



OPUNTIA 558

Thanksgiving 2023

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.

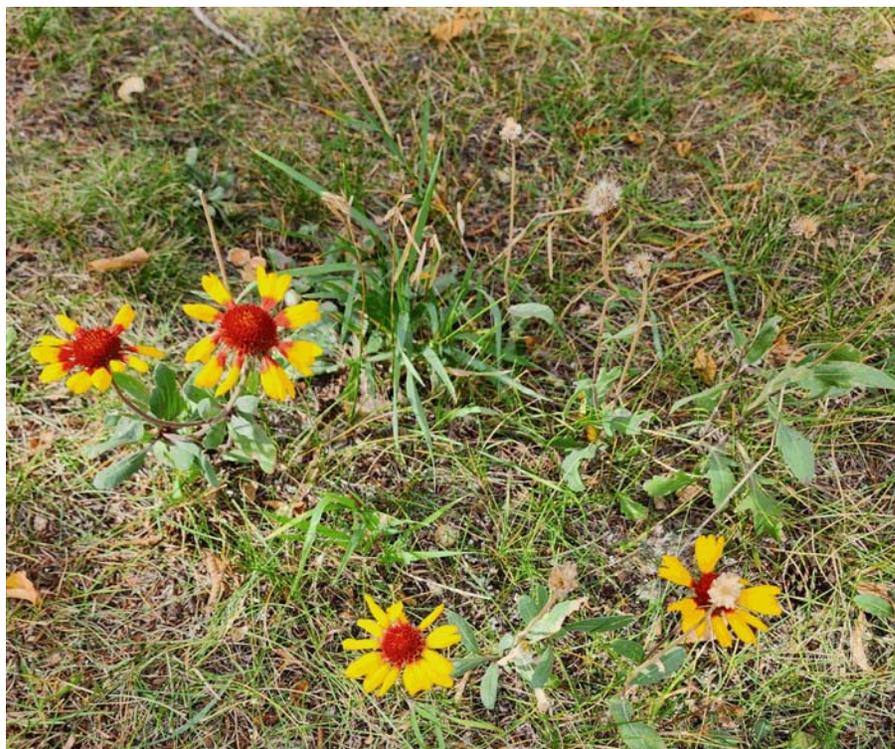
LIFE AT CHEZ OPUNTIA

photos by Dale Speirs

That time of year, alas. On the cover, the big elm tree on my side boulevard has begun changing colour. Soon a massive flurry of leaves will flutter down. Fortunately my house is on the north side of the avenue. Prevailing winds in Alberta are from the north and west, so all the leaves will blow across the road into my neighbour's yard. I bought Chez Opuntia in 1982 and in all that time have never raked leaves once.

Below: *Gaillardia aristata* is native to southern Alberta. I have been growing them directly in the lawn for years. They bloom until the first snowfall.

At right: *Rosa rubrifolia* is not native to Alberta but puts on a nice display of reddish leaves in the summer and berries through the winter.



October 2, 07h15, as I was about to depart the house, I opened the front door and saw through the storm door a creature moving about underneath the big spruce tree in my front yard. At first I thought it was a coyote feeding on a snowshoe hare. Both are common in urban Calgary.

After taking a couple of smartphone photos, I slowly eased the storm door open and held the camera out. The animal moved and I could see it was a bobcat only just slightly smaller than a German shepherd. For size comparison, the tree trunk was about 60 cm in diameter.

I slowly moved down the front steps so as not to scare away the bobcat and took a few more photos with my smartphone. Some of the photos shown here are blurry because they were cropped and greatly enlarged. I didn't have time to get out my Nikon SLR camera with telephoto lens.

I am 67 years old, have hiked countless hours in the mountains, and this was the first time I had ever seen a bobcat in the flesh. At right is the view from the door and below is a cropped close-up from that image.



Notice how well camouflaged the bobcat is against the ground and spruce trunk.



I had an urgent business appointment, so I couldn't stay and watch. When I came home two hours later, the bobcat had finished eating. A flock of magpies was feasting on the scraps. Just a few pieces of white fur with bits of meat were left for the birds to clean up.



PHILATELY OF THE 2022 UKRAINIAN WAR: PART 2

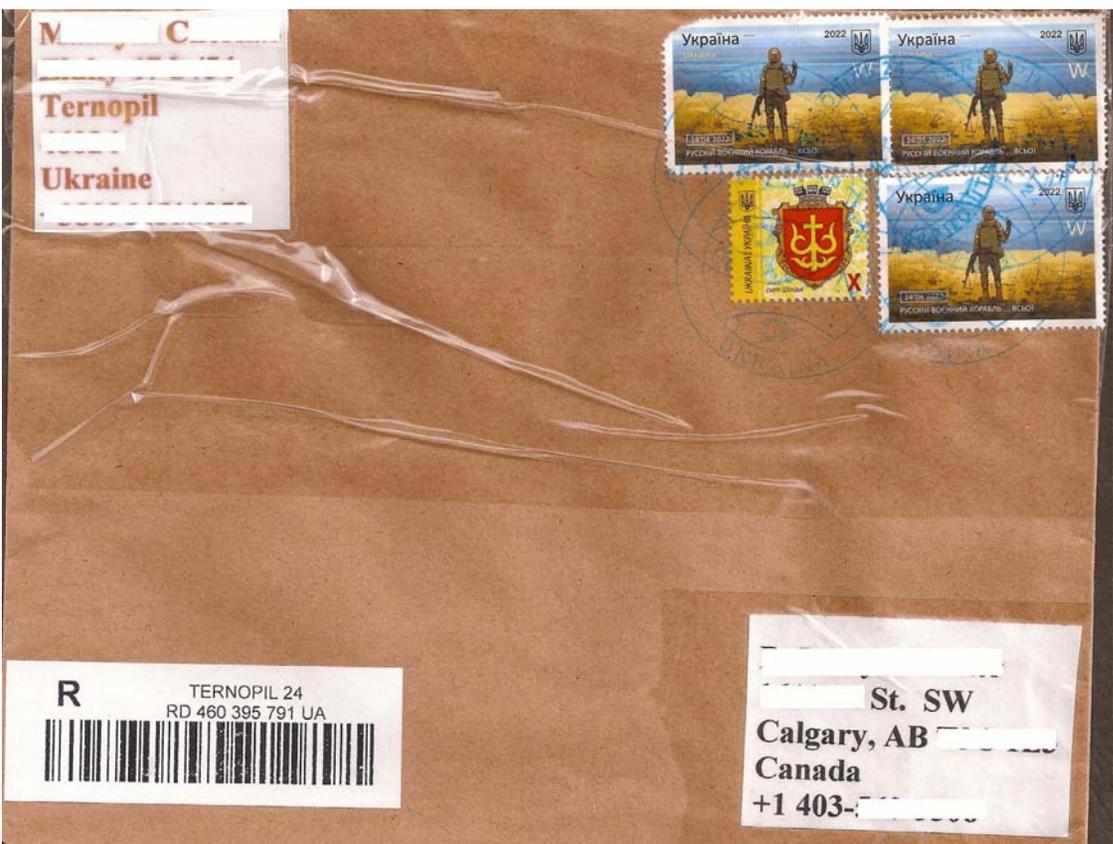
by Dale Speirs

[Part 1 appeared in OPUNTIA #544.]

10% of Canadians are of Ukrainian descent. As we celebrate Thanksgiving this October, we can give thanks we do not have to wonder if today will be the day that a missile hits our apartment building or place of work. Nor do we worry about our brothers, sons, or husbands fighting for the duration, wondering if today will be the day a “We regret to inform you” letter is received.

I am not of Ukrainian descent but have numerous friends who are. I have been collecting the postage stamps issued by Ukrposhta (the Ukrainian post office) both to finance a small bit of the war and as propaganda. Herewith I show some more stamps I recently obtained via a friend with connections in Ukraine.

Stamps are not shown at actual size or to the same scale. To start off, below is a package from Ukraine to Calgary paid with the famous F*** You, Russian Warship stamp. (See OPUNTIA #544 for closeup images of this stamp.)



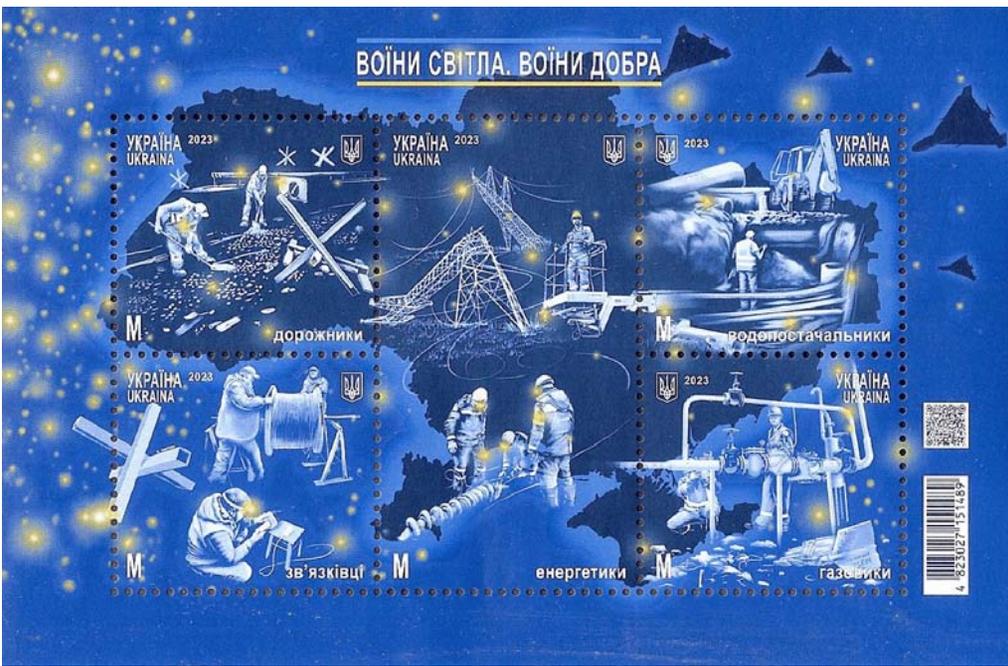
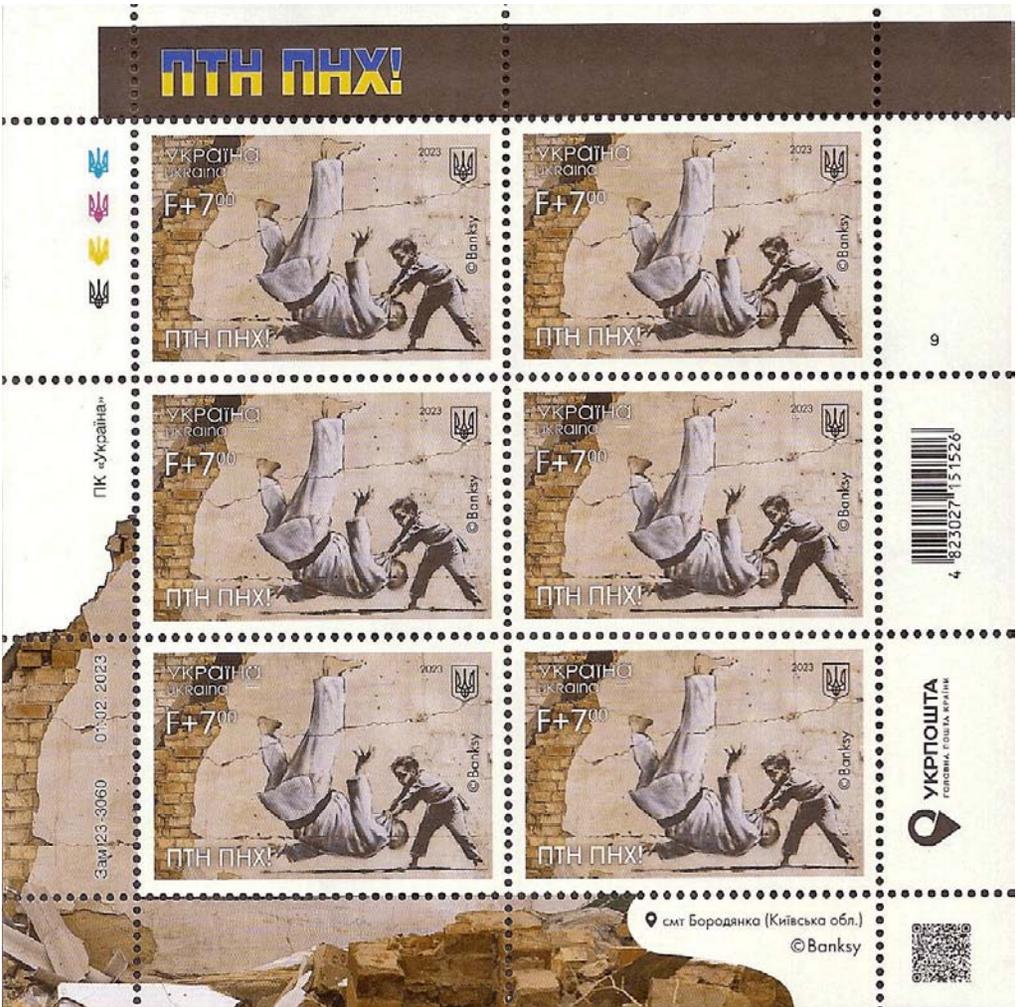
The world’s largest operational aircraft, the freighter Antonov 225 was destroyed in the early part of the war. The Ukrainian dream is to build a new one after the war ends. The stamps below mourn the loss of the plane and look forward to a brighter day.



The British graffiti artist Banksy painted some wall murals in Ukraine, one of which was depicted on a stamp. The particular significance is that the boy is throwing Putin to the ground. Putin is a judo enthusiast and was president of the international organization before being dismissed because of the invasion.

On the stamp, F is the domestic postage rate and the 7.00 hryvnia surcharge is for charity.

Bottom right: The Warriors of Light sheetlet depicts the civilian technicians who are constantly repairing war damage to utilities.



Self-evident symbolism of what Ukrainian jets are doing to Russia.



Sheetlets honouring various branches of the military services.

ЗБРОЯ ПЕРЕМОГИ

U+3.00 ЗБРОЯ ПЕРЕМОГИ УКРАЇНА 2022 UKRAINA



РСЗВ «ВІЛЬХА»

УКРАЇНА ЗБРОЯ ПЕРЕМОГИ 2022 UKRAINA **U+3.00**



РК-360МЦ «НЕПТУН»

УКРАЇНА ЗБРОЯ ПЕРЕМОГИ 2022 UKRAINA **U+3.00**



БПЛА «БАЙРАКТАР ТБ2»

УКРАЇНА ЗБРОЯ ПЕРЕМОГИ 2022 UKRAINA **U+3.00**



ПТРК FGM-148 «ДЖАВЕЛІН»

ЗБРОЯ ПЕРЕМОГИ УКРАЇНА 2022 UKRAINA **U+3.00**



ПТРК «СТУГНА-П»

УКРАЇНА ЗБРОЯ ПЕРЕМОГИ 2022 UKRAINA **U+3.00**



«М142 ХАЙМАРС»



УКРПОШТА
ГОЛОВНА ПОШТА КРАЇНИ

Зам. 22-3622 11.11.2022

4 823027 151236

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ПК «Україна»
Зам. 23-3325 29.05.2023 4 823027 152035

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УКРПОШТА
ГОЛОВНА ПОШТА КРАЇНИ

ПК «Україна»
Зам. 23-3273 10.05.2023 4 823027 151915

DIAMONDS ARE FOREVER: PART 3

by Dale Speirs

[Parts 1 to 2 appeared in OPUNTIA #499 and 528.]

Novels.

Jessica Fletcher was the protagonist of MURDER, SHE WROTE, a television mystery series from 1984 to 1997. Although the show is long gone, novels are still being published, bylined as “Jessica Fletcher and [name of ghostwriter]”.

Fletcher lived in Cabot Cove, Maine, population 3,560, where most of the early murders were concentrated. In later episodes and novels, she went traveling so as to spread the murders around and avoid turning Cabot Cove into a ghost town..

THE QUEEN’S JEWELS (2011) by Jessica Fletcher and Donald Bain opened in Cabot Cove where Fletcher was chatting with newcomers who had recently settled there.

The second paragraph of the novel contained the provocative sentence: “*A cousin who’d settled in Cabot Cove a few years earlier had persuaded them to experience the joys of small-town living.*” Seems to me that would be just cause for a legal action.

Fortunately Fletcher flew to London, England, to visit friends for a few days before returning via the Queen Mary 2 ocean liner, on board which she would be a guest lecturer. In the news at the time was the theft of a 7-carat blue diamond. During the heist the owner was murdered.

While staying in London, Fletcher had several discussions at length about the history of the diamond, an obvious set-up for the plot. The victim had links to terrorists, so MI6, CIA, Mossad, and others were sniffing about.

All and sundry took the boat ride with Fletcher. No one doubted diamonds and troublemakers would be on board. She was, after all, the world’s greatest murder magnet. There was indeed another murder, which put the entire ship in a tizzy. Suspects were plentiful for the good reason that when all was said and done, there were five culprits. They were a mix of spies, terrorists, and jewel thieves.

There was one attempt at pathos which failed because the author sprang it on the readers as a tomato surprise. The ship docked in New York harbour. Fletcher made her way back to doom-laden Cabot Cove.

Old-Time Radio: Amateur Detectives.

The OTR shows mentioned here are available from the Old Time Radio Researchers website as free downloads. Visit www.otrr.org/OTRRLibrary

MICHAEL PIPER, PRIVATE DETECTIVE was either an unsuccessful audition or the final episode of a different series MICHAEL AND KITTY, depending on who you read. Perhaps both. The show aired on 1942-02-06, no writer credited.

The episode was titled “Erie Basin Murder”. Michael Piper and his wife Kitty attended an auction of distressed goods. A small box of no apparent great value was offered up at 50-cents. Three men bid it up against each other.

A Portugese sailor with a parrot was the successful bidder. An underbidder, a Swede, objected with a knife but the sailor got the blade away from him and stabbed him. The story broke away for a commercial about Canada Dry ginger ale, America’s favourite flavour.

Michael and Kitty had an assistant, a taxi driver named Doc. He remembered taking the sailor and parrot to the Erie Basin district of Brooklyn. Off they went for various adventures, including a dead sailor and an angry parrot.

The third man at the auction, who had a vivid scar on his face, was captured and turned over to police. He said the three of them had smuggled uncut diamonds in the box. By mistake the box wound up at the auction. Scarface denied killing the sailor.

To the hospital, where the Swede was in custody recovering from his stab wound. Michael searched the room and found the little box under the mattress. The Swede had made an excursion from the hospital by means too fantastical to believe, went to the sailor, killed him for the box, and then returned to the hospital.

In the denouement, Michael tied off the loose threads, which were more like loose hawsers.

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

The first series aired during the 1941-42 season and has since vanished into the mists of time. The second version aired during the 1945-46 season, written by Ruth and Gilbert Braun. That series was syndicated on transcribed disks and thus survived.

Jim Brandon, a superscience biochemist, 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 Department Of Death" aired on 1945-09-14. The night watchman Grady was found dead at Carne's Department Store. His body was found at the bottom of an elevator shaft.

Inspector White called in Jim Brandon to assist. Always good to have a biochemist helping police on a murder case where the victim was thrown down a shaft from the fifth floor and died of physical trauma.

White and Carne figured the death was accidental. Grady hit himself on the head hard enough to draw blood, pried open the elevator door, and then jumped. Perhaps a biochemist would indeed be more useful than a police detective.

Brandon and Fern Collier spent the day snooping about the store. They watched the window dresser Roger Kilgore change the displays. The jewelry department head Mr Sheldon told them a shipment of diamonds was due, intended for a sale.

Kilgore didn't show up for work the next day. His body was found sitting in one of his displays. That night The Avenger stood guard and captured the killer who was awaiting the diamond shipment.

The murderer had needed a night in advance after the store was closed to prepare for the heist. Grady had spotted him and was therefore eliminated. Kilgore was

an accomplice who became extraneous after the preparations were completed. Sheldon couldn't steal the diamonds surreptitiously because then suspicion would be on him. Thus he tried to stage an apparent break-and-enter.

The listener will wonder though, how murder would be proven against him, or for that matter, even the proposed theft, which never happened. The Avenger's testimony would never hold up in court. Simply explaining how the murders might have been done would not constitute proof.

IT'S A CRIME, MR COLLINS was an old-time radio series. San Francisco private investigator Greg Collins was assisted by his wife Gail. The series ran for a half-season from August 1956 until February 1957, but the surviving mp3s are from an Australian syndication.

"Dull Blue Treasure" aired on 1957-04-01. Greg and Gail Collins attended a vaudeville revival show in their hometown of San Francisco. A stand-up comedian named Slappy MacTavish was killed live on stage when a prop knife turned out to be a real knife.

The Collins investigated backstage. The police? What of them? An old-timer told a tale from decades ago about an uncut diamond that Slappy and others co-owned. The idea was that eventually the stone would be sold and all would share the proceeds.

The diamond disappeared and the old-timer figured the thief was eliminating other heirs to the stone. Fellow comic Jackie Steen was the next victim. Greg interviewed stripper Candy Lamont, much to the displeasure of Gail.

The Collins watched Lamont's dance, then went backstage to strip her again. They found the diamond amongst the paste jewels on her veils. Greg spotted the uncut diamond because it didn't glitter like all the other stones but had a dull blue colour. True enough, as rough diamonds resemble greasy glass pebbles.

Lamont wasn't the thief, but another oldtimer backstage was. Pop was the stage back door custodian, but in an earlier life had done a knife act. He had been in on the diamond deal but now wanted something for his old age.

Old-Time Radio: Private Investigators.

THE ADVENTURES OF SAM SPADE, based on the character created by Dashiell Hammett, aired from 1946 to 1951. Available as free downloads from the Old Time Radio Researchers at www.otrr.org/OTRRLibrary

The series 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. Duff played Spade has a happy-go-lucky character and the episodes were not noir.

“The Rushlight Diamond Caper” was written by Robert Tallman and Gil Doud, and aired on 1948-07-04. Mrs May Rushlight was the client, who wanted Sam Spade to guard the wedding presents.

She was marrying off her nephew Ralph, who was no prize catch. As she said, he had the mentality of a snail and could eat a tomato through a tennis racket. The only wedding present worth stealing was the Rushlight diamond necklace.

Spade didn't witness the ceremony but commented that after it was over the guests shuffled out looking as if they had witnessed an execution. Ralph was obviously drunk. The bride Lotta spoke English mit der Deutsche accent. She was under the guardianship of Colonel Bixby, who was evidently glad to be rid of her.

At the reception, Lotta grabbed the necklace and ran out into the garden, pursued by Ralph. There was a scream, and as Spade and the guests arrived, they found the body of Ralph. His corpse was clutching the necklace and Lotta was gone.

The police set out a dragnet for the missing woman but couldn't find her. Spade did, for she was in his office when he came in the next morning. She said she wanted the necklace, having agreed with Ralph to sell it and split the profit.

Spade phoned Homicide, who told him the necklace in Ralph's cold hands was a paste copy. Spade told them to come and get her. He went back to the Rushlight mansion to spar with May's personal secretary Nancy Warden, then the grande dame herself.

The old lady was grief-stricken, not over Ralph but the loss of the necklace. Spade caught her out in a lie, after which she confessed. Despite her mansion

and elegant lifestyle, she was in financial distress. She had borrowed large sums from Bixby, using the diamond as collateral, quite illegally since the stone was in trust for the family.

Assorted alarms and excursions occurred, followed by gunshots and Lotta's sudden death at the hands of Bixby, with Nancy as his accomplice. The rest was details.

“The Tears Of Night Caper” aired on 1949-07-24. The initial client was Mamie Gaygan, not a polite person, who barged into Sam Spade's office. She ordered him to accompany her to Johnny McCall's illegal casino.

McCall wanted Spade to do a job for him. As the joint was crowded with big ugly guys, Spade asked why his own men didn't do the job. McCall complained bitterly that it was hard to get good help these days.

A gambler Daphne Arlington had put down as collateral for gambling debts a diamond necklace called the Tears of Night. She later threatened to call in police if the necklace wasn't returned.

When Spade arrived at Arlington's house with the necklace, she refused him admission. He saw her wearing an exact duplicate of the necklace. Spade noticed the jeweler's name Mortuous on the necklace case and went to visit the man in a hotel. He said the necklace Spade had was real.

About to depart the place, Spade saw two goons. He got some wrapping paper and mailed the necklace at the front desk. Stepping out of the hotel, he was ambushed by the goons, who beat him severely.

The episode paused for a Wildroot Cream Oil commercial which emphasized the importance of good hair grooming. How well the hair tonic worked during a beating was left unsaid.

Spade was dumped near Arlington's place. He visited her and found her delusional. He also found the two goons, who were stretched on the floor dead. After the police arrived, Spade went back to see Mortuous.

The goons had worked for Mortuous. He explained various plot coupons. He wasn't any more stable than Arlington and confessed to having shot Gaygan in his hotel room. He had wanted the necklace for his pension plan.

Gaygun staggered in half-dead and shot Mortuous fully dead before she herself died. Most of the characters having been killed off, the Wildroot announcer finished the episode.

BARRIE CRAIG, CONFIDENTIAL INVESTIGATOR aired on radio from 1951 to 1955. The episodes are available as free downloads from the Old Time Radio Researchers at www.otrr.org/OTRRLibrary

“Murder By Error” aired on 1954-07-13 and was written by John Roeburt. The client was Sarah Baxter, who thought her husband J.C. was being blackmailed. Barrie Craig followed J.C. about and saw him toss a package out of his car in the country. After he drove off, Craig checked the package and found it held \$10,000 in cash. Putting the package back, Craig waited for the pickup.

The blackmailer arrived. As he picked the package up from the ground, Craig rendered him unconscious, then bound him. The man, named Ben, woke up and gave Craig a ridiculous story about frog hunting for a medical school.

Craig put him in his car and headed back to town. The car had been sabotaged, so they had to stop. Another vehicle arrived and Stacy, the goon driving, took Ben and the cash.

Back in the city, Craig told Sarah that he would have to talk to J.C. and so he did. J.C. was uncooperative but eventually admitted he was being blackmailed by a young woman about their relationship. Craig didn't believe his story.

With some clever investigating, Craig learned the young woman was Paula White. He visited her residence where he found her about to decamp with two suitcases. Craig bluffed her into revealing that the actual blackmail was for J.C. smuggling industrial diamonds into the country and forgetting to declare them.

She told Craig the two men were working for her. Craig visited Stacy's apartment and found he had departed life with a hole in his head. The \$10,000 was still there on his dresser drawer. So was a gold cufflink on the floor, not of Stacy.

Craig then located Ben, who did not mourn Stacy's passing. When Sarah was told, she admitted more details, such as knowing about the diamond smuggling. She recognized the cufflink. The diamonds were found in a desk drawer at the mansion.

The next day she came to Craig's office and said J.C. had been with her at the time of the murder. “*A nice try and a nice lie*”, he told her. He then elaborated why she had done the murder. With that, the orchestra swung into a crescendo and so to the end credits.

Old-Time Radio: Boston Blackie.

BOSTON BLACKIE, real name Horatio Black, had at one time been a jewel thief in Boston, but later became a freelance paladin. He was created by Jack Boyle who only published one book about him, a collection of stories in 1919.

The radio shows were leavened with humour and quips. Everyone, including his girlfriend Mary Wesley, called him Blackie. Writers were not credited, although the actors were. Available as free downloads from www.otrr.org/OTRRLibrary

Blackie's nemesis was NYPD Homicide Inspector Farraday. The name was originally spelt in the usual way with one 'r' but after the series got going for some reason the extra letter was added.

During the golden age of old-time radio, there was a practice of reusing scripts every few years within a series, and sometimes between different series. There was nothing unethical about this procedure.

Because there were no home recording devices, listeners normally heard an episode only once on the air. Repetitions gave them a second chance to hear the episode.

Radio shows were live to air until the late 1940s, so each repetition was different in details. Which brings us to BOSTON BLACKIE. As was also common, the episodes were unnamed, so later OTR fans had to agree on names for them.

On 1944-06-23, an episode subsequently named “The Jonathan Diamond” aired, which was repeated on 1946-08-27 as “The Rockwell Diamond”. The same script was used with different casts. I'll review the first version.

The story began with a young woman Leigh Moray (Murray in the second version) falsely claiming that Boston Blackie had stolen \$10,000 from her grandfather. He was arrested by Inspector Farraday.

Speaking privately with Blackie, she told him that her fiancé George Atwater had given her a big rock called the Jonathan Diamond. The diamond went missing that night and her impending nuptials were in peril.

She had no faith in the police and wanted Blackie to investigate. Not knowing how to contact him, she made up a story to get the police to snag him. She helped him to escape.

Blackie went to Atwater's place, had him open the safe, and found the Jonathan diamond within. The police arrived with alarms and excursions thereabouts. Blackie was captured but not with the diamond, which went missing again.

Once out again by trickery, Blackie and Moray snuck into Atwater's mansion. They overheard him making a deal over the telephone with a fence to pay off a debt for blackmail or gambling. From there, Blackie visited the fence. The visit did not go well, with a fire, confusion, and shots fired. The diamond was recovered though, and all went well. Cue the organ music.

"The Wentworth Diamonds" aired on 1945-04-25. The episode began with a meeting of thieves planning a heist of the Wentworth diamonds from the Manchester museum. Part of the plan was to implicate Boston Blackie by dressing one of them as him and calling his name during the robbery.

The thieves were only going to take the smaller stones. The bigger ones were unsalable because they were too well known, so those stones were to be planted in Blackie's apartment.

Blackie's friend Shorty warned him of the frame, having heard the underworld gossip. Blackie telephoned Farraday, who refused to even listen to the story. Fleeing town proved unworkable.

The gang leader Roger Farling kidnapped Blackie and confirmed the details of the frame-up. The robbery went as planned, including the murder of two guards. Farraday barged into Blackie's apartment and found a big diamond.

Mary Wesley and Shorty were there, and the three settled in to wait. Blackie arrived, blethered with Faraday, and told him the diamonds were still in the museum. They were, but nonetheless two guards were dead. The stone Farraday found and which Farraday now held was paste.

Back to Farling's hotel room, where one of the real diamonds was found. He seemed to take the incriminating evidence and his impending execution for murder with savoir faire.

At that point, Blackie went into an elaborate explanation of how he had switched the diamonds back and forth with paste stones. The two dead guards were just minor details to Blackie, if not Farling, who would fry for them.

"The Richards Diamond" aired on 1945-10-25. Boston Blackie was called in by John Richards to appraise a \$75,000 diamond he was thinking of buying. After Blackie left, Richards' wife Myra heard him answer the door. Shots were fired and John died.

Blackie was the main suspect, not in the least because he had a fresh gunshot wound he couldn't or wouldn't explain. He spent most of the episode evading Inspector Farraday and the police.

As later explained, Blackie had been slugged unconscious after leaving the Richards house, then shot in the shoulder. He woke up unable to figure out how he got the wound.

Mary Wesley had her own problems. A man named Robert Washburn filed a complaint that her dog savagely bit him. Notwithstanding that, she entered the mutt in the local dog show.

Blackie visited Myra and took the diamond from her. Farraday was hiding there and arrested him for murder and grand theft. Somehow Blackie got away and went to the dog show. Mary's dog escaped and they chased him.

They found the dog digging up a jacket. Farraday also got a blood-stained jacket from an anonymous source. He and Blackie met up at the cleaner whose tag was on the jackets. The cleaner said the bloody jacket had been brought in by Washburn.

Farraday visited Washburn and found he had a bullet wound in his shoulder. He had done the deed but had been unsuccessful in grabbing the diamond. Blackie was vindicated once again.

COZY FANTASY

by Dale Speirs

Not really Miss Marple in Middle Earth but fantasies that were not the usual quests or sword swinging. Many of these stories were vignettes, with no real action.

WYNGRAF, subtitled “The Magazine Of Cozy Fantasy”, seemed interesting when I stumbled over a reference to the publication somewhere on the Internet. Their website is at www.wyngraf.com I bought the first two issues from Amazon print-on-demand.

The first issue, dated 2022 Summer, had nine stories, a few of which I’ll mention here. “Your Own Beeswax” by Dan Crawford was about a minstrel named Polijn who came to a sacred forest.

At the centre was Vanagh, an ambulatory stone statue protecting a hoard of gold bees. Not real bees with gold cuticles, just lumps of pure gold cast as bees. Needless to say the pile was an awful temptation.

Those who tried to steal the gold bees could not leave the forest and were turned into non-ambulatory statues. Polijn was able to trick Vanagh into leaving her alone. She then left the gold bees behind and was able to leave the forest.

“Vigil” by Nathaniel Webb covered something that I don’t recall many sword-and-sorcery authors ever mentioned. Mail delivery would be just as important to elves and witches as any suburbanite in our world.

This story covered the saga of a Cadet Messenger on her first delivery. Over cliffs and into magical forests, on she went. She finally reached the terminus, a hamlet so unimportant that the government never bothered to build a road to it. The mail must go through.

“Dragonsmith” by Angelica Fiori was about a village blacksmith making egg-sized dragons in his forge. They were animated and flew about for the day of the village fete before becoming unanimated.

His problem was trying to keep them under control. Dragons guard treasure, so a silver coin was more than enough for each miniature dragon to settle down and nest.

WYNGRAF #2, dated 2022 August, carried ten stories. Like the previous volume, the stories are not always derring-do and swashbuckling. Many are simply vignettes.

As an example, “The Hippogriff” by Adam McPhee was about the trouble required to breed, hatch, and train hippogriffs. For those not up to date on their mythology, a hippogriff is a hybrid between a male horse and a female griffin.

The story follows how the breeding could be done in the first instance, not an easy task. Then a trainer had to stay alone with the egg until it hatched, so the newborn hippogriff would imprint on him. Thereafter would follow the raising and training, a long procedure.

“In The Court Of The Litigious Elves” by Robert E. Harpold had a plot pretty much explained by the title. Some mighty-thewed barbarians took refuge in the Forbidden Forest to escape a posse.

They soon learned why the forest was forbidden when they were swarmed by elves for disobeying a multitude of laws. The warriors found themselves in a courtroom arguing case law and interpretations instead of swinging swords.

“A Murder Of Heroes” by Matthew Cote was an interesting look at a village plagued by Heroes, barbarian swordsmen come to slay the dragon. They were warmly welcomed by the innkeepers, who encouraged them to spend their coins before going out to kill the dragon.

While the Heroes were quaffing their beers and throwing their money around, a villager would nip out and warn the dragon. The Heroes set off to slay the beast and none returned. Very profitable for the village.

Unfortunately one day a Hero managed to survive, albeit the dragon was only wounded. However, with a bit of trickery the problem was solved.

FELINE COZIES: PART 3

by Dale Speirs

[Parts 1 to 2 appeared in OPUNTIA #537 and 543.]

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.

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.

CAT IN A VEGAS GOLD VENDETTA (2011) began when Savannah Ashleigh asked Barr, by now the Miss Marple of Las Vegas, to investigate the death of her aunt's handyman. Barr was dealing with her ex-fiancé and her current fiancé and therefore was happy for a distraction.

Aunt Violet wasn't well but was very rich. Assorted heirs were revolving around her. None of them were happy to learn that she was going to leave her estate to her clowder of 30+ cats.

After numerous alarums, both feline and human, the hoorah finished with Auntie making out a new will. The document promptly went missing but Midnight Louie and Midnight Louise sniffed it out. Such helpful cats, saving the probate court no end of trouble.

CAT IN A WHITE TIE AND TAILS (2012) was the next installment. Temple Barr and her fiancé Matt Devine went to Chicago to meet his family. Midnight Louis accompanied them, under protest, in a carrier.

The flight was quiet compared to Chicago, where Midnight Louis was catnapped. He eventually worked himself free. The alarums in that city sent Temple and Matt fleeing back to Las Vegas. Not so much because of the alarums per se but because they provided clues to the murder of Matt's stepfather some time before.

A serial killer was on the loose but wasn't topping victims at random. Not all the deaths in this novel were attributable to him. Others met their ends in various ways, including an electrified water attraction.

Louis provided helpful clues from time to time, including advice to Temple to answer her cellphone. To be fair, he was sleeping on top of it where she set it on the coffee table at heavy vibrate. Quite a shock to his peaceful slumber when the cellphone suddenly vibrated his tender areas.

The plot didn't so much end as it set up the next novel. Conspiracies abounded and most of the supporting characters were not as they seemed. I reviewed that next novel in OPUNTIA #398.

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.

Which brings us to A WHISKER OF TROUBLE (2016). Charlotte's Angels teamed up again with Sarah Grayson and Elvis. Local collector Edison Hall had departed to the next world by a natural death.

Sarah hoped to bid on some of his stuff for her shop. The body, the suspicious one that is, was Ronan Quinn, an appraiser who had been hired to inventory Hall's wine cellar for the estate. Elvis found his corpse. Quinn never got a speaking part.

Edison's son Ethan said the wine collection was full of fakes, cheap plonk in bottles with counterfeit labels. Edison's sister Stella hired Charlotte's Angels

and Sarah, and presumably Elvis, to investigate. The Deppity Dawgs were much annoyed.

The wine scammers were caught but they weren't the murderers. Ethan was, having resold some of the fake wine to other gullible collectors. The final fight was no contest. Him versus Sarah and Elvis. The cat had four sets of stilettos on his paws and knew how to use them.

TELLING TAILS (2017) was the fourth novel of the series. Sarah Grayson's employee Rose was delivering a purchase from the secondhand shop to a customer Jeff Cameron, just in time to see him murdered by his wife Leesa.

Rose was slugged unconscious. When she revived, no one would believe her story. Leesa said her husband had left her. The storyline was messed up when someone then murdered Leesa.

Charlotte's Angels and Sarah went into action, with an occasional assist from Elvis. The killer was Jeff's sister, who had some family problems and detailed them at great length in her blab-all confession. Surprisingly, Elvis wasn't there at the denouement. Probably catnapping.

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.

HOOKED ON A FELINE (2021) took place at a music festival called The Last Bash, featuring elderly rock musicians. The deceased, and there was one, was a musician who had been researching his family history at the library where Kathleen Paulson worked.

Robbery was the suspected motive but more to the crime was revealed. The victim was Mike Bishop, local dentist and part-time bass guitarist, who was filling in for one of the bands.

The middle part of this novel was mostly sorting out genealogies and inheritances. Another death was barely noticed amidst sorties into the genetics of eye colours and whether blue-eyed parents could have a green-eyed child. Not

just academic points, as there were family legacies and trust funds involved. The standard ending ensued. Trapped by the killer, rescued at the last second, helpful cat with claws. You know the drill.

WHISKERS AND LIES (2022) took place during Halloween. Kathleen Paulson was in charge of the Reading Buddies Halloween Party at the library. She met with local baker Georgia Tepper for the refreshments, which were graveyard cupcakes and tombstone cookies. No recipes though, as this book was a cat cozy, not a food cozy.

Tepper was harassed by a very nasty mother-in-law Margery Wyler who was subsequently found dead. That began the Marpleing because Tepper was the obvious suspect.

Margery made enemies easily and kept them, so Kathleen and the cats had a lot of sleuthing to do. The cats were very helpful with physical clues, entering houses or cars and returning with scraps of paper or artefacts. They carried them in their mouths of course, which made for slobbery clues and inadmissible in court, but useful clues nonetheless.

The culprit was another family member who was fed up with Margery and expressed his resentment with a blunt instrument.

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 CAT, THE WIFE, AND THE WEAPON (2012) began with Jillian Hart returning to Mercy after a tour of craft fairs and cat shows. She went to visit her boyfriend Tom Stewart and found him gone. Mark well his name; she would eventually marry him.

Living in his house was Bob Cochran, claiming to be his half-brother. What concerned Jillian more than Tom's disappearance was that his cat Dashiell was diabetic and needed help. First things first.

The constant daily care required for diabetic animals reminded me of why my father, a livestock veterinarian, left the cat and dog trade to other veterinarians. People get emotional about their pets and try to keep an old cat alive that should be euthanased instead of poked with a needle several times per day for sugar testing or insulin.

But I digress. Tom soon turned up. He had several fantastical stories about his dysfunctional family, bad business partners, and enemies seeking revenge. Then his stolen car was discovered with a dead man inside. These all made the book more noir than cozy.

The next body was found in Tom's back yard, followed by disclosures that some of the white trash in his family were feuding over an impending inheritance. Jillian, however, concentrated on Dashiell as being more important than the humans. She wasn't wrong to think so.

In the final confrontation, Jillian's own cats spread the alarm to the police that Timmy fell down the well, pardon me, Jillian was held at gunpoint. The epilogue had quite a few details to clarify.

THE CAT, THE MILL, AND THE MURDER (2013) started with Jillian Hart volunteering to help clear out a colony of feral cats at an abandoned textile mill. She discovered Jeannie Sloan, who had gone missing a decade ago in search of her wayward daughter Kay Ellen.

Now here she was, in rags, half blind, a ghost cat named Boots for a pet, and as the Scottish say, tetchd. She said she was guarding a holy site. What it was soon transpired to be the skeleton of Kay Ellen, murdered by someone else and stuffed into a chimney.

Working in and around the forensics team, Jillian and friends tried to round up the feral cats. Her problem was that she kept seeing Boots but no one else did. Among the other gossip about the mill was that treasure was hidden there.

The denouement took place inside the mill and tied together all the threads. Jillian was saved from the killer when Boots had all the feral cats swarm him.

Cat Cafés.

Cate Conte (pseudonym of Liz Mugavero) had a cozy series about Madalyn (Maddie) James of Daybreak Island, Massachusetts. She operated a cat café where customers could have a coffee and adopt a cat in one convenient stop. Apparently it's a real thing, although one wonders how the local health board reacts. Maddie found a stray cat and took it in, naming him J.J.

CAT ABOUT TOWN (2017) was the first novel in the series, just after Maddie James arrived in the village. A local sharp-practice man Frank O'Malley tried to take her grandfather's land, against which Maddie fought back. Someone else fought back even harder and murdered O'Malley.

The deceased was not beloved by anyone, including his son and wife. To be fair, they were ill behaved and made his life hell. A second murder threw gasoline on the fire. Maddie carried J.J. about, earning her a reputation as a cat lady, although everyone loved the cat.

The denouement was with a business owner who had killed O'Malley because he was trying to destroy her business. The second murder was done by the dead man's son, who was just looking for cash. Those were just the penultimate wrapping up of details. The big news was Maddie establishing a cat café in her grandfather's house.

PURRDER SHE WROTE (2018) was the sequel. The grand opening of the cat café was a barnburner, as we say out on the prairies. J.J.'s House of Purrs was enlivened when staffer Adele Barrows got into a fight with matron Holly Hawthorne.

The latter had a twin sister Heather, which was emphasized on page 4, so the reader would be alerted. Holly only survived to Chapter 8. Someone suffocated her by stuffing a catnip mouse down her throat.

The police considered Adele as the prime suspect, so Maddie Jones went Fletcherling. This time she was hampered by having to run the cat café. Plus, no one would return her cellphone calls.

Maddie had a run-in with Heather. The sleuthing concentrated on the Hawthorne family, who were rich, snobby, and headed for a fall. Maddie figured out the killer's identity, who was taking revenge for wrongs perpetuated by the family.

Another Meow, Another Murder.

A FAMILIAR TAIL (2016) by Delia James was the first novel in a cat cozy series about Annabelle Britton, newly arrived in Portsmouth, New Hampshire. By the third chapter she had been adopted by a grey smoky cat named Alistair.

His previous owner Dorothy Hawthorne owned a cottage which soon became the centre of attention for all concerned. Hawthorne and another man had been murdered, and the Marpleing was afoot. There was magic in the air, as Annabelle developed into a witch and Alistair became her familiar.

There were also a plethora of shady real estate deals and frauds, all of which came out at the trial. Not mentioned in court was Alistair's part in solving the case. A meow here, a nudge on the ankles there, and pretty soon the crimes were solved. However, cat testimony is not admitted into court records.

FAMILIAR MOTIVES (2017) introduced Annabelle Britton to local veterinarian Ramona Forsythe when she took Alistair for his shots. Not quite that easy for a witch's familiar but as both Annabelle and Ramona were witches, they were able to keep Alistair under control, sort of.

Also at the clinic was Ruby the Attitude Cat, the spokes-kitty for a line of pet food. The plot began when Ruby went missing and Ramona went dead. The Marpleing that followed was suffused with magic, although that didn't seem to speed up the investigation.

Social drama and business feuds were uncovered. The main scandal was tainted pet food killing off cats. The culprit trying to cover up the scandal murdered Ramona for fear she would expose them.

Cat Couture.

CAT GOT YOUR DIAMONDS (2016) by Julie Chase was the first novel in a cozy series about Lacy Marie Crocker of New Orleans. She opened a shop specializing in cat and lapdog couture, continuing the fine tradition of Marpledom of ridiculous businesses that couldn't possibly be economical.

She sold scarves, tutus, and booties for critters. I can just imagine trying to make our barn cats back on the ranch wear them. The shop carried organic pet treats.

Lacy's troubles began when an annoying customer was found dead in front of her shop, another traditional Marpleism. The police decided whoever was closest to the body was the prime suspect, so Lacy had to go into the sleuthing business.

Not all bad, though. She got an order to supply leg warmers for a herd of llamas (first paragraph of Chapter 12). Pause for laughter from Peruvian readers. This was in Louisiana, mind you, where frost three nights in a row is considered a hard winter. There are llama breeders in Alberta, where we have real winters, and I'm sure they don't worry about keeping woolly animals warm.

The alarms were more physical than normal for cozies, as Lacy was beaten hard several times. The killer was trying to plunder her store for complicated reasons, including hidden diamonds she didn't know about.

The wrap-up was the Animal Elegance Gala. Everyone was there. The llamas looked lovely in their leg warmers. Lapdogs in tutus were a tripping hazard throughout the ballroom. The book finished with recipes for pet treats.

CAT GOT YOUR CASH (2017) was the sequel. Lacy Marie Crocker mad friends with a fashion designer Annie Lane, who did not long survive their acquaintance. Lane didn't survive past Chapter 1, leaving two Siamese kittens to mourn her.

NOPD Homicide didn't want the kittens, so Lacy took them home, only to have them catnapped. When Lane's will was read, her fortune had been left to the cats. The scramble was on, with Lacy at the heart of the case.

More violence, another murder, and Lacy had her leg broken. The killer was an ex-employee who embezzled from Lane and was brought to justice. The kittens were okay and were adopted by Lane's parents, who could use the money.

CAT GOT YOUR SECRETS (2017) was the third novel in the series. Lacy Crocker was helping her mother organize the National Pet Pageant. Along the way, she delivered an order of pet treats to a corpse. This time her father was the prime suspect, but to leaven the mix she became the target of a would-be blackmailer.

Marpleing two tracks of enquiries while running a pet food and couture store kept her busy. The deceased had been wealthy and the potential heirs were broke. Once again Lacy got herself beat up as she narrowed down the list of suspects. By now she should be in a wheelchair, drooling. But the murderer was captured, so the beatings were worth the medical bills.

Sneaky Pie Brown.

Rita Mae Brown has a three-decades-long series about Mary Hariston, the Miss Marple of Crozet, Virginia. She was assisted in her sleuthing by her cats Mrs Murphy and Pewter, plus a corgi Tee Tucker.

THE BIG CAT NAP (2012) concerned the murder of a local mechanic, bashed in the head in his shop. Haristeen discovered the body, to no reader's surprise. She and her four-legged companions were on the case at once. She was also busy with her smallholding and her husband had a veterinary practice.

A very anthropomorphic novel, as not only did the cats and dogs chat to each other, so did the wildlife. Later on, the cats found a body in the cemetery, still fresh and not buried with benefit of ceremony. Other people's cats only find mice.

In the denouement, a gang of mechanics had been substituting used car parts and invoicing for new. They feared the dead were going to expose the scheme. The cats, meanwhile, continued their feud with a local blue jay.

PROFESSOR CHALLENGER MARCHES OUT AGAIN: PART 3

by Dale Speirs

[Parts 1 to 2 appeared in OPUNTIA's #326 and 435.]

Sir Arthur Conan Doyle's other great character was Professor Challenger of the Lost World fame. Pastiche about him are rare. I wish there were more.

Chapbooks.

I've been seeing more inexpensive chapbooks on the market lately, a method of selling novellas other than to magazines or blogs. These are published as print-on-demand by Amazon, where I do 95% of my book buying.

THE GOVERNESS by Stephen Gallagher (2021) was a Professor Challenger 36-page chapbook pastiche. The story was narrated by Edward Malone, the newspaper reporter who had accompanied Challenger to the lost world of Mount Roraima.

Malone's personal life was a mess. His wife Enid, daughter of Challenger, had left him after she learned about his 3-year-old son by an illicit relationship. The boy had subsequently died and now his ghost was roaming, unable to find its way.

Challenger reluctantly agreed to help in exchange for Enid getting a no-contest divorce. The two men visited a mystic named La Paix. He recommended they contact a spirit named The Governess, whose job was to shepherd the souls of lost children.

The locale was Kensington Gardens park, where many lost souls congregated. Challenger and Malone found the Governess and a massive crowd of children's souls. She promised to return Malone's son to his world. So she did, in an ending that will evoke emotions from the sternest reader.

THE VALLEY OF THE LOST (2020) by William Meikle took Professor Challenger and his Boswell, the newspaper reporter Edward Malone, to the wilds of Montana. They found a large hidden valley protected by vertical cliffs.

The valley was populated by Pleistocene fauna, relicts from the ice ages. Giant eagles, which had been hunted to extinction outside the valley, attacked the

Challenger expedition to pep up the plot. Along the bottomlands a herd of mammoths roamed. The men were also attacked by saber-tooth tigers.

The second half of the chapbook was about a tribe of hairy pygmies who had been partially converted to Christianity by a now elderly man who had forgotten his name and called himself The Pastor.

He hadn't quite gotten the little people to understand the tenets of religion. As an example, they executed intruding prospectors by crucifixion. Since the Pastor only knew one hymn, that was all they ever sang. After various alarms the Professor and Malone escaped the valley.

William Meikle published a series of inexpensive chapbooks, each containing three novellas and available from Amazon print-on-demand.

LAB (2020) had three stories, two of which were non-Challenger. "Ice" was a Professor Challenger pastiche, narrated by newspaper reporter Edward Malone. The professor and an inventor John Logie-Baird were helping prepare a new Arctic animals exhibit at a London zoo.

Logie-Baird's new refrigeration unit was too efficient. The device ran out of control, producing massive amounts of ice from atmospheric moisture. The controls were blocked off by the ice, which began spreading over London.

As the city was crushed by the ice sheet, Logie-Baird managed to cobble together a heat machine with the help of Challenger. Trouble was, the machine could only tunnel through the thick ice, not melt the sheet covering London.

They drilled into the ice, heading to the refrigeration machine deep in the centre of the newborn glacier. After trials and tribulations, they finally reached their target and shut it down.

The ending skated over what happened to Logie-Baird. Despite the deaths and destruction of the city, he escaped with little more than some censure in the newspapers.

SPORE was a 2020 chapbook by Meikle collecting three stories, one of which was a Challenger pastiche. "The Kew Growths" began with Edward Malone sent by his editor to report on the grand opening of a new tropical greenhouse at Kew Gardens.

Hidden in the jungle foliage of the greenhouse were giant mushrooms, humming a quiet melody. The next day about a dozen people who had been there came down ill. Malone went to investigate and found the greenhouse closed to the public.

He watched a man sneak inside and followed at a distance. The stranger performed some sort of rite to calm the mushrooms. As he departed, he spotted Malone in hiding and cheerfully introduced himself as Thomas Carnacki.

The initial infestation had been stopped. Unfortunately some spores escaped and the mycelia began to spread over London, killing vegetation. Malone summoned Professor Challenger for help.

Then the fruiting bodies rose up, their singing stupifying humans and allowing the mycelia to infect and hollow them out. London was covered with the giant mushrooms. The spores were blowing in the wind out to the Home Counties.

Malone and Challenger visited Carnacki. He had a ritual which could stop the mushrooms but only within the sound of his own voice. Not to worry, as Challenger knew an inventor who had invented a device called a loud speaker.

Across the city they went to find the device. London was once again in ruins, and the trio fought their way through a forest of mushrooms. The loud speaking device was a tall diaphragm which, when hauled to the rooftop, carried Carnacki's chant across the city.

The mushrooms were not all instantly vanquished. Months were needed to destroy all the patches. London slowly rebuilt. A profitable time to be a contractor.

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

[Theo's quarterly mail art postcard for the turn of the seasons. View side is on the next page.]

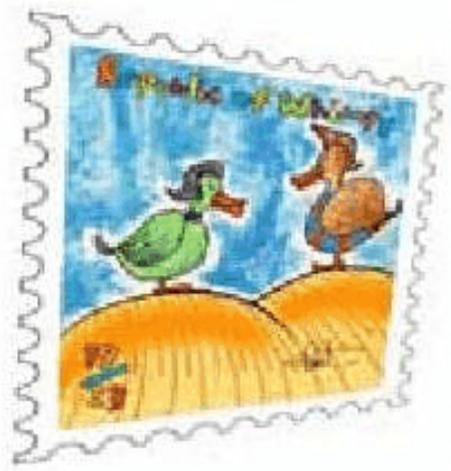
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Oranges, Yellows, and Reds,
The colours of Autumn
Fill the land.
The Northern part
Of our world
Begins the divestiture
Of its deciduous finery.

Our little cosmic speck
Reaches another Equinox.
The Life that covers
Our little world
Make the adjustments
Seasonal changes bring.

"Seasonal Greetings!"

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To:

Date -

Equinoxes bring us

magical colour!



FROM: Lloyd Penney
Etobicoke, Ontario

2023-09-25

[I've never been to a mystery convention, so I look forward to Calgary Bouchercon.]

OPUNTIA #554: [Re: Stampede rodeo] I suppose Stamperderish is some close to English as the ways she is spoke, hm? I like seeing protest signs from the USA, for the English as she is spoke there can be hell a worse.

[Because Calgary is the capital of Canada's petroleum industry, we are used to the accents of Texans and Oklahomans from what they call the awl biz.]

[Re: food festivals] There are a few events with food for all around here, but we usually avoid them. Weight is hard enough to lose at our age.

[I've been slowly reducing with a high protein diet of meat, cheese, eggs, and as few carbohydrates as possible. I've learned not to make sandwiches with bread or rolls but with tortillas. I splurge occasionally at the food trucks but have to starve myself the day after.]

My previous letter: Our local mall, Cloverdale Mall (set for the wrecking ball in a couple of years) had what they called Relish, a food truck festival in their north parking lot. Tempting, but we resisted it.

We are getting ready to travel a little bit, and are planning to go to the closest fannish SF convention to us in Toronto, Astronomicon 14 in Rochester, New York. It comes up near the end of October.

OPUNTIA #555: Before she left for Calgary, Madona Skaff told me this was her first When Words Collide, and she was utterly thrilled to go there. I am pleased to see that there will be further editions to WWC. As an editor, I am not sure I'd fit in there.

[Actually you would be most welcome. The convention crawls with editors and small-press publishers. There is an entire track for pitch sessions, where wanna-be authors can book 15-minute sessions with editors and publishers one on one. As a readercon, When Words Collide is the only convention in Calgary where publishers are stars.]

I didn't know about the Calgary Bouchercon bid either. I doubt it will ever return to Toronto. Those who could do the job have done it, and I am not aware of the mystery readers groups in Toronto as they used to be.

OPUNTIA #556: [Re: UNCLE reviews] I always liked The Man From UNCLE. Just found out by scanning Facebook, McCallum died earlier today.

[To be honest, I thought he was already dead as I have never watched any NCIS shows. Other than Stefanie Powers (now 80), I don't know how many other UNCLE alumni are still alive.]

Because of the writers' strike (now resolved, I hope), we got to see reruns of shows we hadn't seen in some time, and a few UNCLES were shown.

OPUNTIA #557: [Re: Calgary Beakerhead] We recently had our 12-hour arts festival Nuit Blanche, and as always we missed it. It starts at 7pm one evening, and goes until 7am the next morning. A little late for us, and we have found in going to it in the past that when you get there, there are so many people around, it's impossible to really see any of the art installations.

[Re: steampunk reviews] I have enjoyed the Foglio strip Girl Genius in the past, but have now failed to keep up with it. As steampunkish as it is, it was getting a little repetitive.

THIS JUST IN

Manitoba held a general election on October 3, which normally would be of no interest to anyone outside the province. The incumbent Tory government was defeated and replaced by the NDP (socialist), who took 34 seats to 22 for the Conservatives. The Liberals won one riding.

The NDP party leader Wabanakwut 'Wab' Kinew therefore became the new premier. Much was made of the fact that he was the first indigenous premier of the province. For Canadian fandom, he was the winner of the 2022 Aurora Award for Best Young Adult Novel, WALKING IN TWO WORLDS.

Fandom marches onward. Today, Manitoba, tomorrow the world!

Physics.

Anderson, E.K., et al (2023) **Observation of the effect of gravity on the motion of antimatter.** NATURE 621:doi.org/10.1038/s41586-023-06527-1 (available as a free pdf)

Authors' abstract: *Einstein's general theory of relativity from 1915 remains the most successful description of gravitation. From the 1919 solar eclipse to the observation of gravitational waves, the theory has passed many crucial experimental tests.*

However, the evolving concepts of dark matter and dark energy illustrate that there is much to be learned about the gravitating content of the universe. Singularities in the general theory of relativity and the lack of a quantum theory of gravity suggest that our picture is incomplete.

It is thus prudent to explore gravity in exotic physical systems. Antimatter was unknown to Einstein in 1915. Dirac's theory appeared in 1928; the positron was observed in 1932. There has since been much speculation about gravity and antimatter.

The theoretical consensus is that any laboratory mass must be attracted by the Earth, although some authors have considered the cosmological consequences if antimatter should be repelled by matter.

In the general theory of relativity, the weak equivalence principle (WEP) requires that all masses react identically to gravity, independent of their internal structure. Here we show that antihydrogen atoms, released from magnetic confinement in the ALPHA-g apparatus, behave in a way consistent with gravitational attraction to the Earth.

Repulsive 'antigravity' is ruled out in this case. This experiment paves the way for precision studies of the magnitude of the gravitational acceleration between anti-atoms and the Earth to test the WEP.

Planets.

Fu, H., et al (2023) **Moon's high-energy giant-impact origin and differentiation timeline inferred from Ca and Mg stable isotopes.** COMMUNICATIONS EARTH AND ENVIRONMENT 4:doi.org/10.1038/s43247-023-00974-4 (available as a free pdf)

Authors' abstract: *New and traditional theories debate whether the Moon forming giant impact carried sufficiently high energy that vaporized the Mars-sized impactor (Theia) and proto-Earth to homogenize Earth-Moon chemical and isotopic compositions, or whether it was less energetic and led to incomplete mixing of the impactors, that can permit chemical and isotopic heterogeneities of the Earth-Moon system.*

Mass-dependent stable isotopic variations recorded in lunar samples provide novel resolution to the formation and differentiation history of the Moon. In this study, we report new high precision Ca-isotope measurements for lunar rocks and minerals.

Ca-isotope data and modeling of the lunar magma ocean together demonstrate indistinguishable mass-dependent Ca isotopic compositions of the bulk silicate Earth and Moon.

This implied Earth-Moon isotope equilibration is consistent with the Moon's high-energy giant-impact (Synestia) origin and not readily compatible with the traditional giant-impact models.

Moreover, a cross comparison between Ca and Mg isotopic data for an important anorthosite sample (60025) consistently clarifies its formation near the completion of the lunar magma ocean crystallization.

Therefore, the various existing radiometric dating for 60025 sets the lunar magma ocean to have fully solidified by either 4.51 or 4.38 billion years ago, constraining the two respective lunar differentiation timescales to <30 (short-lived) or ~130 to 150 (long-lived) million years.

Witze, Alexandra (2023) **JWST reveals exotic chemistry of planetary nurseries.** NATURE 621:670 (available as a free pdf)

[JWST is the James Webb Space Telescope.]

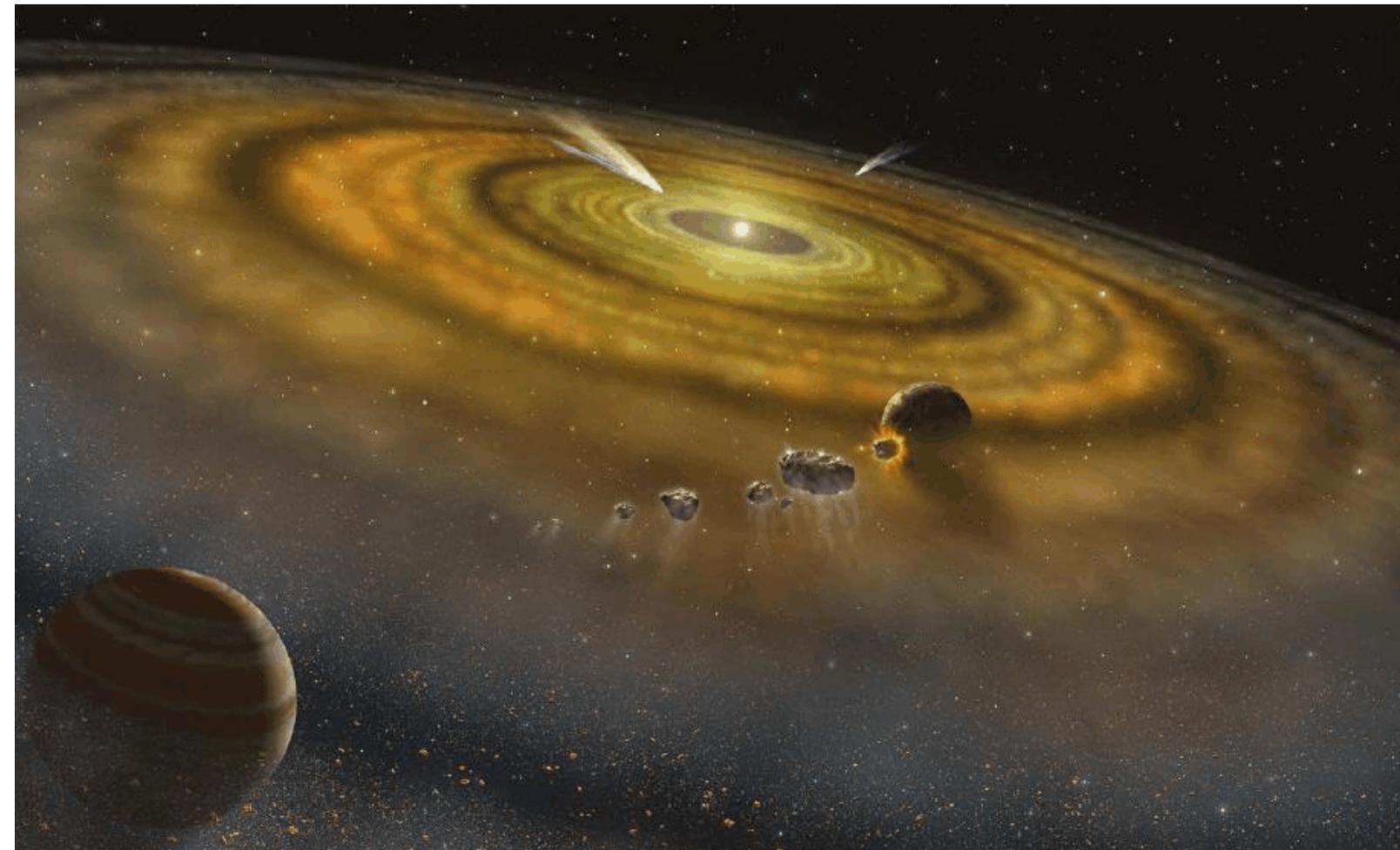
Author's extracts: *At the conference, astronomers showed off new images of the disk around Beta Pictoris, a star that lies 19 parsecs from Earth. In 1984, it became the first star known to have a debris disk encircling it. These images, yet to be published, have revealed a filament of dust that astronomers are calling the 'cat's tail', stretching from the debris disk.*

The feature is obvious in the images, but no one had spotted it before because it was not visible except to JWST's infrared vision, said Marshall Perrin, an astronomer at the Space Telescope Science Institute in Baltimore, at the conference.

The cat's tail of Beta Pictoris is probably a stream of debris that was kicked out of the star's disk when large rocky chunks smashed into each other.

"We're seeing the aftermath of a massive collision in the disk," Perrin said. Earlier JWST observations of a disk around the bright star Fomalhaut had also shown clouds and belts of dust expanding outwards, suggesting that lots more could be going on in the system than anyone had suspected.

[Image is from this paper and shows the Beta Pictoris dust cloud as its planets are being born.]



Teodoro, L.F.A., et al (2023) **A recent impact origin of Saturn's rings and mid-sized moons.** *ASTROPHYSICAL JOURNAL* 955:doi.org/10.3847/1538-4357/acf4ed (available as a free pdf)

Authors' abstract: *We simulate the collision of precursor icy moons analogous to Dione and Rhea as a possible origin for Saturn's remarkably young rings. Such an event could have been triggered a few hundred million years ago by resonant instabilities in a previous satellite system.*

Using high-resolution smoothed particle hydrodynamics simulations, we find that this kind of impact can produce a wide distribution of massive objects and scatter material throughout the system. This includes the direct placement of pure-ice ejecta onto orbits that enter Saturn's Roche limit, which could form or rejuvenate rings.

In addition, fragments and debris of rock and ice totaling more than the mass of Enceladus can be placed onto highly eccentric orbits that would intersect with any precursor moons orbiting in the vicinity of Mimas, Enceladus, or Tethys.

This could prompt further disruption and facilitate a collisional cascade to distribute more debris for potential ring formation, the re-formation of the present-day moons, and evolution into an eventual cratering population of planetocentric impactors.

Geology.

Ferguson, G., et al (2023) **The low permeability of the Earth's Precambrian crust.** *COMMUNICATIONS EARTH AND ENVIRONMENT* 4:doi.org/10.1038/s43247-023-00968-2 (available as a free pdf)

Authors' abstract: *The large volume of deep groundwater in the Precambrian crust has only recently been understood to be relatively hydrogeologically isolated from the rest of the hydrologic cycle.*

The paucity of permeability measurements in Precambrian crust below 1.3 km is a barrier to modeling fluid flow and solute transport in these low porosity and permeability deep environments.

Whether permeability-depth relationships derived from measurements shallower than 1.3 km can be extended to greater depths is unclear. Similarly, application of a widely used permeability-depth relationship from prograde metamorphic and geothermal systems to deep Precambrian rocks may not be appropriate.

Here, we constrain permeabilities for Precambrian crust to depths of 3.3 km based on fluid residence times estimated from noble gas analyses. Our analysis shows no statistically significant relationship between permeability and depth where only samples below 1 km are considered, challenging previous assumptions of exponential decay.

Additionally, we show that estimated permeabilities at depths >1 km are at least an order of magnitude lower than some previous estimates and possibly much lower. As a consequence, water and solute fluxes at these depths will be extremely limited, imposing important controls on elemental cycling, distribution of subsurface microbial life and connections with the near-surface water cycle.

Precambrian crust, which makes up ~72% of the Earth's continents by area, has been estimated to host between ~8.5 and 13 million km³ of groundwater. This deep store of mostly saline fluids accounts for 20 to 30% of total continental groundwater.

Estimates of groundwater residence times in Precambrian rocks, can exceed 1 billion years, with the longest residence times found in Archean age rocks. These deep and ancient groundwaters are estimated to contain a substantial portion of the Earth's biomass, with microbial activity found to depths of up to 2 to 3 km.

The degree of hydrogeologic and associated geochemical isolation from near-surface environments exerts control on the habitability, abundance, and diversity of subsurface microbial life. At these depths, life is isolated from the photosphere and increasingly dependent on chemosynthesis. The supply of electron donors and acceptors exerts an important control on subsurface microbial activity, which is influenced by permeability.

The crystalline rocks of the Earth's Precambrian crust are inherently a low permeability hydrogeologic regime where fluid flow occurs primarily via fractures.

Olierook, H.K.H., et al (2023) **Emplacement of the Argyle diamond deposit into an ancient rift zone triggered by supercontinent breakup.** NATURE COMMUNICATIONS 14:doi.org/10.1038/s41467-023-40904-8

[The Argyle diamond mine in Australia produced 90% of the world’s pink diamonds before closing in 2020. Traditionally diamonds have been mined around the world from volcanic kimberlite pipes. Unusually, Argyle was not volcanic but the result of the supercontinent Nuna breaking apart 1.3 billion years ago.]

Authors’ abstract: *Argyle is the world’s largest source of natural diamonds, yet one of only a few economic deposits hosted in a Paleoproterozoic orogen. The geodynamic triggers responsible for its alkaline ultramafic volcanic host are unknown.*

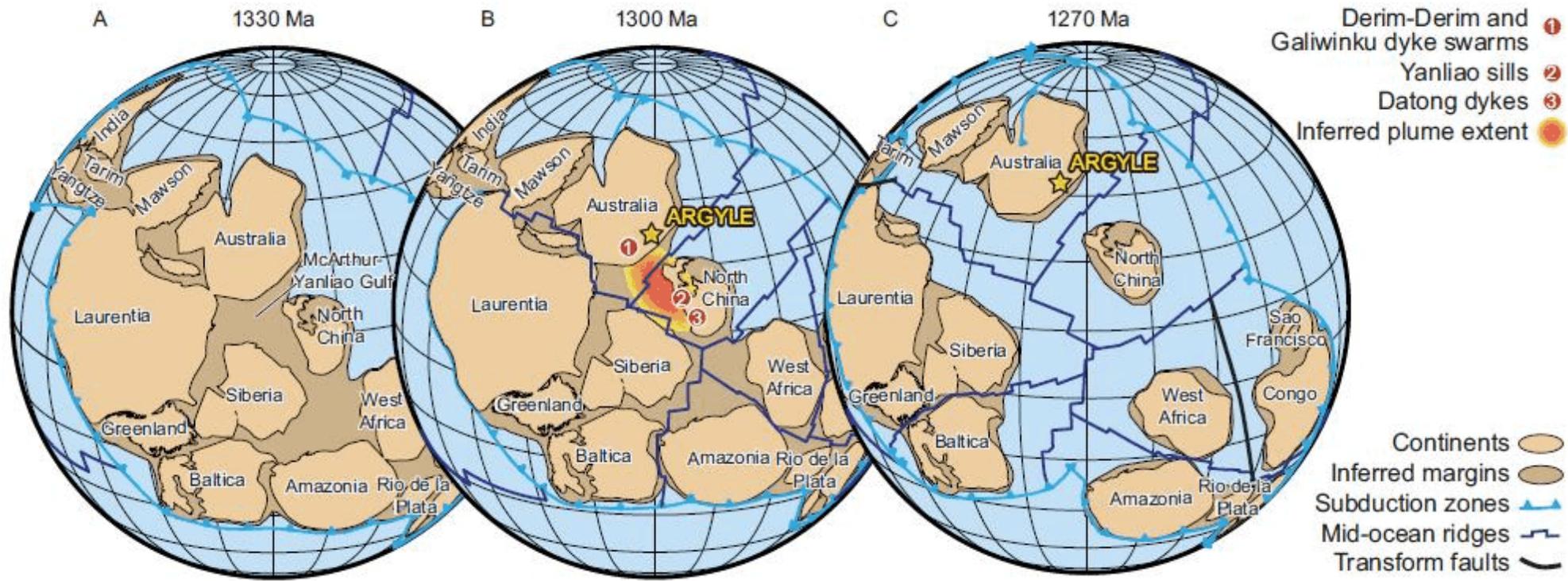
Here we show, using U-Pb and (U-Th)/He geochronology of detrital apatite and detrital zircon, and U-Pb dating of hydrothermal titanite, that emplacement of the Argyle lamproite is bracketed between 1,311 ± 9 megayears ago and 1,257 ± 15 Ma, older than previously known.

To form the Argyle lamproite diatreme complex, emplacement was likely driven by lithospheric extension related to the breakup of the supercontinent Nuna.

Extension facilitated production of low degree partial melts and their migration through transcrustal corridors in the Paleoproterozoic Halls Creek Orogen, a rheologically-weak rift zone adjacent to the Kimberley Craton.

Diamondiferous diatreme emplacement during (super)continental breakup may be prevalent but hitherto under-recognized in rift zones at the edges of ancient continental blocks.

[Maps are from this paper.]



Black, B.A., et al (2023) **A multifault earthquake threat for the Seattle metropolitan region revealed by mass tree mortality.** SCIENCE ADVANCES 9:doi.org/10.1126/sciadv.adh4973 (available as a free pdf)

Authors' abstract: *Compound earthquakes involving simultaneous ruptures along multiple faults often define a region's upper threshold of maximum magnitude.*

Yet, the potential for linked faulting remains poorly understood given the infrequency of these events in the historic era. Geological records provide longer perspectives, although temporal uncertainties are too broad to clearly pinpoint single multifault events.

Here, we use dendrochronological dating and a cosmogenic radiation pulse to constrain the death dates of earthquake-killed trees along two adjacent fault zones near Seattle, Washington to within a 6-month period between the 923 and 924 CE growing seasons.

Our narrow constraints conclusively show linked rupturing that occurred either as a single composite earthquake of estimated magnitude 7.8 or as a closely spaced double earthquake sequence with estimated magnitudes of 7.5 and 7.3.

These scenarios, which are not recognized in current hazard models, increase the maximum earthquake size needed for seismic preparedness and engineering design within the Puget Sound region of >4 million residents.

Buzzanga, B., et al (2023) **Localized uplift, widespread subsidence, and implications for sea level rise in the New York City metropolitan area.** SCIENCE ADVANCES 9:doi.org/10.1126/sciadv.adi8259 (available as a free pdf)

[It isn't just New Orleans that is sinking. So is New York City.]

Authors' abstract: *Regional relative sea level rise is exacerbating flooding hazards in the coastal zone. In addition to changes in the ocean, vertical land motion (VLM) is a driver of spatial variation in sea level change that can either diminish or enhance flood risk.*

Here, we apply state-of-the-art interferometric synthetic aperture radar and global navigation satellite system time series analysis to estimate velocities and corresponding uncertainties at 30-metre resolution in the New York City metropolitan area, revealing VLM with unprecedented detail.

We find broad subsidence of 1.6 mm/year, consistent with glacial isostatic adjustment to the melting of the former ice sheets, and previously undocumented hot spots of both subsidence and uplift that can be physically explained in some locations.

Extinctions.

Callegaro, S., et al (2023) **Recurring volcanic winters during the latest Cretaceous: Sulfur and fluorine budgets of Deccan Traps lavas.** SCIENCE ADVANCES 9:doi.org/10.1126/sciadv.adg8284 (available as a free pdf)

[The Deccan Traps cover the northwestern third of India. They are massive lava flows up to 3.5 km thick, which were emplaced before, during, and just after the asteroid impact at the end-Cretaceous that killed off the dinosaurs.]

Authors' abstract: *Two events share the stage as main drivers of the Cretaceous-Paleogene mass extinction; Deccan Traps volcanism, and an asteroid impact recorded by the Chicxulub crater.*

We contribute to refining knowledge of the volcanic stressor by providing sulfur and fluorine budgets of Deccan lavas from the Western Ghats (India), which straddle the Cretaceous-Paleogene boundary.

Volcanic fluorine budgets were variable (400 to 3000 parts per million) and probably sufficient to affect the environment, albeit only regionally. The highest sulfur budgets (up to 1800 parts per million) are recorded in Deccan lavas emplaced just prior (within 0.1 million years) to the extinction interval, whereas later basalts are generally sulfur-poor (up to 750 parts per million).

Independent evidence suggests the Deccan flood basalts erupted in high-flux pulses. Our data suggest that volcanic sulfur degassing from such activity could have caused repeated short-lived global drops in temperature, stressing the ecosystems long before the bolide impact delivered its final blow at the end of the Cretaceous.

Farnsworth, A., et al (2023) **Climate extremes likely to drive land mammal extinction during next supercontinent assembly.** NATURE GEOSCIENCE 16:doi.org/10.1038/s41561-Article 1-023-01259-3 (available as a free pdf)

[Don't read this if you are feeling depressed on a rainy Sunday afternoon.]

Authors' abstract: *Mammals have dominated Earth for approximately 55 megayears thanks to their adaptations and resilience to warming and cooling during the Cenozoic. All life will eventually perish in a runaway greenhouse once absorbed solar radiation exceeds the emission of thermal radiation in several billions of years.*

However, conditions rendering the Earth naturally inhospitable to mammals may develop sooner because of long-term processes linked to plate tectonics (short-term perturbations are not considered here).

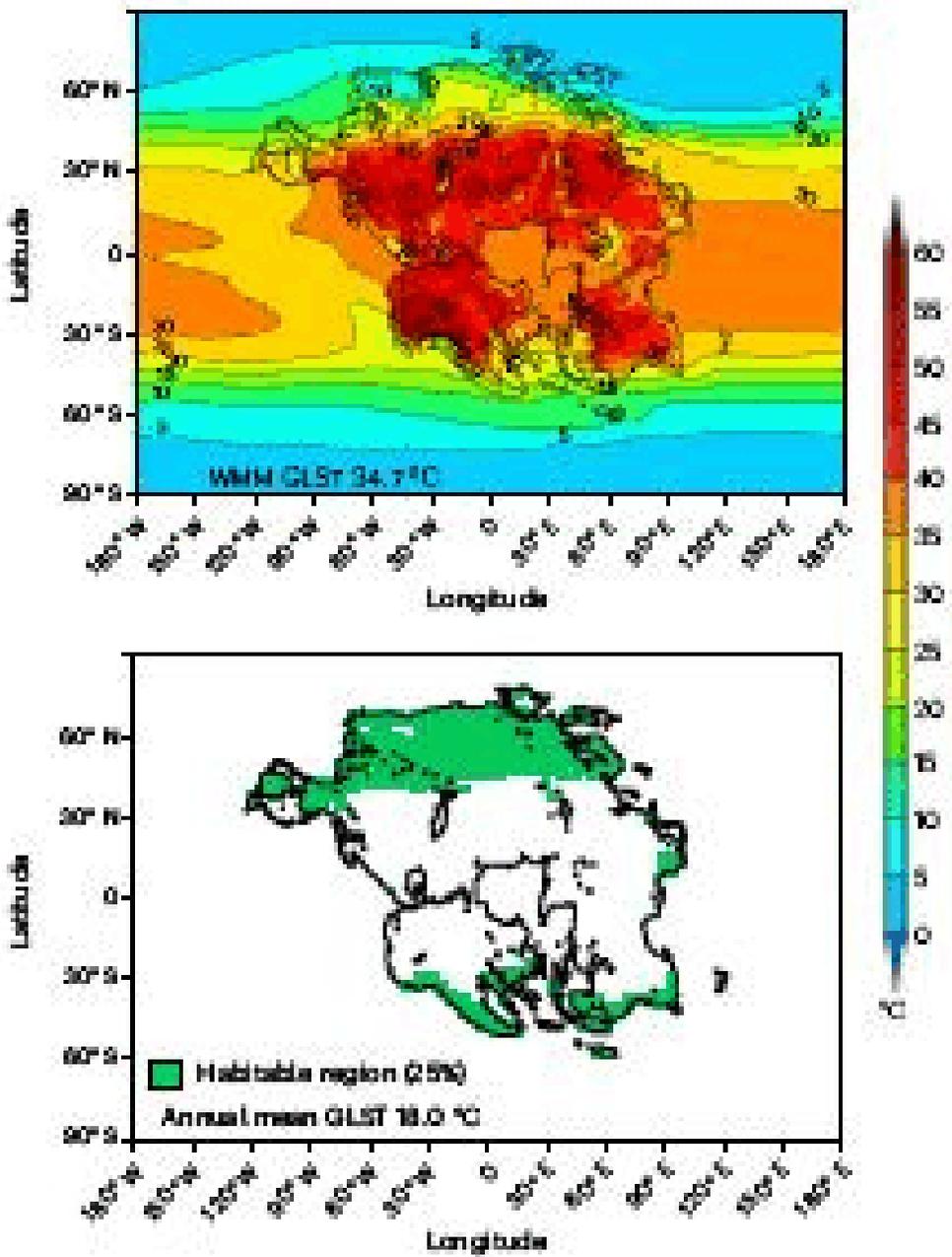
In ~250 Myr, all continents will converge to form Earth's next supercontinent, Pangea Ultima. A natural consequence of the creation and decay of Pangea Ultima will be extremes in pCO₂ due to changes in volcanic rifting and outgassing.

Here we show that increased pCO₂, solar energy and continentality (larger range in temperatures away from the ocean) lead to increasing warming hostile to mammalian life.

We assess their impact on mammalian physiological limits (dry bulb, wet bulb and Humidex heat stress indicators) as well as a planetary habitability index. Given mammals' continued survival, predicted background pCO₂ levels of 410 to 816 ppm combined with increased solar energy will probably lead to a climate tipping point and their mass extinction.

The results also highlight how global landmass configuration, pCO₂ and solar energy play a critical role in planetary habitability. Anthropogenic emissions of greenhouse gasses are pushing Earth's climate towards a warmer state not seen for millions of years, with repercussions for ecosystem resilience.

[Maps of future supercontinent are from this paper.]



Paleobiology.

Brunet, Thibaut (2023) **Cell contractility in early animal evolution.** CURRENT BIOLOGY 33:doi.org/10.1016/j.cub.2023.07.054 (available as a free pdf)

Author's abstract: Tissue deformation mediated by collective cell contractility is a signature characteristic of animals. In most animals, fast and reversible contractions of muscle cells mediate behavior, while slow and irreversible contractions of epithelial or mesenchymal cells play a key role in morphogenesis.

Animal tissue contractility relies on the activity of the actin/myosin II complex (together referred to as 'actomyosin'), an ancient and versatile molecular machinery that performs a broad range of functions in development and physiology.

The most ancient functions of actomyosin are cell crawling and cytokinesis, which are found in a wide variety of unicellular eukaryotes and in individual metazoan cells. Another contractile functional module, apical constriction, is universal in metazoans and shared with choanoflagellates, their closest known living relatives.

The evolution of animal contractile tissue involved two key innovations: firstly, the ability to coordinate and integrate actomyosin assembly across multiple cells, notably to generate supracellular cables, which ensure tissue integrity but also allow coordinated morphogenesis and movements at the organism scale;

and secondly, the evolution of dedicated contractile cell types for adult movement, belonging to two broad categories respectively defined by the expression of the fast (striated-type) and slow (smooth/non-muscle-type) myosin II paralogs.

Both contractile cell types ancestrally resembled generic contractile epithelial or mesenchymal cells and might have played a versatile role in both behavior and morphogenesis.

Modern animal contractile cells span a continuum between unspecialized contractile epithelia (which underlie behavior in modern placozoans), epithelia

with supracellular actomyosin cables (found in modern sponges), epitheliomuscular tissues (with a concentration of actomyosin cables in basal processes, for example in sea anemones), and specialized muscle tissue that has lost most or all epithelial properties (as in ctenophores, jellyfish and bilaterians).

Ye, S., and S.E. Peters (2023) **Bedrock geological map predictions for Phanerozoic fossil occurrences.** PALEOBIOLOGY 49:doi.org/10.1017/pab.2022.46

Authors' abstract: Geographically explicit, taxonomically resolved fossil occurrences are necessary for reconstructing macroevolutionary patterns and for testing a wide range of hypotheses in the Earth and life sciences.

Heterogeneity in the spatial and temporal distribution of fossil occurrences in the Paleobiology Database (PBDB) is attributable to several different factors, including turnover among biological communities, socioeconomic disparities in the intensity of paleontological research, and geological controls on the distribution and fossil yield of sedimentary deposits.

Here we use the intersection of global geological map data from Macrostrat and fossil collections in the PBDB to assess the extent to which the potentially fossil-bearing, surface-expressed sedimentary record has yielded fossil occurrences.

We find a significant and moderately strong positive correlation between geological map area and the number of fossil occurrences. This correlation is consistent regardless of map unit age and binning protocol, except at period level; the Neogene and Quaternary have non-marine map units covering large areas and yielding fewer occurrences than expected.

The sedimentary record of North America and Europe yields significantly more fossil occurrences per sedimentary area than similarly aged deposits in most of the rest of the world. However, geographic differences in area and age of sedimentary deposits lead to regionally different expectations for fossil occurrences.

Using the sampling of surface-expressed sedimentary units in North America and Europe as a predictor for what might be recoverable from the

surface-expressed sedimentary deposits of other regions, we find that the rest of the globe is approximately 45% as well sampled in the PBDB.

Using age and area of bedrock and sampling in North America and Europe as a basis for prediction, we estimate that more than 639,000 occurrences from outside these regions would need to be added to the PBDB to achieve global geological parity in sampling. In general, new terrestrial fossil occurrences are expected to have the greatest impact on our understanding of macroevolutionary patterns.

Pérez-Pinedo, D., et al (2023) Frond orientations with independent current indicators demonstrate the reclining rheotropic mode of life of several Ediacaran rangeomorph taxa. PALEOBIOLOGY 49:doi.org/10.1017/pab.2023.2

[Rangeomorphs were frond-shaped animals from the Ediacaran of 635 to 538 megayears ago, then went extinct as predators developed at the start of the Cambrian. They may have been filter-feeders like sponges or might even have been fungi. They are traditionally depicted as upright growth forms waving in the water, but this paper suggests they may have lain flat against the seabed.]

Authors’ abstract: Fossils from the deep-sea Ediacaran biotas of Newfoundland are among the oldest architecturally complex soft-bodied macroorganisms on Earth.

Most organisms in the Mistaken Point-type biotas of Avalonia, particularly the fractal-branching frondose Rangeomorpha, have been traditionally interpreted as living erect within the water column during life.

However, due to the scarcity of documented physical sedimentological proxies associated with fossiliferous beds, Ediacaran paleocurrents have been inferred in some instances from the preferential orientation of fronds. This calls into question the relationship between frond orientation and paleocurrents.

In this study, we present an integrated approach from a newly described fossiliferous surface (the “Melrose Surface” in the Fermeuse Formation [Newfoundland] at Melrose, on the southern portion of the Catalina Dome in the Discovery UNESCO Global Geopark) combining:

- (1) physical sedimentological evidence for paleocurrent direction in the form of climbing ripple cross-lamination and*
- (2) a series of statistical analyses based on modified polythetic and monothetic clustering techniques reflecting the circular nature of the recorded orientation of Fractofusus misrai specimens.*

This study demonstrates the reclining rheotropic mode of life of the Ediacaran rangeomorph taxon Fractofusus misrai and presents preliminary inferences suggesting a similar mode of life for Bradgatia sp. and Pectinifrons abyssalis based on qualitative evidence.

These results advocate for the consideration of an alternative conceptual hypothesis for position of life of Ediacaran organisms in which they are interpreted as having lived reclined on the seafloor, in the position that they are preserved.

Forsythe, I.J., and A.L. Stigall (2023) Insights for modern invasion ecology from biotic changes of the Clarksville Phase of the Richmondian Invasion (Ordovician, Katian). PALEOBIOLOGY 49:doi.org/10.1017/pab.2022.45

Authors’ abstract: The frequency of biotic invasions in modern ecosystems is increasing due to global trade moving taxa outside their native ranges and climate change facilitating establishment of taxa in previously inhospitable regions.

Thus, developing a holistic understanding of biotic invasions and how they impact ecosystems over different timescales, from annual to geologic timescales, is vital.

Herein we examine a geologically brief invasion event, the Clarksville Phase of the Richmondian Invasion. Prior analyses have established general ecological and evolutionary patterns across the entire Richmondian Invasion, but recent sequence stratigraphic refinement makes analysis of individual invasion pulses possible for the first time.

We examine biotic change across the Clarksville Phase and identify invasion impacts on diversity, paleocommunity composition, and niche stability. Invader arrival and success was strongly linked to increased propagule pressure facilitated by sea-level changes.

Invaders initially colonized deep subtidal environments and then moved offshore facilitated by rapid niche evolution during the invasion interval. Invasive taxa that attained the largest population sizes belonged to previously underutilized ecological guilds.

Overall, the introduction of the invasive taxa resulted in increased diversity that was maintained into the postinvasion interval accompanied by a change in community composition in which the invaders became dominant paleocommunity members.

Combined, these analyses document a biotic invasion facilitated by climate change that increased local diversity through invaders occupying underutilized ecospace and competition-related niche contraction on millennial timescales.

Developing a long-term perspective to accompany shorter-term studies facilitates predicting the long-term impacts of modern invasions and creating better-informed policies and practices.

Kraft, P., et al (2023) Uniquely preserved gut contents illuminate trilobite palaeophysiology. NATURE 621:doi.org/10.1038/s41586-023-06567-7 (available as a free pdf)

Authors' abstract: Trilobites are among the most iconic of fossils and formed a prominent component of marine ecosystems during most of their 270-million-year-long history from the early Cambrian period to the end Permian period.

More than 20,000 species have been described to date, with presumed lifestyles ranging from infaunal burrowing to a planktonic life in the water column. Inferred trophic roles range from detritivores to predators, but all are based on indirect evidence such as body and gut morphology, modes of preservation and attributed feeding traces. No trilobite specimen with internal gut contents has been described.

*Here we present the complete and fully itemized gut contents of an Ordovician trilobite, *Bohemolichas incola*, preserved three-dimensionally in a siliceous nodule and visualized by synchrotron microtomography.*

The tightly packed, almost continuous gut fill comprises partly fragmented calcareous shells indicating high feeding intensity. The lack of dissolution of the shells implies a neutral or alkaline environment along the entire length of the intestine supporting digestive enzymes comparable to those in modern crustaceans or chelicerates.

Scavengers burrowing into the trilobite carcass targeted soft tissues below the glabella but avoided the gut, suggesting noxious conditions and possibly ongoing enzymatic activity.

Siliceous nodules, nicknamed 'Rokycany Balls', weather out of shales of the Šárka Formation (Darriwilian, Middle Ordovician, approximately 465 million years ago (Ma)) of the Prague Basin, Czech Republic and provide abundant well-preserved three-dimensional fossils without secondary deformation due to their very early diagenetic origin.

*One was found to contain a complete specimen of the infrequent trilobite *Bohemolichas incola* with preserved gut content visible in the exfoliated parts of the thoracic axis and occipital ring.*

This specimen was selected for investigation by propagation phase-contrast synchrotron microtomography at the European Synchrotron Radiation Facility (ESRF) in Grenoble, France.

The specimen comprises an almost undisturbed, articulated exoskeleton. Only the librigenae are dislocated laterally to the left and the almost in situ conterminant hypostome is slightly displaced below the glabella.

In lateral view, the sixth segment of the thorax is markedly deflected from the normal position causing a slight vaulting of the central portion of the thorax. Small fossils and fragments of shells are densely distributed exclusively along the exoskeletal axial lobe reflecting an almost continual infill of the digestive tract.

The largest concentration is situated in the cephalic region between the glabella and the hypostome where it forms an arc connecting two wide clusters, one pressed to the hypostome and the other close to the surface of the central and posterior parts of the glabella.

The clusters are confined within the vaulted regions of the glabella and hypostome. The displacement of the hypostome deformed the space below the glabella, affecting the proximal part of the infilled digestive tract, which is compressed and shifted.

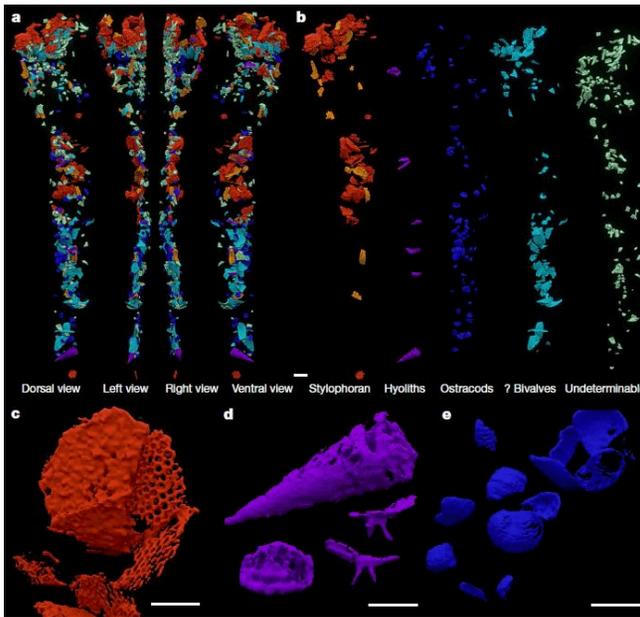
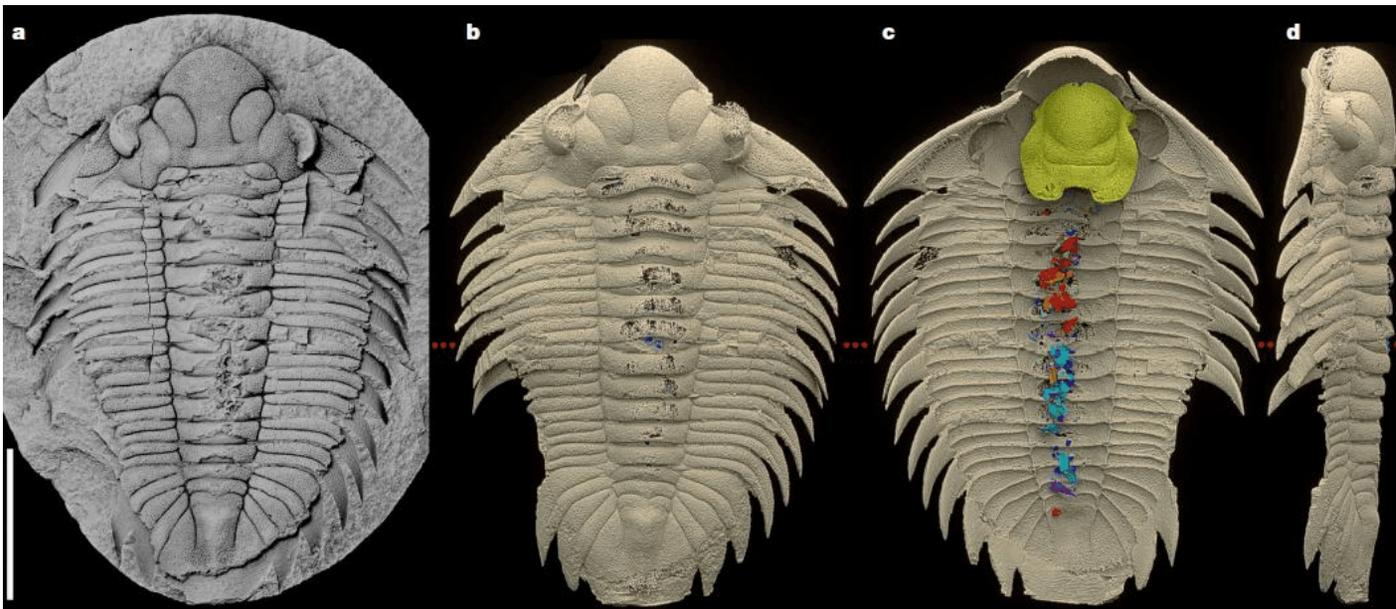
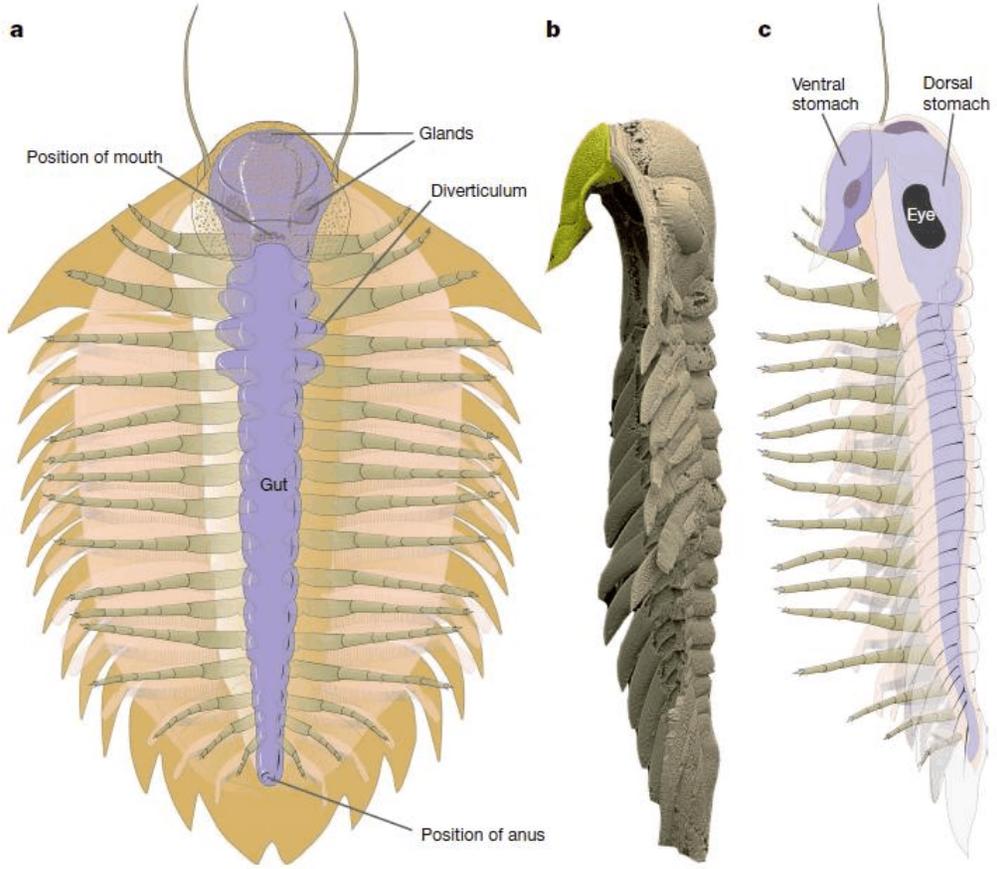
A linear accumulation of shell remains along the midline of the thoracic and pygidial axes, pressed to the ventral side of the vaulted axis, is dorsoventrally flattened resulting in an oval cross-section.

This postcephalic accumulation is almost continuous, though three indistinct clusters can be discerned. The most abundant determinable elements of the digestive tract infill are ostracods characterized by a typical shape of the margin, vaulting of valves and occasional surface ornamentation.

Although fragments dominate, several complete valves, randomly distributed along the entire digestive tract, can be identified as different early instars of *Conchoprimitia osekensis*.

One hyolith conch near the posterior end of the accumulation represents most likely the genus *Elegantilites* with a moderate vaulting of the dorsal side, becoming steeper laterally, and a slightly convex ventral side in cross-section. A fragment of a hyolithid operculum with typical cardinal processes is also present.

[Images are from this paper. Lower right shows fragments of ingested shells.]



[Terror birds died out in South America about a million years before humans arrived. They were the same or taller as adult humans.]

Authors' abstract: *Terror birds (Aves, Phorusrhacidae) comprise the most outstanding group of South American Cenozoic avifauna, and have been considered dominant predators. Terrestrial habits were inferred using the reduction of their forelimbs and high body mass.*

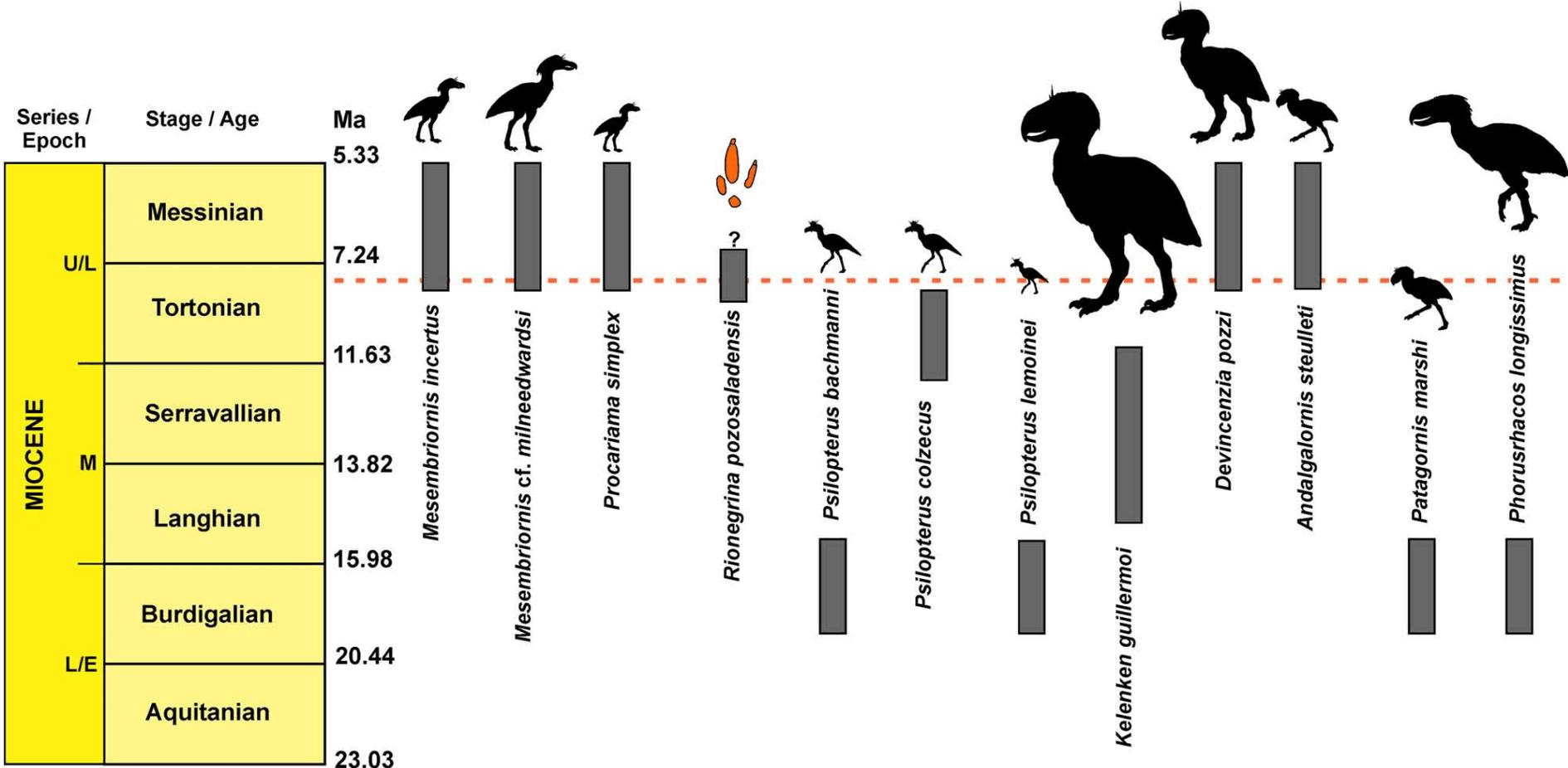
Phorusrhacids were considered functionally tridactyl with three relatively short digits II–IV and a small, elevated digit I. The function of the ungual phalanges of digit II have been debated, including the utility of the ungual for retention or stabbing of prey.

Incomplete or lack of preservation of foot bones have hampered understanding of the evolution and diversification of Phorusrhacidae. Here we show the first known and well-preserved footprints of Phorusrhacidae with a didactyl posture, which are named Rionegrina pozosaladensis igen. et isp. nov.

These footprints yield unprecedented information on the locomotor habits of the group. The finding implies that medium-sized, Late Miocene (~ 8 megayears ago) phorusrhacids developed strong cursorial adaptations; achieved through reduction of digit II, raised metatarso-phalangeal pad, main body support in a large and thick digit III, and digit IV as outrigger.

Raised and long claw of digit II was probably used in pinning of prey. Phorusrhacid footprints differ from the Early Cretaceous didactyl footprints of deinonychosaurian dinosaur affinity by its larger size and strong mesaxony.

[Images are from this paper.]



Dinosaurs.

Taborda, J.R.A., et al (2023) **Biomechanical analysis and new trophic hypothesis for Riojasuchus tenuisiceps, a bizarre-snouted Late Triassic pseudosuchian from Argentina.** ACTA PALAEOLOGICA POLONICA 68:doi.org/10.4202/app.01038.2022 (available as a free pdf)

Authors' abstract: *Ornithosuchids are a Late Triassic pseudosuchian archosaur group, consisting of four species (three from South America, and one from Scotland).*

All of them have triangular skulls with a protruding premaxilla, large nostrils, an extensive diastema in their narrow snout, a short jaw that does not reach the anterior end of the skull, and serrated posteriorly curved teeth.

For this clade, carnivorous and scavenger habits have been previously proposed. Within the Ornithosuchidae, Riojasuchus tenuisiceps (from Argentina) has the most morphologically extreme characteristics. Based on CT scans of the preserved skulls we generated a 3D model, and over this, we estimated the volumes of the adductors and abductor muscles and the force exerted by each.

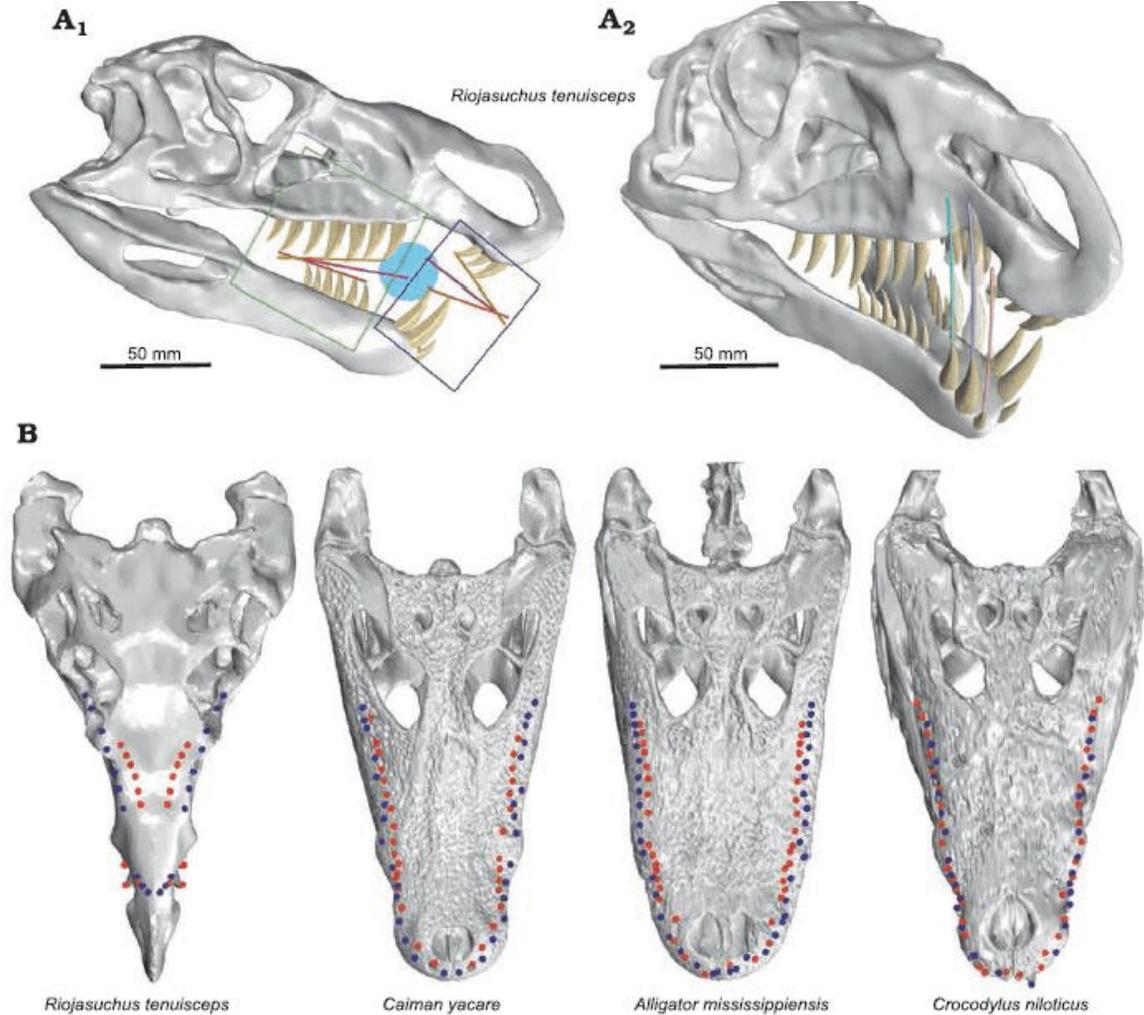
From these data we built the finite element model and measured the bite force. Lateral, tractive, and torsional forces were applied to the end of the snout to evaluate the structural response of the skull during feeding. The results show that R. tenuisiceps could resist tractive and torsional stresses better than lateral stress.

Additionally, we analysed the peculiar morphological characteristics of the skull and their functional implications. We observed that the upper and lower dental rows were laterally separated from each other, preventing the generation of a cutting line during occlusion, and therefore, R. tenuisiceps would have fed on small-sized prey that it could swallow whole.

The curved premaxilla and the short mandible would not allow it to bite with the tip of the snout (ruling out the scavenging hypothesis), but were instead more adequate to capturing prey suspended in a fluid.

This set of results allows us to propose that R. tenuisiceps could have had a zoophagous diet and a wading habit, being able to feed on fish, amphibians, or any small animals that they could catch from the shoreline.

[Images are from this paper.]



Slater, T.S., et al (2023) **Preservation of corneous beta-proteins in Mesozoic feathers.** NATURE ECOLOGY AND EVOLUTION 7:1706-1713

[Many dinosaurs of the Mesozoic are believed to have had feathers, if only as juveniles.]

Authors' abstract: *Keratins (formerly alpha-keratins) and corneous beta-proteins (CBPs, formerly beta-keratins) are of particular interest as they define tissue structures that underpin fundamental physiological and ecological strategies and have the potential to inform on the molecular evolution of the vertebrate integument.*

Reports of CBPs in Mesozoic fossils, however, appear to conflict with experimental evidence for CBP degradation during fossilization.

Further, the recent model for molecular modification of feather chemistry during the dinosaur-bird transition does not consider the relative preservation potential of different feather proteins.

Here we use controlled taphonomic experiments coupled with infrared and sulfur X-ray spectroscopy to show that the dominant beta-sheet structure of CBPs is progressively altered to alpha-helices with increasing temperature, suggesting that (alpha-)keratins and alpha-helices in fossil feathers are most likely artefacts of fossilization.

Our analyses of fossil feathers shows that this process is independent of geological age, as even Cenozoic feathers can comprise primarily alpha-helices and disordered structures.

Critically, our experiments show that feather CBPs can survive moderate thermal maturation. As predicted by our experiments, analyses of Mesozoic feathers confirm that evidence of feather CBPs can persist through deep time.

Zoology.

Doran-Myers, D., et al (2023) **American Black Bears depredate American Alligator nests in South Florida.** SOUTHEASTERN NATURALIST 22:doi.org/10.1656/058.022.0308

Authors' abstract: *Ursus americanus (American Black Bear) and Alligator mississippiensis (American Alligator) are sympatric in areas of Florida. During summer, alligators build nest mounds for eggs on freshwater shores, shallow marshes, and tree islands.*

Biologists have speculated that bears might prey upon alligator nests because of their opportunistic and generalist diet, though such predation in Florida has not been documented in peer-reviewed literature.

Herein, we report three photographed events of American Black Bear predation on American Alligator nests in Everglades National Park, Big Cypress National Preserve, and Dinner Island Ranch Wildlife Management Area, FL.

During each event, bears dug into alligator nests and consumed egg contents. The predation events varied in duration from 36 minutes to nearly 5 hours. During one event, a female bear consumed alligator eggs alongside two cubs of the year.

Botany.

Malabrigo, P. Jr., et al (2023) **Most of the world's largest flowers (genus Rafflesia) are now on the brink of extinction.** PLANTS, PEOPLE, PLANET 5:doi.org/10.1002/ppp3.10431 (available as a free pdf)

Authors' abstract: *The genus Rafflesia, which includes the world's largest flowers, has aroused curiosity among scientists for centuries and features prominently in local culture across Southeast Asia. The plant has long been used in ethnobotanical medicine and, more recently, as a source of revenue from ecotourism.*

But despite its acclaim, Rafflesia remains poorly understood in many respects. Taxonomy is disputed, new species are described each year, and the plant has proven recalcitrant to cultivation.

This has hindered conservation, and most of the 42 known species are now severely threatened, yet only one is listed by the International Union for Conservation of Nature (IUCN). We estimate that 60% of *Rafflesia* species face a severe risk of extinction (equivalent to Critically Endangered [CR]).

Moreover, we predict that at least 67% of known habitats fall outside protected areas, exacerbating their vulnerability. Alarming, recent observations suggest taxa are still being eradicated before they are even known to science.

We present recent scientific discoveries and probable extinctions and highlight case studies of conservation success, with a focus on the role of local people. We propose a multi-pronged conservation approach combining strengthened taxonomy, *ex situ* propagation, ecotourism, and an extension of protected areas.

We suggest action devolved to local communities and awareness campaigns linked to social media networks will be crucial outside of protected jurisdictions.

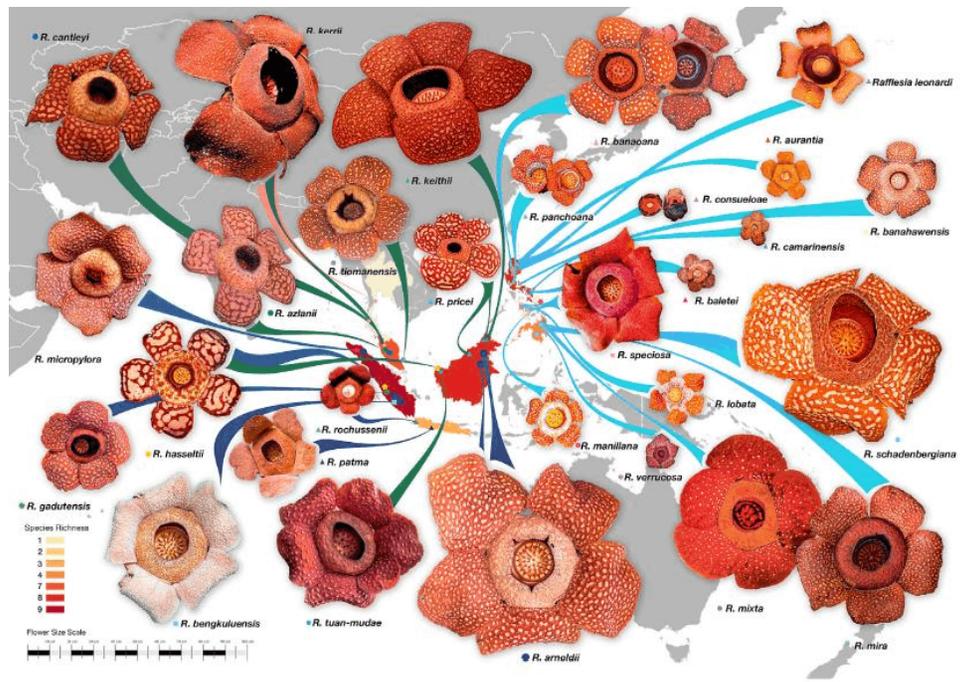


FIGURE 1 Map showing the diversity in the genus *Rafflesia* across the Malesian Floristic Region.

[Images are from this paper.]



Huang, Y., et al (2023) **Pangenome analysis provides insight into the evolution of the orange subfamily and a key gene for citric acid accumulation in citrus fruits.** NATURE GENETICS 55:doi.org/10.1038/s41588-Article 8-023-01516-6 (available as a free pdf)

Authors' abstract: *The orange subfamily (Aurantioideae) contains several Citrus species cultivated worldwide, such as sweet orange and lemon. The origin of Citrus species has long been debated and less is known about the Aurantioideae.*

Here, we compiled the genome sequences of 314 accessions, de novo assembled the genomes of 12 species and constructed a graph-based pangenome for Aurantioideae.

Our analysis indicates that the ancient Indian Plate is the ancestral area for Citrus-related genera and that South Central China is the primary center of origin of the Citrus genus.

We found substantial variations in the sequence and expression of the PH4 gene in Citrus relative to Citrus-related genera. Gene editing and biochemical experiments demonstrate a central role for PH4 in the accumulation of citric acid in citrus fruits.

This study provides insights into the origin and evolution of the orange subfamily and a regulatory mechanism underpinning the evolution of fruit taste.

The orange subfamily (Rutaceae: Aurantioideae) comprises 33 genera and 210 species, including the genus Citrus. Many Citrus species are cultivated worldwide, such as oranges, lemons, limes, mandarins, grapefruits and pomelos.

Little is known about the broad scale of the evolution of the orange subfamily. Five genera of the orange subfamily are believed to be native to tropical Africa; 29 genera are indigenous to monsoon regions in Southeast Asia.

A recent study suggested that the center of origin of Citrus was the southeastern foothills of the Himalayas. However, others hypothesized that either northeastern Australia or South China is the center of origin of Citrus.

Early studies recognized that three basic species in the Citrus genus contribute to the bulk of cultivated citrus: mandarin (Citrus reticulata), pomelo (Citrus maxima) and citron (Citrus medica). Later, papeda, which includes Citrus ichangensis (also known as Citrus cavaleriei), Citrus hystrix and Citrus micrantha, was proposed as the fourth foundational species.

Human Dispersal.

Vidal-Cordasco, M., et al (2023) **Neanderthal coexistence with Homo sapiens in Europe was affected by herbivore carrying capacity.** SCIENCE ADVANCES 9:doi.org/10.1126/sciadv.adi4099 (available as a free pdf)

Authors' abstract: *It has been proposed that climate change and the arrival of modern humans in Europe affected the disappearance of Neanderthals due to their impact on trophic resources. However, it has remained challenging to quantify the effect of these factors.*

By using Bayesian age models to derive the chronology of the European Middle to Upper Paleolithic transition, followed by a dynamic vegetation model that provides the Net Primary Productivity, and a macroecological model to compute herbivore abundance, we show that in continental regions where the ecosystem productivity was low or unstable, Neanderthals disappeared before or just after the arrival of Homo sapiens.

In contrast, regions with high and stable productivity witnessed a prolonged coexistence between both species. The temporal overlap between Neanderthals and H. sapiens is significantly correlated with the carrying capacity of small- and medium-sized herbivores.

These results suggest that herbivore abundance released the trophic pressure of the secondary consumers guild, which affected the coexistence likelihood between both human species. As Homo sapiens populations expanded out of Africa in successive waves and arrived in new environments, they were added to the secondary consumer guild.

Following trophic cascade postulates, it has been proposed that H. sapiens increased the trophic pressure on herbivores and triggered the disappearance of some of their predators. However, the pace and extent of these extinctions were spatially and temporally diverse.

In Europe, one of the first species that became extinct after the arrival of *H. sapiens* was *Homo neanderthalensis*. Rather than a rapid and straightforward replacement of Neanderthals by *H. sapiens*, the Middle to Upper Paleolithic transition was characterized by a mosaic of cultural and biological landscapes lasting several thousand years.

Ancient DNA studies showed that our species and Neanderthals interbred and, therefore, coexisted in some regions. Nonetheless, in other areas of Europe, Neanderthals were quickly replaced by *H. sapiens* or even disappeared a few millennia before their arrival.

Abbas, M., et al (2023) **Human dispersals out of Africa via the Levant.** SCIENCE ADVANCES 9:doi.org/10.1126/sciadv.adi6838

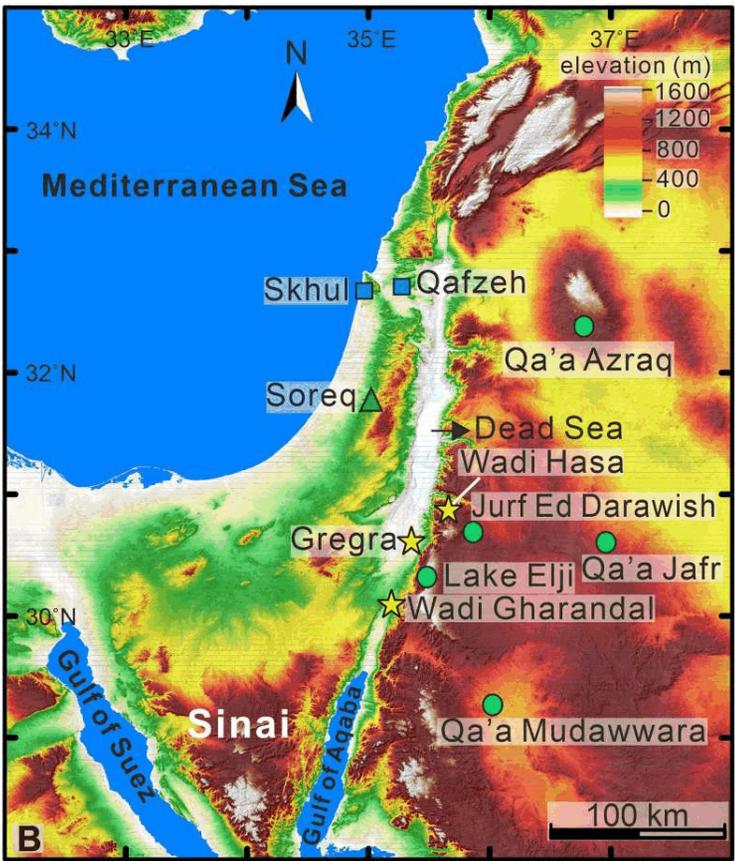
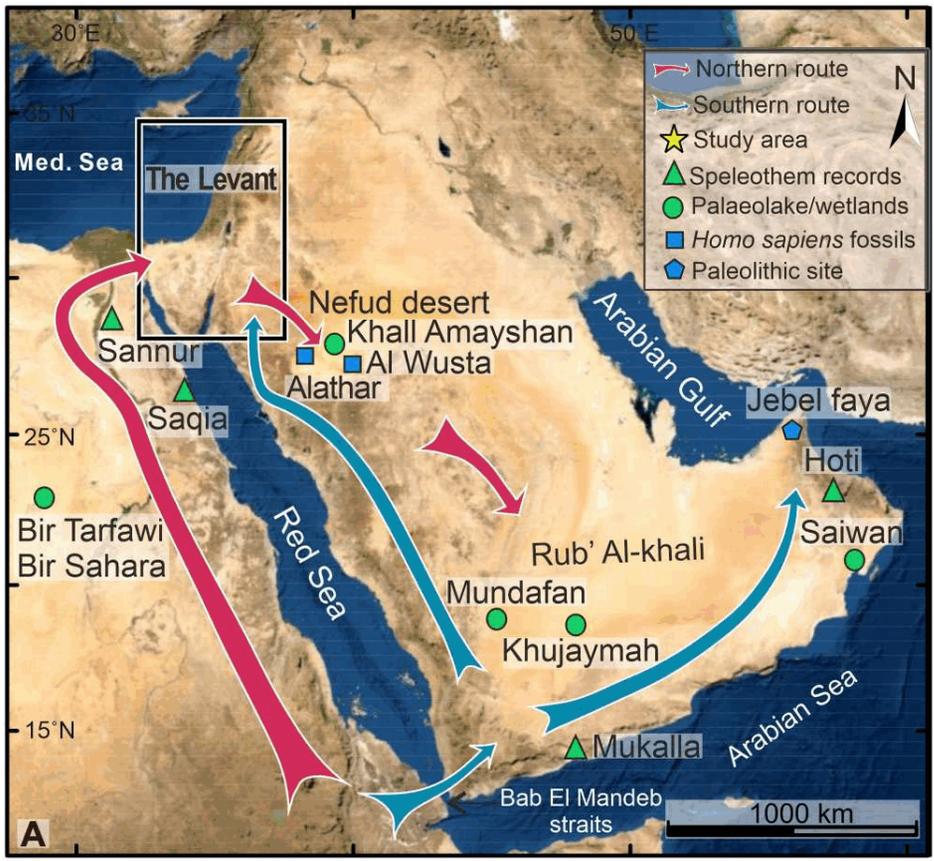
Authors' abstract: *Homo sapiens* dispersed from Africa into Eurasia multiple times in the Middle and Late Pleistocene. The route, across northeastern Africa into the Levant, is a viable terrestrial corridor, as the present harsh southern

Levant would probably have been savannahs and grasslands during the last interglaciation.

Here, we document wetland sediments with luminescence ages falling in the last interglaciation in the southern Levant, showing protracted phases of moisture availability.

Wetland sediments in Wadi Gharandal containing Levallois artifacts yielded an age of 84 ka. Our findings support the growing consensus for a well-watered Jordan Rift Valley that funneled migrants into western Asia and northern Arabia.

[Maps are from this paper.]



Pigati, J.S., et al (2023) **Independent age estimates resolve the controversy of ancient human footprints at White Sands.** SCIENCE 382:73-75

Authors' abstract: *Human footprints at White Sands National Park, New Mexico, USA, reportedly date to between ~23,000 and 21,000 years ago according to radiocarbon dating of seeds from the aquatic plant Ruppia cirrhosa. These ages remain controversial because of potential old carbon reservoir effects that could compromise their accuracy.*

We present new calibrated carbon ages of terrestrial pollen collected from the same stratigraphic horizons as those of the Ruppia seeds, along with optically stimulated luminescence ages of sediments from within the human footprint-bearing sequence, to evaluate the veracity of the seed ages.

The results show that the chronologic framework originally established for the White Sands footprints is robust and reaffirm that humans were present in North America during the Last Glacial Maximum.

Traditionally, researchers believed that humans arrived in North America around 16,000 to 13,000 years ago. Recently, however, evidence has accumulated supporting a much earlier date.

In 2021, fossilized footprints from White Sands National Park in New Mexico were dated to between 20,000 and 23,000 years ago, providing key evidence for earlier occupation, although this finding was controversial.

Pigati et al. returned to the White Sands footprints and obtained new dates from multiple, highly reliable sources. They, too, resolved dates of 20,000 to 23,000 years ago, reconfirming that humans were present far south of the ice sheets during the Last Glacial Maximum.

Human Prehistory.

Barham, L., et al (2023) **Evidence for the earliest structural use of wood at least 476,000 years ago.** NATURE 621:doi.org/10.1038/s41586-023-06557-9

Authors' abstract: *Wood artefacts rarely survive from the Early Stone Age since they require exceptional conditions for preservation. Consequently, we have limited information about when and how hominins used this basic raw material.*

We report here on the earliest evidence for structural use of wood in the archaeological record. Waterlogged deposits at the archaeological site of Kalambo Falls, Zambia, dated by luminescence to at least 476 ± 23 kyr ago (ka), preserved two interlocking logs joined transversely by an intentionally cut notch.

This construction has no known parallels in the African or Eurasian Palaeolithic. The earliest known wood artefact is a fragment of polished plank from the Acheulean site of Gesher Benot Ya'aqov, Israel, more than 780 ka. Wooden tools for foraging and hunting appear 400 ka in Europe, China, and possibly Africa.

At Kalambo we also recovered four wood tools from 390 ka to 324 ka, including a wedge, digging stick, cut log and notched branch. The finds show an unexpected early diversity of forms and the capacity to shape tree trunks into large combined structures.

These new data not only extend the age range of woodworking in Africa but expand our understanding of the technical cognition of early hominins, forcing re-examination of the use of trees in the history of technology.

In the African context, indirect evidence for woodworking comes from use-wear traces and residues on Early Pleistocene stone tools in East Africa (Oldowan, Acheulean). Actual wood objects are found in Mid-Pleistocene waterlogged deposits in southern Africa with Acheulean and Middle Stone Age tools.

At Kalambo Falls, wood was recovered from Acheulean horizons in the 1950s to 1960s (sites A and B), but taphonomic processes removed evidence of intentional shaping from most pieces. A wood chip and three objects with transverse notches raised the possibility of intentional modification. Attempts to date the wood gave minimum ages.

At Amanzi Springs, South Africa, a single stick with a possible chop mark was reported from waterlogged Acheulean deposits excavated in the 1960s. The deposits were radiometrically dated (approximately 404 to 390 kyr), with wood found in recent excavations but without evidence of modification.

*The earliest clearly modified wood object, collected in 1952 from spring deposits at Florisbad, South Africa, was associated with Middle Stone Age tools and hominin remains (*Homo helmei*)²².*

The object's tip shows cutmarks and fine striations, but its location relative to dated deposits is uncertain. Excavations at Kalambo Falls in 2019 recovered five modified wood objects at site BLB from four areas (BLB2, BLB3, BLB4 and BLB5) in sediments above and below river level. A sixth object, from BLB3, showed no evidence of modification.

Two objects were associated with Acheulean artefacts below the river (BLB3 and BLB5); three from contexts above river level, without stone tools (BLB2 and BLB4).

The Quaternary sequence is a 9-metre-deep exposure above the Kalambo River (BLB1 is a geological section). Sediments are fluvial sands and gravels with occasional, discontinuous beds of fine sands, silts and clays with wood preserved in the lowermost 2 metres.

A permanently elevated water table has preserved wood and plant remains. The depositional sequence is typical of a high- to moderate-energy sandbed river that underwent lateral migration. The sands are dominated by a lower unit of horizontal bedding and an upper unit of planar/trough cross-bedding.

Upper and lower sand units are separated by fine sands, silts and clays with plant material deposited in still water after the river migrated/avulsed elsewhere in the floodplain.

Wood is deposited in this environment either through anthropogenic emplacement, or naturally transported in the flow, and snagged on sand bedforms.

Dating is based on 16 sand samples collected for luminescence analyses from deposits bracketing key finds including those containing wood. Younger samples are dated using single-grain quartz optically stimulated luminescence (OSL) and older samples by post-infrared infrared stimulated luminescence (pIR IRSL) from potassium-rich feldspars.

[Image of two notched logs is from this paper.]

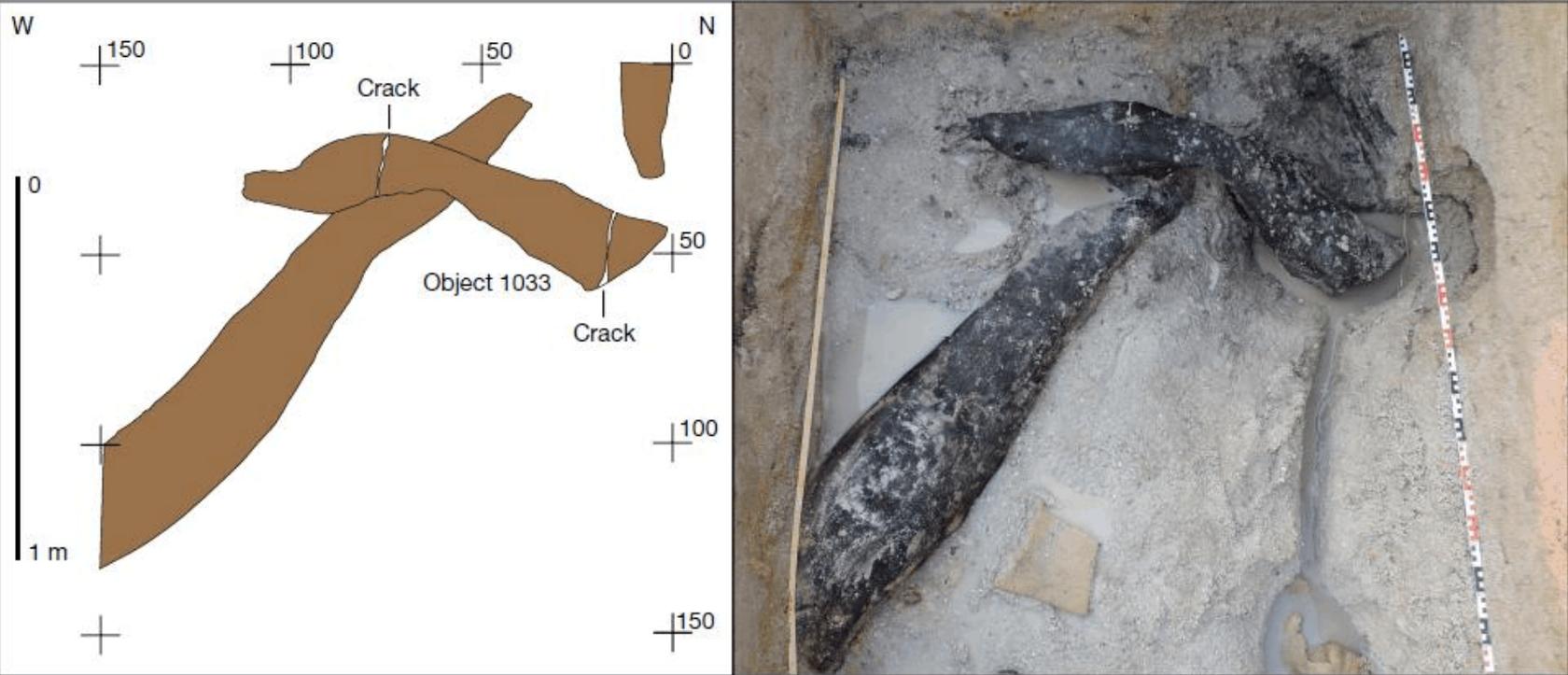


Fig. 3 | Structural unit formed by two overlapping logs in BLB5. The underlying log passes through a central notch cut into the upper log (object 1033) and extends into the section. Plan view of the unit (left) and during excavation (right). The numbers refer to the distance in centimetres.

Peripato, V., et al (2023) **More than 10,000 pre-Columbian earthworks are still hidden throughout Amazonia.** SCIENCE 382:doi.org/10.1126/science.ade2541 (available as a free pdf)

Authors' abstract: *Indigenous societies are known to have occupied the Amazon basin for more than 12,000 years, but the scale of their influence on Amazonian forests remains uncertain.*

We report the discovery, using LIDAR (light detection and ranging) information from across the basin, of 24 previously undetected pre-Columbian earthworks beneath the forest canopy.

Modeled distribution and abundance of large-scale archaeological sites across Amazonia suggest that between 10,272 and 23,648 sites remain to be discovered and that most will be found in the southwest.

We also identified 53 domesticated tree species significantly associated with earthwork occurrence probability, likely suggesting past management practices.

Closed-canopy forests across Amazonia are likely to contain thousands of undiscovered archaeological sites around which pre-Columbian societies actively modified forests, a discovery that opens opportunities for better understanding the magnitude of ancient human influence on Amazonia and its current state.

Guidetti, G., et al (2023) **Photonic crystals built by time in ancient Roman glass.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 120:doi.org/10.1073/pnas.2311583120

Authors' abstract: *Ancient glass objects typically show distinctive effects of deterioration as a result of environmentally induced physicochemical transformations of their surface over time. Iridescence is one of the distinctive signatures of aging that is most commonly found on excavated glass.*

In this work, we present an ancient glass fragment that exhibits structural color through surface weathering resulting in iridescent patinas caused by silica reprecipitation in nanoscale lamellae.

This archaeological artifact reveals an unusual hierarchically assembled photonic crystal with extremely ordered nanoscale domains, high spectral selectivity, and reflectivity (~90%), that collectively behaves like a gold mirror.

Optical characterization paired with nanoscale elemental analysis further underscores the high quality of this structure providing a window into this sophisticated natural photonic crystal assembled by time.

The analysis revealed a highly reflective metallic patina composed of highly ordered nanostructured domains resembling Bragg-stacks.

The study of this patina provides insights into the comodulation of self-assembly and pH-driven nanofabrication processes, involving top-down glass corrosion and bottom-up nano-to-micro-scale structuring of silica nanoparticles into ordered lamellae.

This allowed for the observation of phenomena across different temporal windows that are not accessible through existing artificial aging methods.

Environmental Sciences.

Martin, P.E., et al (2023) **The rise of New Guinea and the fall of Neogene global temperatures.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 120:doi.org/10.1073/pnas.2306492120 (available as a free pdf)

[The Neogene period was from 23.03 megayears ago until 2.58 megayears. When it cooled the Earth enough, glaciations began, defining the subsequent Quaternary period.]

Authors' abstract: *The Earth's climate has cooled by 5 to 10°C over the past 15 megayears, but it is unknown whether this interval of geological climate change is due predominantly to a decrease in CO₂ sources through volcanic outgassing or an increase in global weatherability and CO₂ sinks.*

New thermochronology data and a coupled weathering-climate model estimate that mountain building in New Guinea from 10 to 6 megayears increased carbon sinks and consumed the CO₂ equivalent of 0.6 to 1.2°C, contributing to Neogene global cooling.

Schmidt, M.J., et al (2023) **Intentional creation of carbon-rich dark earth soils in the Amazon.** SCIENCE ADVANCES 9:doi.org/10.1126/sciadv.adh8499 (available as a free pdf)

[Contrary to popular belief, the Amazon jungles were not pristine wilderness before Columbus but were cultivated extensively.]

Authors' abstract: *Fertile soil known as Amazonian dark earth is central to the debate over the size and ecological impact of ancient human populations in the Amazon. Dark earth is typically associated with human occupation, but it is uncertain whether it was created intentionally.*

Dark earth may also be a substantial carbon sink, but its spatial extent and carbon inventory are unknown. We demonstrate spatial and compositional similarities between ancient and modern dark earth and document modern Indigenous practices that enrich soil, which we use to propose a model for the formation of ancient dark earth.

This comparison suggests that ancient Amazonians managed soil to improve fertility and increase crop productivity. These practices also sequestered and stored carbon in the soil for centuries, and we show that some ancient sites contain as much carbon as the above-ground rainforest biomass.

Our results demonstrate the intentional creation of dark earth and highlight the value of Indigenous knowledge for sustainable rainforest management.

Rentschler, J., et al (2023) **Global evidence of rapid urban growth in flood zones since 1985.** NATURE 622:doi.org/10.1038/s41586-023-06468-9 (available as a free pdf)

Authors' abstract: *Disaster losses are increasing and evidence is mounting that climate change is driving up the probability of extreme natural shocks. Yet it has also proved politically expedient to invoke climate change as an exogenous force that supposedly places disasters beyond the influence of local and national authorities.*

However, locally determined patterns of urbanization and spatial development are key factors to the exposure and vulnerability of people to climatic shocks. Using high-resolution annual data, this study shows that, since 1985, human

settlements around the world, from villages to megacities, have expanded continuously and rapidly into present-day flood zones.

In many regions, growth in the most hazardous flood zones is outpacing growth in non-exposed zones by a large margin, particularly in East Asia, where high-hazard settlements have expanded 60% faster than flood-safe settlements.

These results provide systematic evidence of a divergence in the exposure of countries to flood hazards. Instead of adapting their exposure, many countries continue to actively amplify their exposure to increasingly frequent climatic shocks.

Moreover, spaces that are safe from floods are increasingly occupied and the resulting land scarcity can drive new developments disproportionately into previously avoided areas, including riverbeds and floodplains.

Economics.

Huang, H., et al (2023) **Research on the crisis propagation in the global coal trade under the Russia-Ukraine conflict.** SCIENTIFIC REPORTS 13:doi.org/10.1038/s41598-023-42643-8 (available as a free pdf)

Authors' abstract: *The outbreak of the 2022 Russia-Ukraine conflict exacerbated the natural gas supply shortage in European countries. European countries restarted coal-fired power plants to maintain economic and social operations.*

The uneven distribution of coal resources in the world makes coal international trade inevitable. The intricate trade relations between trading countries have formed a coal trade network.

When a country's coal exports are limited due to geopolitical factors, it will cause coal supply risks. The risk will spread to more countries along the trade network, eventually leading to the collapse of the trade network.

This paper builds a crisis propagation model of the coal supply under the Russia-Ukraine conflict using the cascading failure model. The results showed that the Czech Republic, Ireland, Portugal, and Bulgaria become abnormal as the proportion of coal exports increases.

When the Russian Federation reduced its coal exports by 80% and countries maintained only 10% coal exports against crisis, 23 European countries were the worst.

Iceland, Ireland, Turkey and other countries were spread by the indirect risk and became abnormal countries. The Czech Republic and Bulgaria were spread by multiple risk and became abnormal countries.

Technology.

Yousefzadeh-Valendeh, S., et al (2023) **Dandelion flower-fabricated Ag nanoparticles versus synthetic ones with characterization and determination of photocatalytic, antioxidant, antibacterial, and alpha-glucosidase inhibitory activities.** SCIENTIFIC REPORTS 13:doi.org/10.1038/s41598-023-42756-0

[Silver is used as an anti-bacterial medicine. It has the advantage that microbes cannot develop immunity against it because the silver uses an ionizing chemical action that corrodes the cells physically. Such substances have traditionally been produced by chemical factories but this paper reports a better way with dandelion extracts.]

Authors' abstract: *In the present work, silver nanoparticles (AgNPs) were fabricated through the dandelion flower hydroalcoholic extract, and their properties were characterized by FTIR, XRD, UV visible, SEM, and EDX.*

The results demonstrated that the average diameter of the green fabricated AgNPs is 45 to 55 nm (G-AgNPs). The antioxidant, antimicrobial, antidiabetic, and photocatalytic properties of G-AgNPs were compared with two commercially available different diameter sizes (20 and 80 to 100 nm) of AgNPs (C-AgNPs1- and C-AgNPs2, respectively).

The sample's capacity for antioxidants was evaluated by DPPH free radical scavenging method. The consequences showed that G-AgNPs have higher radical scavenging activity (47.8%) than C-AgNPs2 (39.49%) and C-AgNPs1 (33.91%).

To investigate the photocatalytic property, methylene blue dye was used. The results displayed that G-AgNPs is an effective photo-catalyst compared to

C-AgNPs2 and C-AgNPs1, which respectively have an inhibition potential of 75.22, 51.94, and 56.65%.

Also, the antimicrobial capacity of nanoparticles was assayed against, the gram-negative Escherichia coli and gram-positive Staphylococcus aureus bacteria. The results indicated that G-AgNPs could effectively inhibit the growth of both bacteria, compared to C-AgNPs1 and C-AgNPs2.

Finally, G-AgNPs exhibited a considerable alpha-glucosidase enzyme inhibitory effect (88.37%) in comparison with C-AgNPs1 (61.7%) and C-AgNPs2 (50.5%).

Vicente, L., and H. Matute (2023) **Humans inherit artificial intelligence biases.** SCIENTIFIC REPORTS 13:doi.org/10.1038/s41598-023-42384-8 (available as a free pdf)

Authors' abstract: *Artificial intelligence recommendations are sometimes erroneous and biased. In our research, we hypothesized that people who perform a (simulated) medical diagnostic task assisted by a biased AI system will reproduce the model's bias in their own decisions, even when they move to a context without AI support.*

In three experiments, participants completed a medical-themed classification task with or without the help of a biased AI system. The biased recommendations by the AI influenced participants' decisions.

Moreover, when those participants, assisted by the AI, moved on to perform the task without assistance, they made the same errors as the AI had made during the previous phase.

Thus, participants' responses mimicked AI bias even when the AI was no longer making suggestions. These results provide evidence of human inheritance of AI bias.