clade-based study, we investigate recent shifts into North American deserts in the rock daisies (tribe Perityleae), a diverse tribe of desert sunflowers (Compositae).

We sample rock daisies across two separate contact zones between tropical deciduous forest and desert biomes in western North America and infer a time-calibrated phylogeny based on target capture sequence data.

We infer biome shifts using Bayesian inference with paleobiome-informed models and find evidence for seven independent shifts into desert habitats since the onset of aridification in the late Miocene.

The earliest shift occurred out of tropical deciduous forests and led to an extensive radiation throughout North American deserts that accounts for the majority of extant desert rock daisies.

Estimates of life history and micro-habitat in the rock daisies reveal a correlation between a suffrutescent perennial life history and edaphic endemism onto rocky outcrops, an ecological specialization that evolved prior to establishment and diversification in deserts.

That the insular radiation of desert rock daisies stemmed from ancestors preadapted for dry conditions as edaphic endemics in otherwise densely vegetated tropical deciduous forests in northwest Mexico underscores the crucial role of exaptation and dispersal for shifts into arid environments.

Human Prehistory.

Plummer, T.W., et al (2023) **Expanded geographic distribution and dietary strategies of the earliest Oldowan hominins and Paranthropus.** SCIENCE 379:561-566 (available as a free pdf)

[C₄ plants are dryland plants such as grasses and drought-resistant broad-leaved plants.]

Authors' abstract: *The oldest Oldowan tool sites, from around 2.6 million years ago, have previously been confined to Ethiopia's Afar Triangle. We describe sites at Nyayanga, Kenya, dated to 3.032 to 2.581 million years ago and expand this distribution by over 1,300 kilometers.*

Furthermore, we found two hippopotamid butchery sites associated with mosaic vegetation and a C₄ grazer-dominated fauna. Tool flaking proficiency was comparable with that of younger Oldowan assemblages, but pounding activities were more common.

Tool use-wear and bone damage indicate plant and animal tissue processing. Paranthropus sp. teeth, the first from southwestern Kenya, possessed carbon isotopic values indicative of a diet rich in C₄ foods.

We argue that the earliest Oldowan was more widespread than previously known, used to process diverse foods including megafauna, and associated with Paranthropus from its onset.

Gaudzinski-Windheuser, S., et al (2023) **Hunting and processing of straight-tusked elephants 125,000 years ago: Implications for Neanderthal behavior.** SCIENCE ADVANCES 9:doi.org/10.1126/sciadv.add8186 (available as a free pdf)

Authors' abstract: *Straight-tusked elephants (Palaeoloxodon antiquus) were the largest terrestrial mammals of the Pleistocene, present in Eurasian landscapes between 800,000 and 100,000 years ago. The occasional co-occurrence of their skeletal remains with stone tools has generated rich speculation about the nature of interactions between these elephants and Pleistocene humans. Did hominins scavenge on elephants that died a natural death or maybe even hunt some individuals?*

Our archaeozoological study of the largest P. antiquus assemblage known, excavated from 125,000-year-old lake deposits in Germany, shows that hunting of elephants weighing up to 13 metric tons was part of the cultural repertoire of Last Interglacial Neanderthals there, over >2000 years, many dozens of generations.

The intensity and nutritional yields of these well-documented butchering activities, combined with previously reported data from this Neumark-Nord site

complex, suggest that Neanderthals were less mobile and operated within social units substantially larger than commonly envisaged.

Manning, S.W., et al (2023) **Severe multi-year drought coincident with Hittite collapse around 1198-1196 BC.** NATURE 614:doi.org/10.1038/s41586-022-05693-y (available as a free pdf)

Authors' abstract: *The archaeological-historical record contains multiple instances of human societies successfully adapting to low-frequency climate change.*

It is likely that consecutive multi-year occurrences of rare, unexpected extreme climatic events may push a population beyond adaptation and centuries-old resilience practices. Here we examine the collapse of the Hittite Empire around 1200 BC.

The Hittites were one of the great powers in the ancient world across five centuries, with an empire centred in a semi-arid region in Anatolia with political and socioeconomic interconnections throughout the ancient Near East and Eastern Mediterranean, which for a long time proved resilient despite facing regular and intersecting sociopolitical, economic and environmental challenges.

Examination of ring width and stable isotope records obtained from contemporary juniper trees in central Anatolia provides a high resolution dryness record.

This analysis identifies an unusually severe continuous dry period from around 1198 to 1196 (± 3) BC, potentially indicating a tipping point, and signals the type of episode that can overwhelm contemporary risk-buffering practices.

The vast Hittite Kingdom and subsequently Empire, based in central Anatolia, Turkey, with its capital at Hattusa, is recognized from both rich archaeological remains and textual sources as one of the major Old World powers of the Eastern Mediterranean and Near East between 1650 and 1200 BC.

During this time, the Hittite Empire vied with the Egyptian Empire for sociopolitical dominance in the Near East, a struggle that culminated in the largest battle of the era at Kadesh in Syria in the early 13th century BC.

Around or shortly after 1200 BC, the Hittite Empire and central administrative system collapsed in a great realignment that reverberated around the Near East.

The reign of the last known king, Suppiluliuma II, began around 1207 BC and included claimed victories against several intra-Anatolian rivals (Wiyawanda, Masa, Lukka and Ikkuna) and Alashiya (Cyprus) in sea and land battles, but no further Hittite rulers were recorded subsequently.

An inscription of the Egyptian ruler Ramesses III, approximately dated to 1188 BC or 1177 BC, depending on selection and debate in Egyptian history and chronology, lists the Hittites among those swept away by the 'Sea Peoples' before they attacked Egypt.

The end of settlement at Hattusa itself has been a key topic of historical scrutiny. Long considered a victim of attack, whether by the Sea Peoples or local Anatolian raiders, archaeological investigations now indicate that the city was abandoned and emptied by the royal administration and only later burnt.

Loffelmann, T., et al (2023) **Sr analyses from only known Scandinavian cremation cemetery in Britain illuminate early Viking journey with horse and dog across the North Sea.** PLOS ONE 18:doi.org/10.1371/journal.pone.0280589 (available as a free pdf)

Authors' abstract: *The barrow cemetery at Heath Wood, Derbyshire, is the only known Viking cremation cemetery in the British Isles. It dates to the late ninth century and is associated with the over-wintering of the Viking Great Army at nearby Repton in AD 873-4.*

Only the cremated remains of three humans and of a few animals are still available for research. Using strontium content and isotope ratios of these three people and three animals, a horse, a dog and a possible pig, this paper investigates the individuals' residential origins.

The results demonstrate that strontium isotope ratios of one of the adults and the non-adult are compatible with a local origin, while the other adult and all three animals are not.

In conjunction with the archaeological context, the strontium isotope ratios indicate that these individuals most likely originated from the area of the Baltic Shield, and that they died soon after arrival in Britain.

This discovery constitutes the first solid scientific evidence that Scandinavians crossed the North Sea with horses, dogs and other animals as early as the ninth century AD.

The Anglo-Saxon Chronicle, our primary contemporary source, records that in AD 865 a Viking Great Army landed in East Anglia. Previously, raids had followed a pattern of hit-and-run, attacking vulnerable coastal monasteries, but this new army remained longer, overwintering at camps set within the heart of England.

Over the following decade this force moved rapidly, travelling by land and water, and fighting each of the Anglo-Saxon kingdoms in turn, its strategy changing from the quest for portable wealth to the seizure of land for permanent settlement.

Human Physiognomy.

Baryah, N., et al (2023) Unusual fingerprint patterns in humans: implications for forensic casework and fingerprint research. SCIENCE OF NATURE 110:doi.org/10.1007/s00114-023-01834-z

Authors' abstract: The tenacity of the fingerprint evidence for the identification of criminals has been well documented, but none of the research work so far focussed on unusual prints. Therefore, in the present study, we attempted to define rarely encountered fingerprints in a human population.

Our purpose was to explore unusual pattern types on the finger balls and compare these with commonly occurring and classifiable pattern types. Furthermore, we discuss the occurrence of unusual fingerprints in both the sexes with reference to the finger digits.

The study was conducted on 512 participants aged between 18 and 35 years from two ethnic groups of North India. A total of 5,120 fingerprints from each digit of the 512 individuals were obtained.

The fingerprints were analysed for the pattern types based on Henry's classification. Patterns that did not fall in the prescribed category as per the definition of the published finger pattern types were identified as unusual fingerprints.

We found an incidence of unusual prints of 0.21% and describe these based on a comparison with the general pattern types according to Henry's classification. We describe eleven unusual fingerprint patterns, formulating categories that may aid in the individualisation process.

The proposed new nomenclature of these unusual fingerprints may assist forensic scientists and fingerprint examiners in better understanding and labelling of similar patterns in forensic cases.

Our research may also influence the general forensic science community and biological anthropologists in making population standards pertaining to different types of fingerprints in various population groups and their genetic and familial relationships.

Glover, J.D., et al (2023) The developmental basis of fingerprint pattern formation and variation. CELL 196:doi.org/10.1016/j.cell.2023.01.015 (available as a free pdf)

Authors' abstract: Fingerprints are complex and individually unique patterns in the skin. Established prenatally, the molecular and cellular mechanisms that guide fingerprint ridge formation and their intricate arrangements are unknown.

Here we show that fingerprint ridges are epithelial structures that undergo a truncated hair follicle developmental program and fail to recruit a mesenchymal condensate. Their spatial pattern is established by a Turing reaction-diffusion system, based on signaling between EDAR, WNT, and antagonistic BMP pathways.

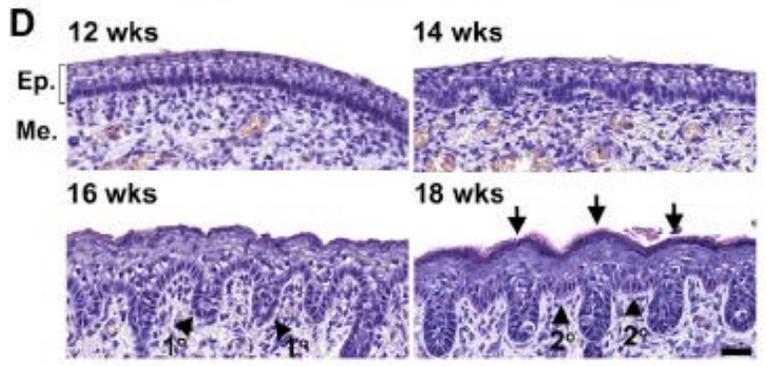
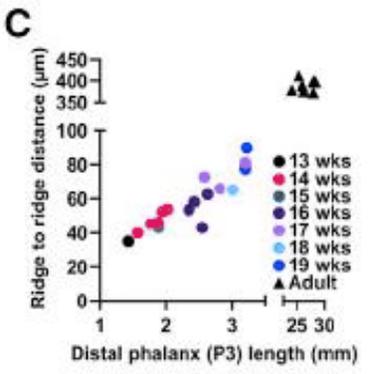
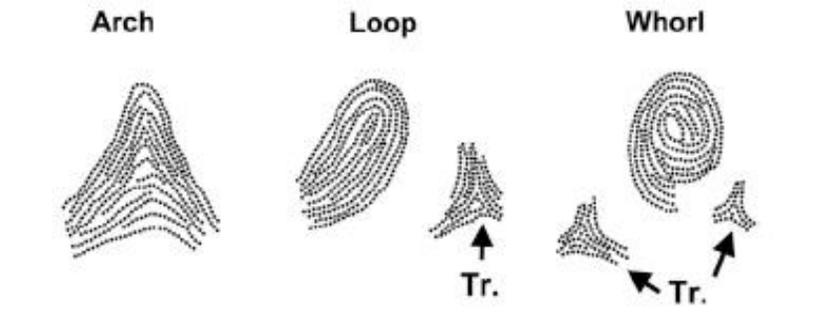
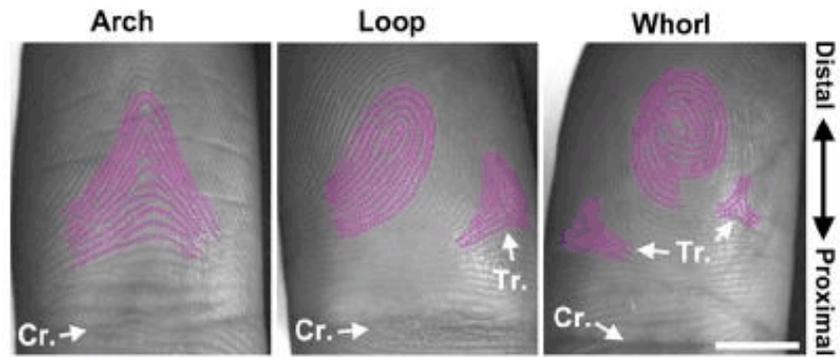
These signals resolve epithelial growth into bands of focalized proliferation under a precociously differentiated suprabasal layer.

Ridge formation occurs as a set of waves spreading from variable initiation sites defined by the local signaling environments and anatomical intricacies of

the digit, with the propagation and meeting of these waves determining the type of pattern that forms.

Relying on a dynamic patterning system triggered at spatially distinct sites generates the characteristic types and unending variation of human fingerprint patterns.

[Images are from this paper.]



Modern Humans.

Gindelsky, M., and R. Jedwab (2023) **Killer cities and industrious cities? New data and evidence on 250 years of urban growth.** JOURNAL OF ECONOMIC GEOGRAPHY 23:doi.org/10.1093/jeg/lbac015

Authors' abstract: *In the historical literature, cities of the Industrial Revolution are portrayed as having a demographic penalty: killer cities with high death rates and industrious cities with low birth rates.*

To econometrically test this, we construct a novel data set of almost 2,000 crude demographic rates for 142 large cities in 35 countries for 1700 to 1950.

Mortality actually decreased faster than fertility during the Industrial Revolution era and rates of natural increase rose in the cities of industrializing countries, especially large cities.

This implies a declining, not rising, demographic penalty thanks to the Industrial Revolution. To explain the puzzle, we posit that negative health and industriousness effects of industrial urbanization might have been outweighed by positive effects of increased income and life expectancy.

Ebatamehi, S. (2023) **How French currency imperialism in Africa led to the assassination of Muammar Gaddafi.** AMERICAN JOURNAL OF ECONOMICS AND SOCIOLOGY 81:doi.org/10.1111/ajes.12495

Author's abstract: *Who was responsible for the assassination of Muammar Gaddafi, the president of Libya? The official story says it was Libyan rebels who were seeking justice against a political dictator.*

But there is more than meets the eye regarding this assassination, which was an orchestrated event. Yet, the mainstream media have ignored the evidence that counters the official narrative.

Emails between former U.S. Secretary of State Hillary Clinton and her aide Sidney Blumenthal describe how French currency imperialism in Africa led to the death of Gaddafi.

John Perkins, a former economic hitman, draws the same conclusion. In this

article, we reveal why the French government had strong motives to silence Gaddafi and to put an end to his efforts to replace the CFA franc with a truly African currency not controlled by an imperial power.

DeStefano, T., et al (2023) **The (fuzzy) digital divide: the effect of universal broadband on firm performance.** JOURNAL OF ECONOMIC GEOGRAPHY 23:doi.org/10.1093/jeg/lbac006 (available as a free pdf)

Authors' abstract: *Differences in access to high-speed broadband between urban and rural locations are known as the 'digital divide'. Governments around the world have committed to spending considerable amounts of money to alleviate disparities in broadband infrastructure.*

However, to date, there is limited causal evidence for broadband and firm performance with even less of an understanding on whether the effects are distinct between firms located in urban versus rural localities.

In this article, we exploit geographical discontinuities in broadband availability across the UK to capture the causal effects on firms on both sides of this divide.

We find for both urban and rural firms that broadband causes an increase in their size, but not labor productivity. In addition, we find evidence that these size effects are strongest for urban firms, but for both urban and rural firms, the effects are concentrated in knowledge-intensive industries.