

# OPUNTIA 532





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

**BOOKED IN CALGARY**

photos by Dale Speirs

Further on in this issue is my report about Calgary’s annual readercon When Words Collide. This gave me an excuse to clean out a bunch of photos from my Future Topics folder.



The cover shows a bookmobile at the East Village street fair on Canada Day. It was operated by a local bookstore.

Below left: Two views of a Calgary Public Library bookmobile parked at the Nose Hill branch. Which, strangely, is not on Nose Hill but down in the Brentwood district. There is a branch on the hill but it is called Crowfoot, after a Blackfoot chief who lived out on the prairies and never went near the hill.

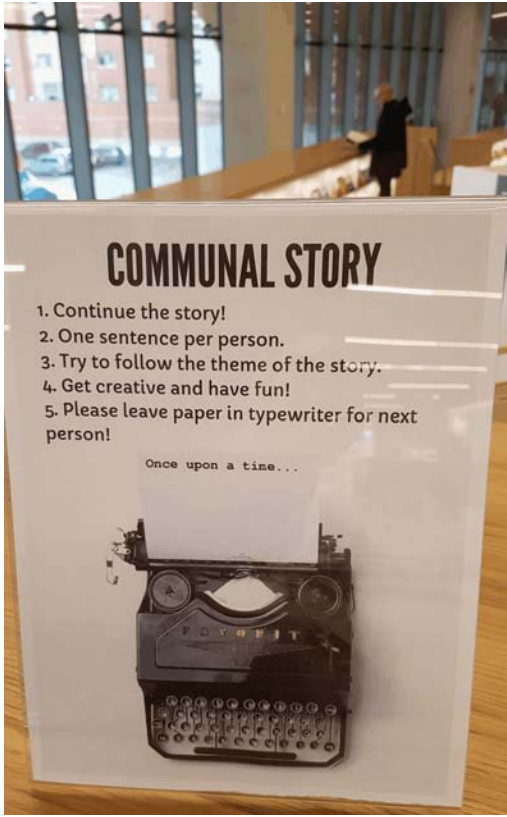


This photo was taken inside the Nose Hill library where I was doing some reading.

I noticed that the strip lights in the ceiling formed a reflection in the windows that matched the elm tree across the street,



This next group of photos were all taken at the New Central branch over the past few years. See OPUNTIA #428 for lots of photos of this spectacular building. The New Central has an open space on the ground floor for rotating exhibits such as shown in these photos.





Little Free Libraries.

I spotted this mansard-roofed LFL on Carleton Street SW in the posh Mount Royal district, which matches the style of the mansion. Unfortunately the big house was screened by trees so I couldn't get a good photo of both together.



Bookselling.

I buy books several times a year from Amazon.ca, almost entirely science fiction and mystery. What baffles me is how their recommendation software works, or rather, doesn't. They can't be using any logical algorithm if this screen shot is a typical example of what I get after buying Cthulhu Mythos and Sherlock Holmes books.

Search Amazon.ca

Books you may like





At one time, Calgary had a plethora of street boxes for free newspapers and magazines. A few linger for advertising supplements but the rest are gone.

The CALGARY JOURNAL was the student newspaper of Mount Royal University but it went online only during the pandemic.



FREE STUFF ONLINE

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

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

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

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

The Old Time Radio Researchers have thousands of old-time radio shows (1930s to 1950s) covering all the genres, such as comedy, science fiction, fantasy, and mystery. Visit [www.otrr.org/OTRRLibrary](http://www.otrr.org/OTRRLibrary).

They also publish a bulletin OLD RADIO TIMES, available at [www.otrr.org/?c=times](http://www.otrr.org/?c=times), with a free email notification service. Don’t pay money for audio books and listen to a droning voice when you can listen for free to full-cast shows such as Jack Benny or Inner Sanctum from the OTRR.

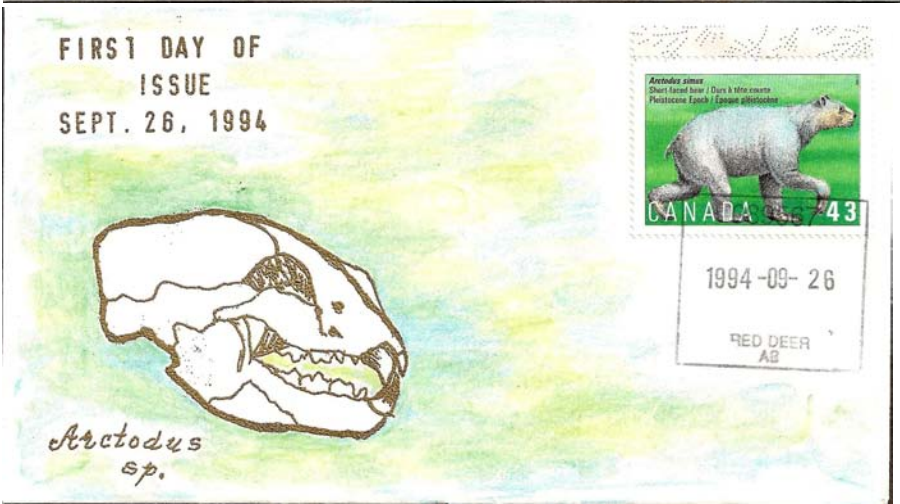
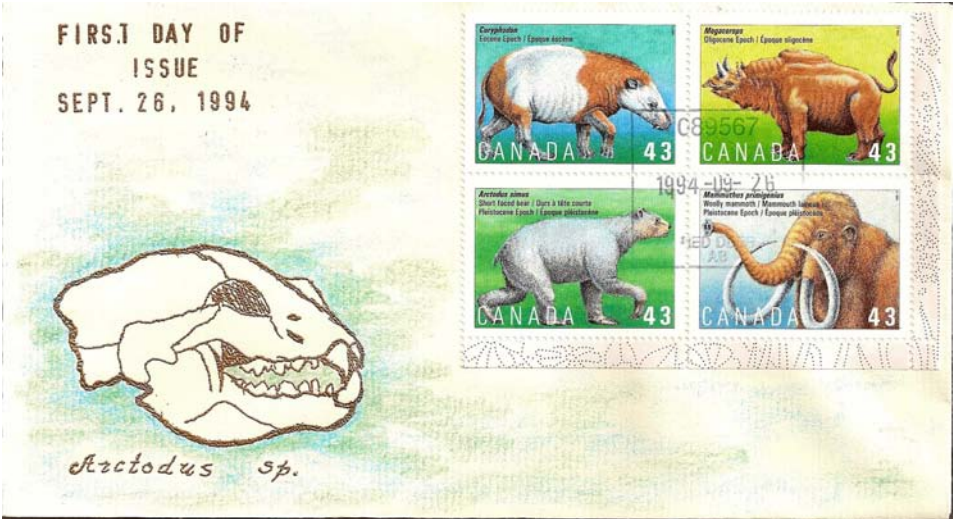
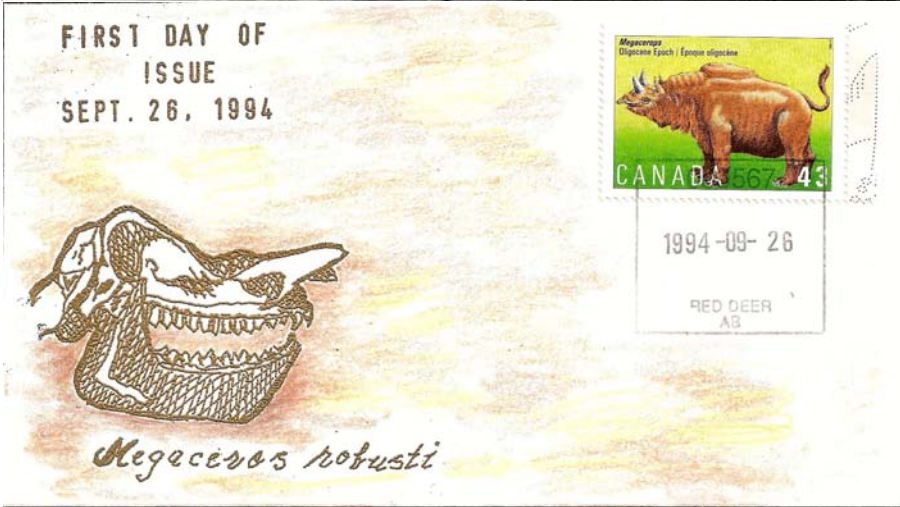
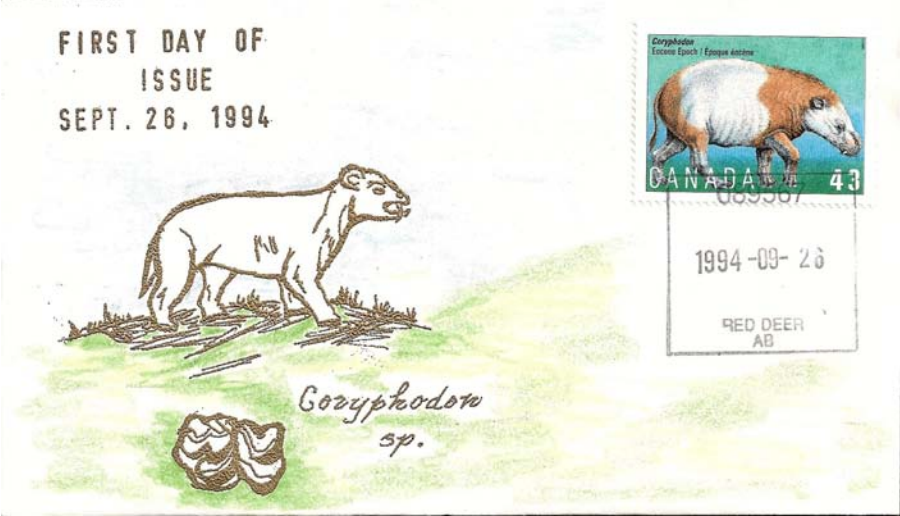
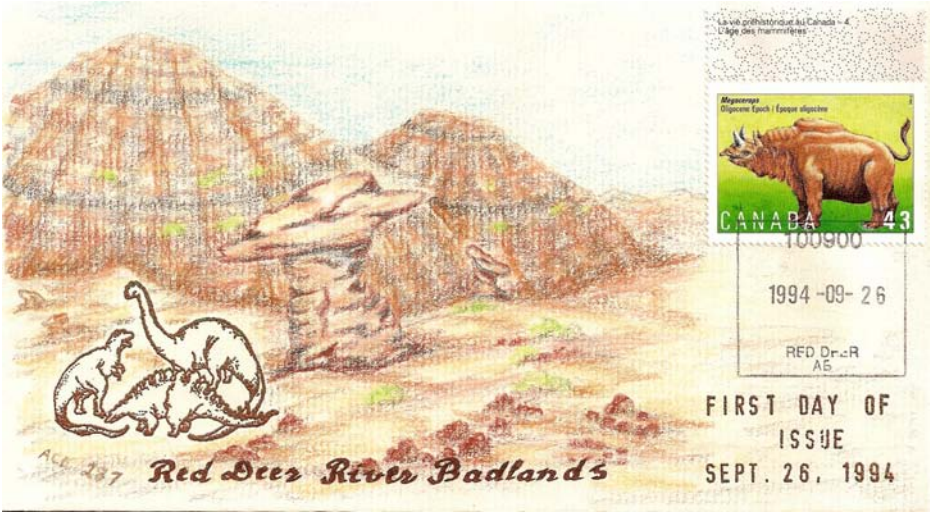
For pulp fiction magazines from all genres, visit [www.archive.org/details/pulpmagazinearchive?&sort=-downloads&page=2](http://www.archive.org/details/pulpmagazinearchive?&sort=-downloads&page=2) Books in the public domain are free from [www.gutenberg.org](http://www.gutenberg.org)



MAIL ART OF BETTY SPEIRS: PART 15  
by Dale Speirs

[Parts 1 to 14 appeared in OPUNTIA's #511, 514, 517, 519, 521, 523 to 531.]

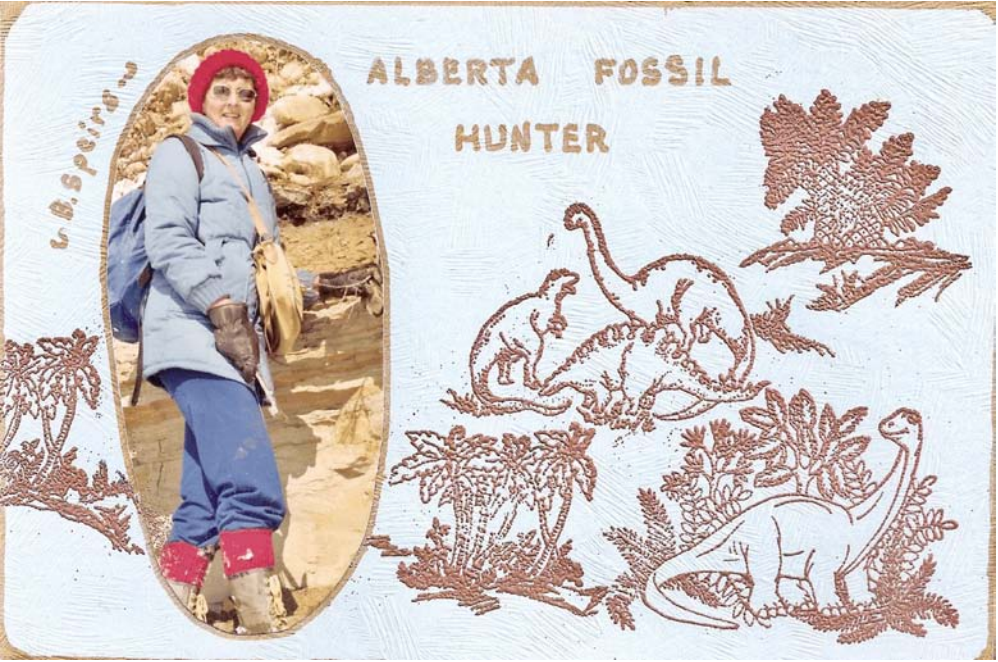
My mother Betty was a palaeontologist as well as a philatelist, so here are some hand-drawn covers on the topic.





Betty had several fossil species named after her, one of which was the Palaeocene tree *Joffrea speirsii*.

At right are hand-made postcards showing her at the fossil sites.



# WHEN WORDS COLLIDE 2022

[Reports of previous WWC conventions appeared in OPUNTIA's #71, 253, 266, 282, 318, 350, 387, 421, 452, 481, and 507.]

Calgary's annual readercon When Words Collide was held August 12 to 14 online. The convention committee had to decide in January whether to go live and risk a massive hotel bill from failing to make the room nights guarantee or play it safe and have the event online.

The problem wasn't so much the actual COVID-19 pandemic but whether or not travel restrictions would ease by August. The majority of WWC's attendance of about 1,000 are outlanders, so that was a major point of concern.

Funnily enough, or perhaps not if you were a air traveler, the actual problem wasn't the pandemic restrictions but the failure of airlines to staff enough flights, leading to numerous cancellations or long delays sitting on the taxiway.

We all trust that the 2023 WWC will definitely be a live event. I certainly hope so. There were a number of panels I skipped online that I would have attended as a live event. I can only stare so long at a screen before my eyes go blurry. However the weekend in Calgary was 30°C heat, so it was nice to sit in a cool basement den while viewing the sessions.

The seminars here are sorted by topic rather than reported in chronological order. The title is in bold face and the blurb in italics, followed by my notes in plain text. I completely forgot to take screenshots of the panelists as I did in previous years.

One important note for anyone hosting a Zoom session. Please mute all the spectators at the beginning. One of the panels I attended was bombed by hackers who kept interrupting because the host didn't know how to mute everyone at once and she couldn't figure out who the culprit was.

## Practical World Building.

### Baking, Brewing, And Babies

Sandy Fitzpatrick, Celeste Peters, David Worsick, Marina Stevens  
*What do your fantasy characters eat and how does it affect your stories? What do they drink? How do they grow their food? Hunt for game? What herbs do*

*your characters use for healing? What methods and materials do your characters use to create and repair clothing? Who does this work? Panelists will discuss these topics and more and how they have used this in their writing.*

Peters and Stevens both emphasized that getting food in medieval times was not that easy. People had to be self-sufficient in ways that we, who shop in supermarkets, cannot appreciate. Trade routes were extensive though.

Fitzpatrick mentioned that baking depended on yeast. Stevens said barley was the best grain because it is more drought and salt tolerant and can be used for both baking and brewing. Barley straw was the best kind for thatching. Rye had the problem of getting argot fungus in humid conditions.

She mentioned that corn, tomatoes, and potatoes are New World crops, so they cannot be used in any pre-Columbus settings. Cattle and horses were very expensive, so the preference was for goats and sheep.

Stevens pointed out that roasting whole pigs or sides of beef was not practical but it is a common cliché in fiction and particularly movies. Medieval barbecue was done with cuts of meat, same as today, not entire animals spitted inside a fireplace. Cattle were mixed use, giving both milk, then beef later. Not until about 150 years ago did dairy and beef breeds separate.

The Vikings ate mainly mutton and root crops such as turnips. The Scandinavian climate was not suitable for grains. The Viking settlement at L'Anse aux Meadows, Newfoundland, paradoxically did not fish.

Peters mentioned the difficulty of warble flies and worms infecting livestock, not a problem today but common back then. Warble fly maggots burrow into cattle flesh, puncturing the hide with holes that ruin the leather for waterproof clothing.

The women on the panel agreed that the phrase "beautiful baby" is nonsensical. They are red, wrinkly, and have distorted heads at birth. Infant mortality became higher after women began having babies in hospitals instead of homes.

Writers should be aware of what diseases were common back when, such as cholera. Beer and wine were common drinks because water was contaminated. Innkeepers did not wash cups or cutlery in between customers.



## Map-Making For Authors

Amanda Witow

*Words are the bread-and-butter of writers, so sometimes the need to draw something, like a map, can be intimidating. Whether it's a country, city, or building, there are tricks and strategies for making maps that even the most artistically challenged writers can manage.*

Maps are important for consistency and details in the fiction, whether continents or a city. They can be contour but with standard symbols can be easily built, using hex grids, D&D symbols, or digital sources.

Maps should be needs-based, showing what is relevant to the story, without unnecessary detail. Don't forget to respect geology. Mountains do not form at random, nor do valleys or plains.

If the map is only for personal reference, it can be hand-drawn and doesn't have to be neat. If the map will eventually be published, then professional work is needed. Digital is easier to correct or edit, and can be enlarged or reduced depending on what scale is wanted.

Use real world maps for historical or contemporary settings but be aware of copyrights. Google maps are handy for digital drawing. For fictional worlds, there are several websites that will generate world maps or medieval city plans.

## World Building Through Fashion And Food

Krista D. Ball

*What we eat and how we dress says a lot about who we are and where we stand in the world. In this fun and informative presentation, author Krista D. Ball walks through how to use food, clothing, and shopping to develop a rich texture in your own fiction world, be it fiction writing or your next tabletop gaming session.*

If the book is based on the real world, the author will be competing with reader expectations of what it should look like. Fictional worlds only need enough detail to support the plot. Massive binders of how a world operates are okay to use in writing to maintain continuity but not as infodumps in the story.

Details can change how the world is perceived. A fireplace means the world has a brick manufacturing industry. Rural and urban housing will differ. Apartment buildings and boarding houses will not have fireplaces in individual rooms.

Food had to be transported. Alleys were needed to unload deliveries. Horse-drawn wagons left a trail of manure behind them.

Clean sanitation did not exist in medieval societies. Drink a hearty cup of spiced wine at a tavern, and the bartender will hand it on to the next customer unwashed, just as you received it unwashed from the previous customer. For fantasy worlds, such is to be expected.

Clothing from olden days had less give to the fabric. However, all clothes were custom fitted, as opposed today where we buy them off the rack and expect sagging or tightness. Corsets were never worn against bare skin so as to avoid sweat stains, and were not normally worn tight to make a tiny waist.

**Genres: Fantasy.**

## The Forge Sword Fight Writing Workshop

Mark Winkleman, Jeff Mostowich, and Alex Williamson

*A fantastic fusion of writing workshop and sword fighting tutorial. Historical European Martial Arts instructors Mark and Jeff will walk us through a crash course in the language of medieval sword masters, technique, demonstrations, and common errors in books and film.*

*Between each segment Alex will lead a brief writing exercise, so by the end of the session participants will have crafted their own sword fight!*

The demonstrations were streamed from a gymnasium, beginning with the anatomy of various types of swords. Short demonstrations were staged to allow viewers to write down each movement in authentic style. First the fighters posed en garde, then for individual body movements and swings. Each segment of a sword fight was paused for an explanation of why the movement was done that way.

A common error is to lead with the body forward instead of the sword. This makes an easier target for the opponent. Each clash of swords is first intended to deflect the opponent's sword, then to tilt one's own sword into the opponent's body, all in a single movement.

## Power Dynamics In Fantastical Worlds

Susan Forest, Swati Chavda, Nina Munteanu

*In many tales, plot dynamics hinge on who has power and who doesn't. How*



*are some characters marked and how does that affect their agency in a fantasy or science fiction world. How can you use viewpoint to emphasize power dynamics? Panelists will talk how handle power ebbs and flows when writing speculative fiction.*

Munteanu said that power depends on the circumstances. The environment has power, as anyone in a strong storm or earthquake knows.

“Knowledge is power” is a well known statement that speaks for itself. The transfer or disconnects of power provide the conflict of the story. Fear is one of the biggest drivers of power transfer.

Forest said the best expression of power is the ability to influence people and change their way of thinking. Titles may assert power but actually exerting it requires some consensus among others to agree.

Chavda said education is power. Poverty can prevent access to education and thus denies power to the lower classes. A motive for characters is whether or not they are willing to challenge power. The classic example is the young lad/girl from a backroads farm who challenges the king and wins the throne.

**Everyday Magic**

C. J. Lavigne

*This workshop digs into the kind of urban fantasy that introduces one subtle change and rewrites the world. We’ll examine small elements of “what if?” and how they can be used to best effect, sliding the magical into the mundane. Examples, writing exercises, and discussion will all be used to explore this topic and give you some ideas for sparking the speculative in your work.*

Magic needs to be grounded in the mundane to provide a spark of contrast. The term “urban fantasy” has supplanted everything that was originally lumped under “magical realism”. The latter term has since been narrowed to a specific type of Latin American fantasy.

An example cited was a man’s smart fridge possessed by the soul of his mother-in-law. He tried to give away the fridge, just to be free of her annoying nagging.

**Genres: Science Fiction.**

**Building Better Aliens**

J.D. DeLuzio, Arlene F. Marks, Nina Munteanu, Stephen B. Pearl

*All too often the aliens in science fiction are either humans with bad nose jobs or make no sense biologically. This panel will explore the science and logic of making realistic alien species for use in science fiction.*

DeLuzio said many movie alien worlds have to be in settings like southern California for obvious reasons. Such worlds have to be consistent with the species.

Aliens are often simplified cultures, such as warrior races, logical species, etcetera. They would then clash with each other because they had no common ground.

Munteanu concentrated on world building first. Whatever ecosystem is created will require the alien species to be logically fitted into that environment. Conversely, the shape and type of alien will give an idea of what the home world would look like.

She mentioned some sentient aliens would be incapable of communication, such as the living planet in SOLARIS, which imitated humans but could not understand them.

Marks said she notes whether the alien evolved from a predator or prey, which will shape their behaviour and societies. For example, prey animals have wider field of vision to detect predators, so the placement of the eyes suggests origins. She doubted that two sentient species could share the same environment, much like *Homo sapiens* eventually obliterated other *Homo* species.

Pearl discussed body plans, such a species with six limbs compared to humans with four limbs. Aliens interacting with each would have trouble being in each other’s physical presence because they have different needs for air temperature, breathing atmosphere, and so forth. Way stations where aliens could meet would be uncomfortable for all.



**Genres: Historical Fiction.**

**Sugarcoating The Past: Quakers, Nostalgia, And Empire in British Confectionery Industry Advertising And Packaging, 1850-1914**

Anna Part

*The confectionery industry in Britain between 1850 and 1914 was dominated by Quaker-owned companies, but the advertising material produced by this industry exemplifies the contradictions and overlapping ideologies between popular Victorian tastes and Quaker beliefs.*

An odd subject, but the topic seemed interesting so I logged in to hear what Part had to say. This presentation was from her master’s thesis.

Packaged confections began to prevent adulteration or spoilage of the candy by store keepers which would reflect unfairly on manufacturers. The packages then became part of the advertising strategy, with colourful wraps.

Quaker Oats were not produced by actual Quakers. However, Rowntree, Fry, and Cadbury were Quakers, and dominated the British chocolate and cocoa market. They had almost all of the confectionary market between them.

Their advertising emphasized images of wealth, purity, quality, progress, and leisure, even though their customers often had none of these. This was during the transition from an uneducated rural populace to universal literacy. The bucolic images on the tins and boxes showed idealized life as customers would have liked to live.

During the 1800s, the Big 3 helped changed the way products were distributed. They began selling in packages, not barrels or crates from which shopkeepers would ladle out food. This improved the quality tremendously.

We take packaged food for granted today. The soap industry and many other manufacturers also went to small individually wrapped products to protect their brand names.

**Genres: Mystery.**

**Badges? What Badges?**

Joan Donaldson-Yarmey, Diane Bator, Debra Purdy Kong, Joanna Vander Vlugt, Erik D’Souza

*These authors use sleuths who don’t carry a badge (and probably no weapon either) to solve crimes. Panelists will discuss the wide spectrum of amateur sleuth tales, from cozies to gritty thrillers, and sleuths who are “amateur” only because they lack the badge.*

Donaldson-Yarmey began by discussing cozy mysteries as an example of amateur sleuths. Blood, gore, and foul language are minimized. The Miss Marple is drawn into the investigation by outside events, not of her own volition like a professional or police detective. Cozy detectives are just plain nosy.

Kong said amateur detective fiction is not necessarily cozy. Protagonists can be involved in edgier stories and are not Miss Marples. In cozies, the amateur sleuth often gets involved because she cares about people.

Bator said the rules can be blurred for detective fiction. While most cozies adhere to the standard tropes, some veer into hard-boiled or at least just over the boundary line. Cozy sleuths are seekers of justice.

D’Souza said he had heard a term ‘solid boiled’ for fiction between a cozy and hard-boiled or noir fiction. Marples and Fletchers have to feel confident that they are smarter than the local police.

Vander Vlugt mentioned prosecutors in Canada cannot investigate but only rely on police evidence. One of her characters was a lawyer who had to walk a fine line between getting all the evidence and staying impartial. She classified cozy detectives as protectors.

**Marketing Your Great Words.**

**Web 3, NFT, Blockchain And All That Jazz: What Should Writers Know?**

Ron Friedman

*In this presentation we will explore the basic concepts of these new technologies. The good, the bad and the ugly. So, you, a Sci-Fi or a contemporary writer, can incorporate this growing trend into your work.*



*Additionally, I'll show you how to mint your first story as an NFT and discuss how we, as writers, can potentially increase our visibility, sales, and revenue with this new technology.*

Web 3 is where the users own their content and use cryptocurrency for transactions. One problem is that it consumes huge amounts of electricity. Another is that such financial transactions are not regulated and governments will not protect users.

Non Fungible Tokens are a digital form of collectibles or registration of ownership, but wildly uncontrolled. Lose your pass phrase and you lose everything. Books and stories can be minted as NFTs.

Friedman experimented by registering one of his stories as an NFT. Selling is a very complicated matter, depending on the websites. He had to work back and forth between two websites.

Caezik Crypto is selling limited-edition ebooks of Robert Heinlein, each numbered by a NFT. The question with many NFTs is whether the item includes the copyright. One would think that no one would pay big money for an NFT if the item is easily available elsewhere, but every fad has its fallacies.

**Writing For The Christmas Market**

Raine Hughes, Tracey Cooper-Posey, Lori Whyte, B.G. Cousins  
*Christmas is a magical time, and a strong economic one as well. Writing stories with Christmas themes can be very popular during the season, but the theme needs to be perfected. Our panelists will discuss their experiences writing for this lucrative market.*

Hughes said Christmas writing should be about traditions and family love. She markets her books ahead of time via social media to create a buzz for the actual sales later.

Whyte added that Christmas is a nostalgia holiday when we think about the past in sentimental terms. Stories should be an escape from everyday troubles. Christmas is a good time for magical stories. She was trying to market winter solstice stories.

Cooper-Posey said family traditions are part of the Christmas narrative. Not just the nationally accepted traditions but those in the home. Christmas can't be just

a background for romance fiction and others that rely on relationships. Novels must be marketed early, well ahead of the season, to time sales during peak demand.

Mainstream publishers prefer to sell novels as series because the readers will keep buying. Most Christmas books are not part of a series, but could be if annual books such as done by Anne Perry.

Cousins mentioned that Christmas marketing begins in October. Not just books but everything else for the season, whether Hallmark tree ornaments or candy. I'll vouch for that. Christmas candy goes on sale in Calgary in September, and Halloween candy is already here in middle August.

Short stories about Christmas are difficult to sell, unless in single-author collections, anthologies, or print-on-demand chapbooks. The latter are ideal for marketing as inexpensive gifts.

**THRILLING TYPEWRITER TALES: PART 5**

by Dale Speirs

[Parts 1 to 4 appeared in OPUNTIA's #287, 345, 378, and 435.]

**The Voice Of The Typewriter.**

“The Typewriter That Laughed” by Arthur Stanley Riggs (1906 July, THE BLACK CAT, available as a free pdf from [www.archive.org](http://www.archive.org)) was a cutting-edge technology story at the turn of the last century. Herman Billings had just taken delivery of a new state-of-the-art typewriter. There was just one problem with it.

When typing on the machine, at low speeds it would chuckle. As one typed faster, the machine began laughing. Real laughter. Billings was perturbed to say the least. After many vexations, he finally learned it was a practical joke by friends who had heard he was buying the typewriter.



They had gone to the shop selling the machine and arranged for a technician to install a talking disk (as records were then called) inside the bottom of the machine. The disk was powered by the keystrokes. The faster the typist worked, the louder the prerecorded laughter sounded. If ANALOG was in publication in 1906, its editor would have bought the story.

**Dr. PARKHURST** in the *Independent*,  
Dec. 12, 1895:

*"The value of a machine is not in the exquisiteness or even the antiquity of its build, but in the amount of good work it will turn out."*

Measured by this  
Standard, the... **Caligraph...  
Typewriter**

**Is Absolutely without a Peer.**

**"It  
Outlasts  
Them  
All."**



Our Illustrated Catalogue for 1896 will be sent on request.  
Ask also for sample book of Typewriter Papers.  
**American Writing Machine Co., 237 Broadway, N. Y.**

Bob Elliott and Ray Goulding were among the top comedians of old-time radio and worked four decades in that era, then carried on to the 1980s with a fresh series. They worked for every radio network at one time or another.

Their forte was interviewing oddballs and reporting with straight faces many ridiculous events. All the characters were done by them with many voice changes. Their OTR shows are available as free mp3s from [www.otrr.org/OTRRLibrary](http://www.otrr.org/OTRRLibrary).

BOB AND RAY PRESENT THE CBS RADIO NETWORK included a 1959 episode "Musical Typewriter". They interviewed an inventor of a musical typewriter, who started out wanting to alleviate the problem of finger fatigue. Like many inventors, as he proceeded he lost sight of his original purpose and produced something completely different.

The device was air-driven and had to be pumped up first for several minutes before it would work. It had 450 keys and was 9 feet wide. As the inventor demonstrated the machine, it sounded remarkably like a bagpipe.

It may have saved the fingers but would damage the ears. It only took a half hour to type one page on the machine. Clearly another case of a solution looking for a problem.

### **Murderous Typewriting.**

IT'S MURDER was a weekly 15-minute series that aired in June 1944, no writers credited. It was sponsored by the National Safety Council. The blood and mayhem of each episode was bookended by commercials urging listeners to act safe at home and on the road. Available as free mp3s from [www.otrr.org/OTRRLibrary](http://www.otrr.org/OTRRLibrary)

"Picture Wire Murder" was written by Stedman Coles and aired on 1944-08-10. Retired actor Rex Starr and his niece, reporter Joan Adams, were vacationing in an artists' colony in Maine. They went out for a stroll to visit Jonathan Bixby.

They hardly got in the door when his daughter Annabelle burst in, crying havoc. She had been walking along the lake shore when she found the body of the artist Mark Turner. He had been strangled with picture wire.

Starr and Adams went down to the beach to sleuth. She filled him in on the gossip. Turner had married Felice Morgan, his secretary, about five years previous but the union failed about a year ago. She began carrying on with Paul Bradford, a novelist. Turner wouldn't give her a divorce.

Bradford vanished from the colony. Morgan was the next victim, strangled by picture wire in her cabin. There was an unsigned suicide note in a typewriter, poorly typed, supposedly by her, claiming to have killed her husband. When she told Bradford, he rejected her, so she was going to kill herself.

The listener will immediately realize that nobody commits suicide by strangling themselves with wire. A noose perhaps, but not by hand tightening a wire around the throat.

Starr noticed all the portrait paintings in the room had the faces of the women cut out. They found one painting was missed by the vandal and determined the faces were those of Annabelle. Trotting over to the Bixby residence, they found her being consoled by her father, who was telling her Turner wasn't her type anyway.

One giant leap to a conclusion and Starr accused Jonathan of the crimes. After a musical segue, Starr explained everything in the denouement. Morgan did not type the note because she had been a secretary and would not have made so many errors. Neither would have Bradford, a professional writer.

That left Annabelle and Jonathan. He slipped up by saying the suicide note clearly blamed Bradford. Starr and Adams were the only ones who knew about Morgan's death and the note, and hadn't yet notified police. Jonathan had slipped up by mentioning the note, which he had typed after strangling Morgan. Ergo, he was the murderer.

**A Kinder, Gentler Typewriter.**

“Phoebus ‘Gins Arise” by Kate Riedel (2007, from the anthology TESSERACTS ELEVEN, edited by Cory Doctorow and Holly Phillips) was about Miss Claudia Parry, spinster teacher who taught typing and stenography.

She went berserk one day and dinged a student by throwing a Selectric typewriter ball at her. (If you're a Millennial and don't know what that is, ask your mother.) Parry lived in a world of rigidity but change was to come.

Pending a disciplinary hearing, she went for a walk in search of a less rigid world. She found it, sort of, and slipped into an alternative reality.

*At A Century of Progress*

AIN - THE WORLD'S  
INTERNATIONAL SCHOOL TYPING CONTEST

**WON ON A WOODSTOCK**

INTERNATIONAL COMMERCIAL SCHOOLS CONTEST **1933**

MISS DOROTHY DOW  
Declared World's Champion School Typist, 1933

*Marie Thiem*  
**1934 CHAMPION**  
INTERNATIONAL COMMERCIAL SCHOOLS CONTEST  
and her  
**WOODSTOCK**

Miss Thiem's victory was scored against the keenest of capable competition—a splendid field of contestants from the country's representative high schools, commercial schools, colleges and universities. The writing machines used by the contestants were 34 L. C. Smiths; 29 Woodstocks; 21 Royals; 20 Underwoods, and 2 Remingtons.  
We congratulate Miss Thiem on her earned and well deserved honor.

**1934**

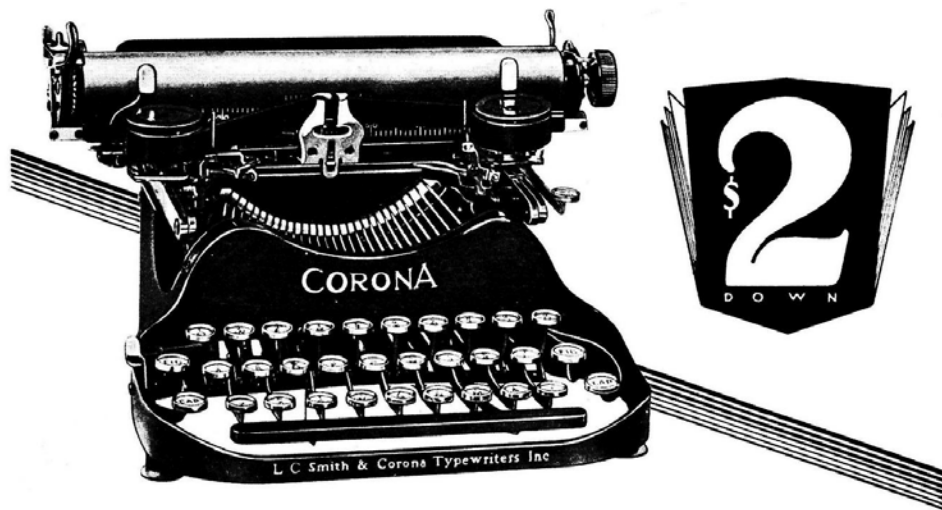
WHEN QUALITY AND PERFORMANCE  
**WIN REPEATEDLY**  
*... it is No Accident*

**WOODSTOCK**  
TYPEWRITER COMPANY

SIX NORTH MICHIGAN AVENUE — CHICAGO

Branches in all principal cities  
Distributors all over the world





# BRAND NEW CORONA GENUINE Model #3

**Lowest Price — Easiest Terms  
Ever Offered**

HERE'S your chance to own that brand new Genuine Model 3 Corona you've wanted — on the easiest terms ever offered — at the LOWEST PRICE ever offered. Complete in every detail; back spacer, etc. *Manufacturer's Guarantee.* Recognized the world over as the **finest, strongest, sturdiest portable built.**

S. Joveton writes: "It truly is a wonderful machine. I am very pleased with it and find it very simple to work, although it is the first typewriter I have ever used."  
Don P. Fina, composer and pianist says: "Corona has helped me put my songs over and is still doing it. I find it just the thing for writing words, to songs and for all correspondence to the profession."

F. J. Barsuglia, Jr., writes: "I am very well pleased with your little Corona and I must say I do not know what I would really do without it. It works like a charm and has every convenience of a larger machine."  
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## MISCELLANEOUS SCIENCE FICTION REVIEWS

by Dale Speirs

### Aliens.

STAR KNIGHT was a 1985 movie filmed in Spain, written by Fernando Colomo, Andreu Martin, and Miguel Angel Nieto. The original title was EL CABALLERO DEL DRAGON, and the film was dubbed into English. My copy was on the DVD boxed set "Sci-Fi Invasion" from Mill Creek Entertainment.

While not a comedy, there was a good bit of humour in the movie. An alien spaceship splashed into a lake in medieval Spain, alarming the inhabitants, who thought it had been a dragon. There was rioting and the local Count had all he could do to keep the peace.

His daughter got herself snatched by the alien, a very handsome male humanoid. She didn't struggle that much, and fell in love with him. There was much to-ing and fro-ing between the castle and the countryside.

Competing for the hand of the fair maiden were an alchemist and a bumbling knight. The latter loved his reflection in the mirror, which led to an amusing scene where he was being outfitted for new armour by a limp-wrist tailor.

The alchemist was sidetracked by the local bishop who didn't approve of him. The alien and the knight ended up jousting on horseback with each other. There was a twist ending when the alien lost his spacesuit and the knight found himself wearing it.

The spaceship, apparently sentient, took the knight and bishop for a ride out to the stars. The alien was left behind but got the girl, while the alchemist was the odd man out. In the epilogue, the alien had an intermittent halo, which made the superstitious peasants accept him as a saint.

The movie occasionally dragged in spots but on the whole was an amusing watch.

AD ASTRA was a 2019 movie written by James Gray and Ethan Gross. The SFX were spectacular and very authentic. No whooshing sounds in space, just dead silence as it should be.

The overall design of the movie was reminiscent of 2001: A SPACE ODYSSEY. The spacecraft and lunar bases were clean and bright. It was obvious that a strong effort had been made to be scientifically accurate as possible. If you enjoyed 2001, then you'll like this movie.

The opening began with a giant electromagnetic pulse hitting Earth, originating from Neptune, where a failed space expedition was stranded. At the time, Roy McBride, the heroic astronaut, was doing maintenance work on the rigging of a space antenna.

As was not immediately evident, and probably confused mundane audiences, this structure was built on the space elevator concept. It was grounded to Earth and its upper end out in space attached to a station. When the EMP hit, Roy and other astronauts were thrown off. They all had parachutes, which suggests they were not more than 80 km above the surface, at the edge of the atmosphere. A very well done sequence.

The electromagnetic pulse was quickly dubbed The Surge. The effects were at the Carrington Event level, causing tremendous damage and significant casualties across Earth. The source was discovered to be the Lima Project, a manned spaceship lost in orbit around Neptune, commanded by Roy's father Clifford.

Roy was sent on an epic voyage across the Solar System. First to the Moon, now a patchwork of capitalist domains and political satrapies. On to Mars, with a side trip that had nothing to do with the plot and merely padded out the movie.

Many alarms and excursions along the way. The pace of the movie sped up and slowed down, alternating between action adventure and long introspective passages where Roy psychoanalyzed himself. He had issues with Daddy, and only functioned in life by being emotionless.

Through an incredible and highly implausible sequence, Roy managed to hijack a spaceship in mid-launch and take it out to Neptune. He found his father, a mad scientist if ever there was one. Clifford had been searching for alien life and failed to find it. The realization that his obsession had wasted his life drove him over the edge.

The pace of the movie was often slow but no worse than 2001. A clean antiseptic future with messy people. Well recommended.

## **The Diaspora.**

CEMETERY WORLD by Clifford D. Simak (1972) was a novel set in the far future. Earth was mostly abandoned as humanity sprawled across the galaxy. Large portions of the planet were covered by The Cemetery, operated by Mother Earth Inc. No one cared about the rest of Earth, gone to wilderness.

Fletcher Carson was the protagonist, come to study the cemetery world. He brought along a free robot Elmer and a combination computer/transport vehicle named Bronco. Elmer had been a mechanic on Earth millennia ago during the last stages of the final atomic war.

When humans fled the ruined planet, they took Elmer along because a mechanic is always useful. They kept Elmer in good repair and he/it was eventually able to buy his/its freedom. When Elmer learned that Carson was going to Earth, the robot asked to accompany him to the place where it was first assembled. The cost of freight was outrageous, so Elmer contributed its life savings for the fare.

Arriving on Earth, Carson began by interviewing Maxwell Peter Bell, the manager. Bell emphasized that The Cemetery acted as a reminder to humans far out in the stars of where their ancestors came from. Many hoped to be buried there, no matter the incredible expense.

As Mecca is meant to be a unifying force for Moslems, so it was that Earth would not be forgotten as long as there were pilgrims and burials. Without that link, Earth would be a backwater and humans would lose their roots.

After the interview with Bell was over, Carson was approached by Cynthia Lansing. She carried a letter of introduction from their mutual university professor William Thorndyke.

He was studying a semi-mythical species called the Anachronians. They had come and gone across the galaxy long before humans went into space. Only fragments here and there on a few scattered planets provided any trace of their existence.

Most scholars thought they were traders, but Thorndyke believed they were observers analysing other cultures. He wanted Carson and Lansing to find evidence about them on Earth. The group made their way out of The Cemetery and into the wilderness.



At that point the novel came to a dead stop for large infodumps about the characters and their back histories, told as stories around the campfire. The infodumps often regressed into internal infodumps, like Russian nesting dolls. Once they were disposed of, the group had visitors.

First, a war machine, a giant autonomous tank from millennia ago, crashed past them in the forest. Then some hillbillies, the remnants of human civilization outside The Cemetery, dropped in for a heaping helpin’ of their hospitality.

The hillbillies called the war machine The Ravener, although it did little harm as long as one didn’t stand in its path. It was seldom seen and never twice in the same place. Most people might only catch a glimpse of it once in their lifetime.

The hillbillies didn’t know the history of Earth, the atomic wars, or the diaspora into space. They had never seen books. They worked occasionally for The Cemetery as casual labourers. Relations were not entirely smooth. Whenever The Cemetery needed more land, they just grabbed it, and the hillbillies had to move further away.

There were legends, such as the Census Taker, who counted ghosts, and the immortal man. More alarums followed as Carson’s group moved deeper into the land. The Cemetery sent metal wolves after them, and the Census Taker unloaded some more infodumps. There was an entanglement with grave robbers, who traded in bronze caskets cut up into armour plate.

The ghosts sent Carson’s party back in time for some fresh excursions. Among them were meeting two sentient war machines, Joe and Ivan. They just wanted to be friends, but humans fled at their appearance. Joe was a talkative tank and unloaded another infodump.

The two tanks were left over from the final atomic war. There being no targets left, they became comrades. They were worried about not making friends with humans, since they needed resupply of lubricants and replacement parts.

Another time jump sent Carson’s group far into the future for the grand finale. A bit of a disappointment as all the loose threads were hastily tied off by a robot operating in “As you know” mode.

The time travel paradoxes were swept into a dustbin. Carson, and by extension the reader, was told not to worry about the chronological paradoxes. Make no

mistake. The author had written himself into a corner. His haste to wrap up the story was evident in the final scenes. The rest of the novel deserved better.

### Crossover Fiction.

Theodora Goss has a series of crossover novels about Mary Jekyll, daughter of the well-known mad scientist. I reviewed the first novel THE STRANGE CASE OF THE ALCHEMIST’S DAUGHTER in issue #475 of this zine.

To briefly recap, Mary Jekyll had formed the Athena Club as a counterweight to the evil machinations of the Societe des Alchimistes. She recruited Beatrice Rappaccini, Catherine Moreau (the original catwoman), Justine Frankenstein, and Mary’s sister Diana Hyde.

The sequel was a 699-page doorstop novel EUROPEAN TRAVEL FOR THE MONSTROUS GENTLEWOMAN (2018). The book began with the kidnapping of Lucinda Van Helsing of the Austro-Hungarian Empire. Therein was the reason for the size of this book.

The characters did a lot of to-ing and fro-ing over the empire. Basically this was historical fiction and travelogue, as the women made their way around Europe. One good line was Jekyll’s embarrassment at not speaking any of the local languages, while everyone she met knew English.

Sherlock Holmes and Dr Watson got speaking parts, as did Herr Doktor Sigmund Freud. Irene Norton nee Adler was living in Vienna, so she had a cameo in a few chapters. Van Helsing was rescued, not that there was any doubt.

As with the first novel, the characters kept breaking focus and talked directly to the reader in sidebars. Annoying because such too-clever literary devices disrupt the narrative flow and yank the reader out of the story.

Following on was the third novel in the series THE SINISTER MYSTERY OF THE MESMERIZING GIRL (2019). The plot repeated, and one hopes the author will think of a different storyline for the fourth book.

The Athena Club had returned to England in triumph, having rescued Lucinda Van Helsing. They discovered their maid Alice had been kidnapped. Holmes and Watson went missing.

A fresh set of excursions ensued, although they were around London. The Athena Club basically collected plot coupons as they dashed about town.

There was a side trip to the Diogenes Club to meet Mycroft. He advised that Moriarty was on the loose, Sherlock would get himself out of whatever mess he was in, and the safety of the Queen had been threatened.

The plot ran amok. An ancient Egyptian queen had been revived. She felt she could do a better job than Victoria and intended to supplant her. The fate of the British Empire hung in the balance as it usually did. The reader will easily surmise the ending.

**Alarums In The Backwoods.**

NIGHT FRIGHT was a 1967 movie written by Russ Marker. My copy was on the DVD boxed set “Sci-Fi Invasion” from Mill Creek Entertainment. Pretty much a standard monster movie.

The plot was set in rural Texas where a NASA spacecraft crashed into the backwoods. On board was one survivor of an experiment to test the ability of vertebrates to survive space radiation.

The survivor was a stunt man dressed in a gorilla suit with a plastic head that was supposed to be a mutated alligator. It looked more like the later version of Klingons, the ones with bony crests on their heads.

The monster costume was risible, hence its appearances were only in night scenes where only a glimpse was visible. Later in the movie the monster held the camera frame for minutes at a time, a mistake on the part of the director.

Everyone drove 1960s land yachts, quite an accomplishment on some of the back roads where the big cars bottomed out on the swales. The county dwellers were not originally aware of what happened, only that something was tearing apart college students necking in Lovers’ Lane.

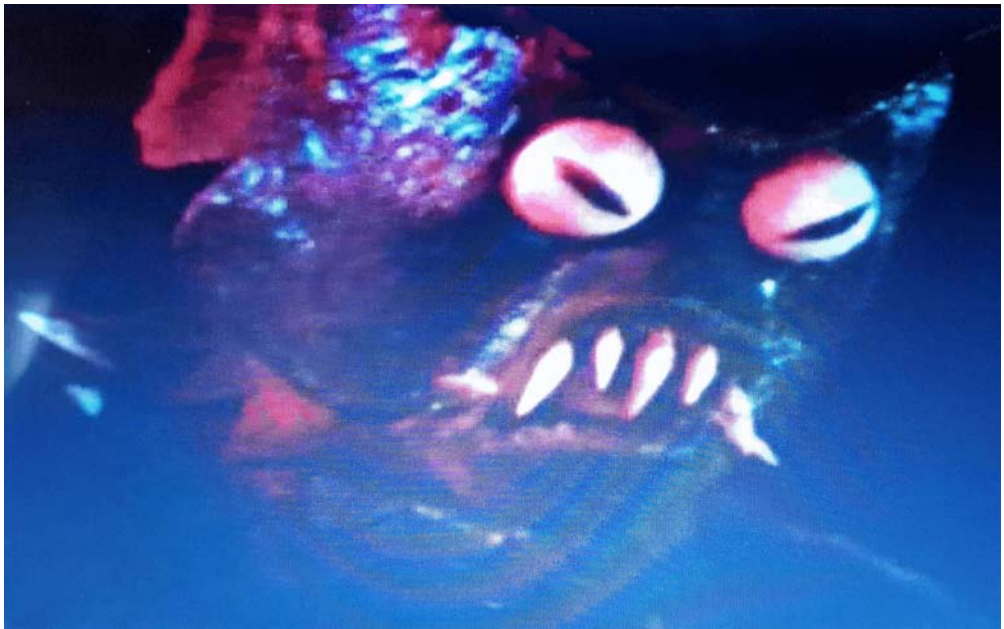
Gradually the terror dawned on them. The beast was invulnerable to bullets but was eventually stopped by a few sticks of dynamite. Basically a 1950s B-movie filmed in colour for television.

IT’S ALIVE was a 1969 movie with no writer credited. Not a surprise considering this was a B-movie out of time and ranking near the bottom of the 1950s era, even though it was a 1960s television movie. My copy was on the DVD boxed set “Sci-Fi Invasion” from Mill Creek Entertainment.

A young couple Norman and Leela Sterns were driving through the Ozarks when they ran low on fuel and stopped at a farm to enquire for a supply. It was their misfortune that the farmer was a madman who had his own private monster down in a cave. The critter needed feeding, and the couple seemed like a good meal.

The housekeeper Bella and a passing paleontologist Wayne Thomas tried to rescue them. Assorted alarums occurred in the cave, and Norman got eaten by the critter. More on the beast in a moment. Leela transferred her affections to Wayne and they eventually killed Greely and the monster.

Over-acting alternated with wooden dialogue, but what destroyed the movie was the monster. Not just any rubber suit, but the exact same one that had been used in several 1950s no-budget movies. A scuba suit, a plastic alligator head, and yes, actual Ping Pong balls for eyes. Its fangs stuck out at random and would have been useless for eating.





## Plagues.

All of us will henceforth read stories about plagues in a new way, having had personal experience of what such disasters are like. Here are a couple of novels I found while browsing the shelves at the New Central Library.

WORLD WAR MOO (2015) by Michael Logan was the sequel to his first book APOCALYPSE COW, which I reviewed in issue #418 of this zine. That was back in 2018 when modern-day plague stories were just speculative fiction. Little did we know.

When last we left this sceptered isle, zombie cows infected with an escaped cocktail of laboratory viruses had begun to spread the disease. Britain was now quarantined by force. Russia, the USA, and China were planning a joint mission to carpet bomb Britain with nukes.

The zombified humans were still semi-rational, enough that they could retaliate with ballistic missiles carrying payloads of virus aerosols. The problem the rest of the world had was to keep the viruses from spreading.

This book appeared five years before a real pandemic and made an interesting comparison. In the novel, governments dithered and improvised with the zombie plague, exactly as they did with COVID-19. Both the fictional and real pandemics exposed people for what they really were, as true thoughts and behaviours came to the fore.

Britain was surviving on air-dropped food. The zombies got along with each other but tried to kill or infect any healthy people. Most of the characters were bumbling twits who could hardly function before the virus, much less during an apocalypse. The narrative played them for comedy but the humour was mild at best and soon grew tiresome.

There was no real ending, as this novel was obviously an installment for the next book in the series. The final pages had a general confirming the countdown to a nuclear strike, while the British Prime Minister ordered the plague missiles to be launched at will.

By coincidence the next book on the library shelf was THE SCARLET PLAGUE by Jack London. Apparently there are no science fiction writers between LOG and LON, at least in the Calgary Public Library system.

London's book was originally published in 1912 and was reprinted in 2012 in the Radium Age series put out by HiLo Books.

This novel was an early example of post-apocalyptic science fiction. In 2013, a plague was spread around the world in days by airship passengers and crews. (Zeppelins, because fixed-wing aircraft were still flimsy, unreliable, and short range.)

The barbarians ruled in the wildernesses that grew over empty cities. Knowledge was lost and would not be regained for millennia. An old man struggled to store books in a safe place for some future generation to discover.

The younger generation were brought up hearing stories about a golden past with incomprehensible devices that constituted magic. Not a book to read when feeling depressed on a rainy Sunday afternoon.

## TALES WELL CALCULATED

by Dale Speirs

SUSPENSE was one of the great anthology series of radio, airing from 1940 to 1962. The announcer would intone "*Tales well calculated to keep you in* [dramatic pause] *SUSPENSE!*" Episodes are available as free mp3s from the Old Time Radio Researchers at [www.otrr.org/OTRRLibrary](http://www.otrr.org/OTRRLibrary)

This series had the distinction of being the very last old-time radio show ever aired. The episodes were a mixture of mystery, fantasy, science fiction, and weird fiction. Well worth perusing.

"Sell Me Your Life" was written by Emile Tepperman and aired on 1945-02-15. Joe Bland was standing on a bridge railing ready to jump. A woman, later identified as Lenora Bodine, came driving by and stopped him. He got into her car and as she drove he told her the back story. His co-worker had embezzled huge sums, then dropped dead from a heart attack, leaving him to face the auditors alone.

Lenora said her husband was the banker Andrew Bodine. She took him home, introduced an assistant named Foraday, gave Bland \$1,000 to settle the books, and sent him on his way. When he arrived back at his apartment, the police were waiting for him.

Andrew had been murdered. It was a setup by Lenora and Foraday to frame Bland for the murder. They lied and lied about everything. Bland made a run for it, which only worsened matters.

He doubled back to the Bodine mansion and confronted Foraday and Lenora. There was a three-way confrontation and Lenora shot Foraday dead. She pinned that one on Bland as well. Fingerprints resolved the matter. The gun that killed the two men had only Lenora's fingerprints on it.

“My Wife Geraldine” was written by Larry Marcus and Robert Tallman, and aired on 1945-03-01. Mr Graham (first name never given) didn't have much of a life so he invented a wife Geraldine.

In those days, a man on the way up was supposed to have a wife to handle his home and social affairs. Single men were not as likely to be promoted. The phrase “trophy wife” hadn't been invented yet but the concept was nothing new.

As he commuted to work on the train, Graham felt left out when his fellow riders discussed their families, so he told stories about Geraldine. His boss promoted him because he thought he was a married man but said the company needed a marriage licence.

Graham managed to get a fake document. He had to rent an apartment and told the landlady he was married to get the place. (This was during the war when there was a housing shortage.)

From there, it was a slippery slope. Complications ensued, and people began to wonder about a wife no one ever saw. Graham was hospitalized after a bad accident. He refused to have Geraldine notified, which raised red flags at the hospital and the company.

When a woman's body was found, it was mistakenly identified as Geraldine and the police wanted to charge him. Graham would rather go to prison than be humiliated as a faker. His landlady posed as Geraldine to get him free. She was secretly in love with him. The ending was obvious.

“Bank Holiday” was written by Robert L. Richards and aired on 1945-07-19. A bank was held up by gunmen who obviously had inside information. The teller Jane Evans, who narrated, had \$25,000 extra cash for a customer coming later that day.

She was engaged to the branch manager Harold. The thieves took her hostage for the getaway. One wanted to dump her on the side of the road, and the other wanted to kill her. The police stopped them but they bluffed the patrolman.

Crossing the desert, the men discussed what to do with Evans. Yet another police car pursued. A moving gun battle erupted. They fled up a mountain road but the alarms continued. They slugged her unconscious.

When she woke up, she was prisoner in a hideout cabin in the mountains. One of the thieves let her go. She was told to walk down the road. Before she could do so, the thief waxed eloquently on the philosophy of being a bad guy.

As he finished, the police arrived, which cancelled the plan. The telephone rang. Harold was with the police and talked to her. The thieves decided to make an attempt to escape while she walked out.

Evans got to the police line. She was upset when the police opened fire on the cabin with tear gas and smoked out the bandits. She had a bad case of Stockholm syndrome. The next day she broke off her engagement with Harold.

“The Earth Is Made Of Glass” was a 1945 episode written by Silvia Richards. It was based on Ralph Waldo Emerson's 1841 essay “Compensation”, which argued that whatever a person does will be matched by something else.

If an individual commits a crime, for example, then something will happen to rectify the balance, either arrest and court appearance, or a guilty conscience. Wrote Emerson: *Commit a crime and the Earth is made of glass.*

The plot began with the death in hospital of Richard Steel. He had made a bet with a friend that he could commit a murder in such a way as to evade any consequence. Steel's reasoning began with deciding the victim should be someone he had no connection with no any motive to kill. He would not know the victim's name or see the face. The murder had to be done in a simple manner.



Steel went for a walk and found himself in a crowd. He plunged a knife into a man's back at random and kept walking without looking to see who got it. He could hear shouts and screams from the crowd, although no one knew it was him who killed the man. Over the next few days he ignored the newspapers and radio so that he would not learn who it was he murdered.

The weather was hot and muggy. During this time he began suffering a throbbing headache, then began hearing crowd voices, the same sounds as the murder scene. He began hearing an endless heartbeat, shades of Poe, and remembering all the little details.

As it appeared that compensation was indeed working, Steel changed his plans. He decided to learn every possible thing about his victim, build a portrait of him in his own mind, and then obliterate it. That only made matters worse because everywhere he went, every man he saw looked exactly like his victim.

Steel woke up in hospital, having had a major heart attack. He was convinced he was paying the price for the murder and had to die in order for the debt to be extinguished. After Steel's death, the doctor and nurse discussed the case. Steel had never committed a murder, only deluded himself that he had.

"Death On Highway 99" was written by William Spear, and aired on 1945-10-04. Morton and Pauline Blake were squabbling over a divorce as he drove at high speed on the highway.

The car hit an elderly pedestrian and killed him. Pauline said she would frame her husband for manslaughter rather than give him a divorce. That backfired when Morton snapped. He killed her at the side of the highway and threw her off a cliff. The murder was a messy one.

Driving down the highway, Morton managed to dispose of the other body, the pedestrian. That came back to haunt him because the old man, named Haggerty, managed to survive. Morton went to the hospital to find him but blew that one. A police officer told Morton that evidence had been recovered such as tire prints. Haggerty recovered and identified Morton but declined to press charges.

The emotional backlash was too much for Morton. He promptly babbled that he killed Pauline. No one had asked, but the guilty flee when no one pursues. An idiot plot finish, supposedly a twist but actually an unbelievable ending. Boo, hiss.

"A Week Ago Wednesday" was written by Winifred Wolfe and aired on 1945-12-29. The narrator was Maude Haskins, who found herself disjointed in time. She began the narrative by telling how she woke up in a park and returned home.

There was a strange woman living in her apartment. From her, she learned that Maude's husband Harry had been murdered the previous Wednesday. She fled the apartment and then surmised that she was the dead one. Weird sequences followed, with a boy on a scooter reappearing at intervals.

Harry showed up and took her home. Their apartment was normal. She wasn't, dithering and blithering. That padded out the middle of the episode. The strange woman reappeared. Maude couldn't tell what was reality and what was a dream. She suddenly became paranoid, grabbed an ice pick, and killed her husband.

By now the listener will be impatient to hear if the story was a dream or she was insane. Her constant babbling erased any sympathy for her. The story reverted to reality as she walked from Death Row to the electric chair, still babbling.

"Another Man's Poison" aired on 1951-05-17, and was written by Arthur Ross. Claude Bouget, played by Charles Boyer with a genuine French accent, found a package of banknotes, tens of thousands of dollars. He showed the cash to his wife Alice, who wanted to notify the police.

Claude counted the bills, which totaled \$98,000. Say a million in our depreciated currency. His lawyer told him he would have to wait a year to see if anyone claimed the cash. Claude filed a report with the police. He decided to store the cash himself, against their warning.

Naturally the grifters and thieves flooded him with false claims and threats. Trouble and strife followed, and Claude became a hunted man. He was going to earn every penny of that \$98,000.

From the beginning of the episode, Claude demonstrated self-righteousness and arrogance that he was always right. In any circumstance, however innocent, he felt himself the victimized party and was aggrieved. The listener's sympathy for him soon evaporates. We have all met people like that, not paranoid per se but always carrying a grudge because they are always right and everyone else is wrong. This was one episode where I was rooting for the bad guys.

# SEEN IN THE LITERATURE

## Planets.

von Hegner, Ian (2022) **Extreme exoworlds and the extremophile paradox.** ASTROBIOLOGY 22:doi.org/10.1089/ast.2021.0153

Author's abstract: *Extremophiles have gained prominence by providing an experimental approach to astrobiology. Extremophiles gain equal value by being part of a framework for high-level characterization of the evolutionary mechanisms that must necessarily restrict or promote their emergence and presence on solar system bodies.*

*Thus, extremophiles exist in extreme environments, and therein lies the paradox: extremophiles can only live in extreme environments but are not able to originate in such environments.*

*Therefore, even though the range of extremophile capabilities in extreme environments is wider than that in mesophiles, the range of their emergence possibilities is still equally restricted.*

*Therefore, even if one locates an extreme exoworld where terrestrial extremophiles could live here-and-now, it can be predicted that no extremophile analogs are present anyway. Furthermore, it is possible for a world to be uninhabited, yet be habitable.*

*Therein arises the extreme environment paradox: an extreme environment can sustain chemical evolution as well as arriving non-native life, yet native life cannot be built up in that very environment. Thus, life may exist on an extraterrestrial extreme world (if imported there), and chemical evolution may be present on that world.*

*However, it can be predicted that there is no native life anyway. This situation can be predicted to function as a chemosignature and eventually as a biosignature.*

*However, the fact that a non-native extremophile in principle can exist in extreme environments may demonstrate that the intermediate step between chemical evolution and extremophiles can still occur in the form of a statistical deviation.*

*In summary, the use of extremophiles as analogs to extraterrestrial life has limitations due to the very conditions evolution operates under, although analysis of these conditions provides conceptual tools for the search for life elsewhere in the Solar System and beyond.*

Johnson, T.E., et al (2022) **Giant impacts and the origin and evolution of continents.** NATURE 608:330-335

Authors' abstract: *Earth is the only planet known to have continents, although how they formed and evolved is unclear. Here using the oxygen isotope compositions of dated magmatic zircon, we show that the Pilbara Craton in Western Australia, Earth's best-preserved Archaean (4.0 to 2.5 billion years ago (Ga)) continental remnant, was built in three stages.*

*Stage 1 zircons (3.6 to 3.4 Ga) form two age clusters with one-third recording submantle  $d^{18}O$ , indicating crystallization from evolved magmas derived from hydrothermally altered basaltic crust like that in modern-day Iceland. Shallow melting is consistent with giant impacts that typified the first billion years of Earth history.*

*Giant impacts provide a mechanism for fracturing the crust and establishing prolonged hydrothermal alteration by interaction with the globally extensive ocean.*

*A giant impact at around 3.6 Ga, coeval with the oldest low- $d^{18}O$  zircon, would have triggered massive mantle melting to produce a thick mafic-ultramafic nucleus.*

*A second low- $d^{18}O$  zircon cluster at around 3.4 Ga is contemporaneous with spherule beds that provide the oldest material evidence for giant impacts on Earth. Stage 2 (3.4 to 3.0 Ga) zircons mostly have mantle-like  $d^{18}O$  and crystallized from parental magmas formed near the base of the evolving continental nucleus.*

*Stage 3 (<3.0 Ga) zircons have above-mantle  $d^{18}O$ , indicating efficient recycling of supracrustal rocks. That the oldest felsic rocks formed at 3.9 to 3.5 Ga, towards the end of the so-called late heavy bombardment, is not a coincidence.*



**Aliens.**

Döbler, N.A. (2022) **Where will they be: Hidden implications of solutions to the Fermi paradox.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 21:doi.org/10.1017/S147355042200012X (available as a free pdf)

Author’s abstract: *Solutions to the Fermi paradox either deny the existence of extraterrestrials or offer alternative reasons to explain the non-occurrence of a first contact. While the latter, more optimistic approaches generally assume the existence of extraterrestrials, they simultaneously hint to limited future detectability.*

*If solutions to the Fermi paradox are accepted as true, they must be evaluated in terms of how they affect the likelihood of success of future SETI efforts. Some solutions may lead to the so-called Fermi constraint.*

*In order to explain why there has not been any contact so far, optimistic solutions to the Fermi paradox have to accept assumptions that, if the solution is assumed to be correct, indicate a very low probability of future contact. In other words: they are not here, and that is why they may never appear.*

Ellery, Alex (2022) **Curbing the fruitfulness of self-replicating machines.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 21:doi.org/10.1017/S1473550422000246 (available as a free pdf)

Author’s abstract: *The self-replicating machine has high utility by virtue of its universal construction properties and its productive capacity for exponential growth. Their capacity is unrivalled.*

*They can be deployed to the Moon to industrialize it using local in-situ resources in the short term to open up the solar system and thence deployed on interstellar spacecraft to explore the entire Galaxy by exploiting in-situ stellar system resources.*

*Nevertheless, there are significant concerns regarding the inherent safety of self-replicating machines. We consider the general problem of runaway population growth in physical self-replicating machines to prevent the grey goo problem, the number of offspring spawned by self-replicating machines may be controlled at a genetic level.*

*We adopt a biologically-inspired approach based on telomeres, DNA endcaps that are progressively shortened during cellular replication. This acts as a counter that imposes a limit to the number of replication cycles (Hayflick limit).*

*By examining the biological process in detail, we can obtain some insights in implementing similar mechanisms in self-replicating machines. In particular, we find that counting mechanisms are vulnerable to cancerous runaway.*

Ellery, Alex (2022) **Self-replicating probes are imminent: implications for SETI.** INTERNATIONAL JOURNAL OF ASTROBIOLOGY 21:doi.org/10.1017/S1473550422000234 (available as a free pdf)

Author’s abstract: *In the early 1980s, the Sagan-Tipler debate raged regarding the interpretation of the Fermi paradox but no clear winner emerged. Sagan favoured the existence of ETI on the basis of the Copernican principle and Tipler favoured the non-existence of ETI on the basis of the Occam’s razor principle.*

*Tipler’s stance was an expansion of the similar but earlier Hart declaration. However, crucial to the Tipler argument was the role played by self-replicating interstellar robot probes.*

*Any technologically capable species will develop self-replication technology as the most economical means of exploring space and the Galaxy as a whole with minimal investment. There is no evidence of such probes in our solar system including the asteroid belt, ergo, ETI do not exist. This is a powerful and cogent argument.*

*Counter-arguments have been weak including Sagan’s sociological explanations. We present a Copernican argument that ETI do not exist: humans are developing self-replication technology today.*

*We are developing the ability to 3D print entire robotic machines from extraterrestrial resources including electric motors and electronics as part of a general in-situ resource utilization (ISRU) capability.*

*We have 3D-printed electric motors which can be potentially leveraged from extraterrestrial material that should be available in every star system. From a similar range of materials, we have identified a means to 3D print neural*

network circuitry. From our industrial ecology, self-replicating machines and indeed universal constructors are feasible.

We describe in some detail how a self-replicating interstellar spacecraft may be constricted from asteroidal resources. We describe technological signatures of the processing of asteroidal material (which is expected to be common to most star systems), and the excess production of certain types of clay and other detritus materials.

Self-replication technology is under development and imminent. If humans are pursuing self-replication technology, then by the Copernican principle, so would any technologically savvy species elsewhere. There is no evidence that they have.

**Paleobiology.**

Hsieh, S., et al (2022) **The Phanerozoic aftermath of the Cambrian information revolution: sensory and cognitive complexity in marine faunas.** PALEOBIOLOGY 48:doi.org/10.1017/pab.2021.46

Authors’ abstract: *The Cambrian information revolution describes how biotically driven increases in signals, sensory abilities, behavioral interactions, and landscape spatial complexity drove a rapid increase in animal cognition concurrent with the Cambrian radiation.*

*Here, we compare cognitive complexity in Cambrian and post-Cambrian marine ecosystems, documenting changes in animal cognition after the initial Cambrian increase.*

*In a comparison of Cambrian and post-Cambrian Lagerstätten, we find no strong trend in the proportion of genera possessing two types of macroscopic sense organs (eyes and chemoreceptive organs such as antennae, feelers, or nostrils).*

*There is also no trend in general nervous system complexity. These results suggest that sophisticated information processing was already common in early Phanerozoic ecosystems, comparable with behavioral evidence from the trace fossil record.*

*Most taxa capable of complex information processing in Cambrian ecosystems were panarthropods, whereas mollusks and chordates made up larger proportions afterward.*

*In both the Cambrian and the present day, ecological occupation of diverse habitat tiers and feeding modes is possible with even simple nervous systems, but ecological lifestyles requiring rapid, regular movement are almost exclusively associated within brain-bearing taxa, suggesting a connection with fast information-processing abilities and bodily responses.*

*The overall rise in cognitive sophistication in the Cambrian was likely a unique event in the history of life, although some lineages subsequently developed more elaborate sensory systems and/or larger brains.*

Moysiuk, J., and J.B. Caron (2022) **A three-eyed radiodont with fossilized neuroanatomy informs the origin of the arthropod head and segmentation.** CURRENT BIOLOGY 32:doi.org/10.1016/j.cub.2022.06.027

Authors’ abstract: *The radiodont Stanleycaris is reconstructed from a collection of exquisite fossils. Stanleycaris has three eyes, demonstrating evolutionary continuity of median eyes.*

*In addition to being among the most iconic and bizarre-looking Cambrian animals, radiodonts are a group that offers key insight into the acquisition of the arthropod body plan by virtue of their phylogenetic divergence prior to all living members of the phylum.*

*Nonetheless, radiodont fossils are rare and often fragmentary, and contentions over their interpretation have hindered resolution of important evolutionary conundrums. Here, we describe 268 specimens of Stanleycaris hirpex from the Cambrian Burgess Shale, including many exceptionally preserved whole-body specimens, informing the most complete reconstruction of a radiodont to date.*

*The trunk region of Stanleycaris has up to 17 segments plus two pairs of filiform caudal blades. The recognition of dorsal sclerotic segmentation of the trunk cuticle and putative unganglionated nerve cords provides new insight into the relative timing of acquisition of segmental traits, the epitome of the arthropod body plan.*

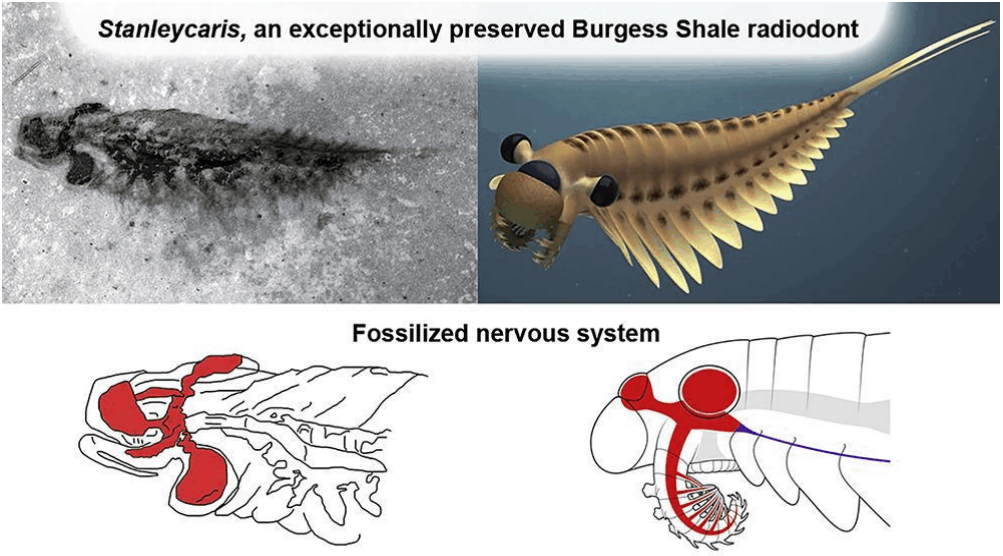


*In addition to the pair of stalked lateral eyes, the short head unexpectedly bears a large median eye situated behind a preocular sclerite on an anteriorly projecting head lobe. Upon re-evaluation, similar median eyes can be identified in other Cambrian panarthropods demonstrating a deep evolutionary continuity.*

*The exquisitely preserved brain of Stanleycaris is consistent with the hypothesized deutocerebral innervation of the frontal appendages, reconciling neuroanatomical evidence with external morphology in support of an ancestrally bipartite head and brain for arthropods.*

*We propose that the integration of this bipartite head prior to the acquisition of most segmental characters exclusively in the arthropod trunk may help explain its developmental differentiation.*

[Images are from this paper.]



Prokop, J., et al (2022) **Abdominal serial homologues of wings in Paleozoic insects.** CURRENT BIOLOGY 32:doi.org/10.1016/j.cub.2022.06.024

Authors’ abstract: *Palaeodictyopteran abdominal segments show serially homologous structures of wings. Cordate lateral structures (flaps) in larvae were fused to tergum covering the hinge. Adults shared these abdominal flaps with larvae either functionally or vestigially.*

*Flap functions remain unknown, perhaps performing locomotion, respiration, or sensory. The Late Paleozoic acquisition of wings in insects represents one of the key steps in arthropod evolution.*

*While the origin of wings has been a contentious matter for nearly two centuries, recent evolutionary developmental studies suggest either the participation of both tergal and pleural tissues in the formation of wings or wings originated from exites of the most proximal leg podite incorporated into the insect body wall.*

*The so-called “dual hypothesis” for wing origins finds support from studies of embryology, evo-devo, and genomics, although the degree of the presumed contribution from tergal and pleural tissues differ.*

*It was confirmed a major role for tergal tissue in the formation of the cricket wing and suggested that “wings evolved from the pre-existing lateral terga of a wingless insect ancestor.”*

*Additional work has focused on identifying partial serially homologous structures of wings on the prothorax and abdominal segments.*

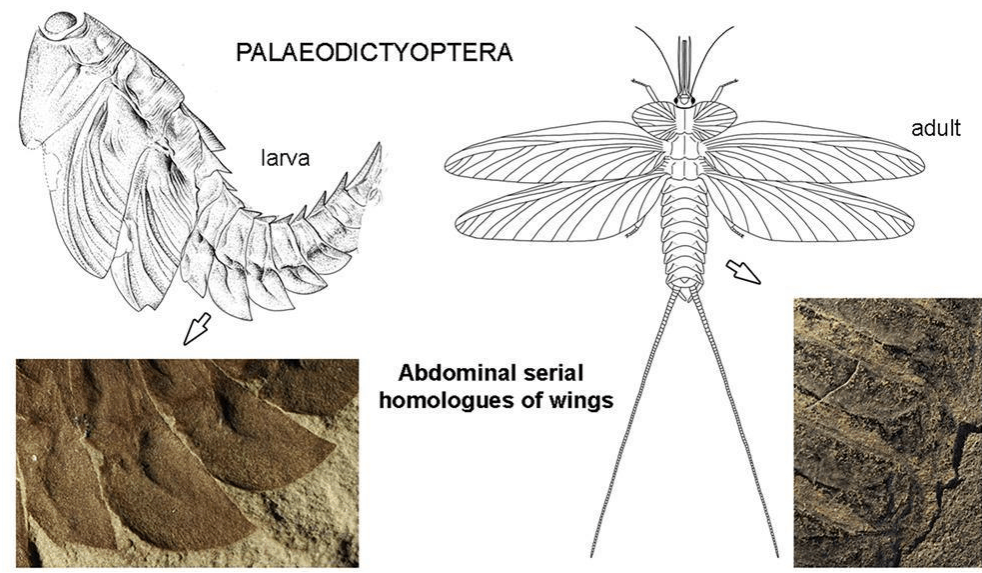
*Thus, several studies have suggested that the prothoracic horns in scarab beetles, gin traps of tenebrionid and scarab beetle pupae, or abdominal tracheal gills of mayfly larvae evolved from serial homologues of wings.*

*Here, we present critical information from abdominal lateral outgrowths (flaps) of Paleozoic palaeodictyopteran larvae, which show comparable structure to thoracic wings, consisting of cordate lateral outgrowths antero-basally hinged by muscle attachments.*

*These flaps therefore most likely represent wing serial homologues. The presence of these paired outgrowths on abdominal segments I–IX in early*

diverging Pterygota likely corresponds to crustacean epipods and resembles a hypothesized ancestral body plan of a “protopterygote” model.

[Images are from this paper.]



Dinosaurs.

Griffin, C.T., et al (2022) **The developing bird pelvis passes through ancestral dinosaurian conditions.** NATURE 608:346-352

[Technically speaking, dinosaurs did not become completely extinct. One group called avian theropods survived. We call them birds. They are dinosaurs because their skeletal structures are the same as theropods in general.]

Authors’ abstract: *Living birds (Aves) have bodies substantially modified from the ancestral reptilian condition. The avian pelvis in particular experienced major changes during the transition from early archosaurs to living birds.*

*This stepwise transformation is well documented by an excellent fossil record; however, the ontogenetic alterations that underlie it are less well understood. We used embryological imaging techniques to examine the morphogenesis of*

*avian pelvic tissues in three dimensions, allowing direct comparison with the fossil record.*

*Many ancestral dinosaurian features (for example, a forward-facing pubis, short ilium and pubic ‘boot’) are transiently present in the early morphogenesis of birds and arrive at their typical ‘avian’ form after transitioning through a prenatal developmental sequence that mirrors the phylogenetic sequence of character acquisition.*

*We demonstrate quantitatively that avian pelvic ontogeny parallels the non-avian dinosaur-to-bird transition and provide evidence for phenotypic covariance within the pelvis that is conserved across Archosauria. The presence of ancestral states in avian embryos may stem from this conserved covariant relationship.*

*In sum, our data provide evidence that the avian pelvis, whose early development has been little studied, evolved through terminal addition, a mechanism whereby new apomorphic states are added to the end of a developmental sequence, resulting in expression of ancestral character states earlier in that sequence.*

*The phenotypic integration we detected suggests a previously unrecognized mechanism for terminal addition and hints that retention of ancestral states in development is common during evolutionary transitions.*

Jannel, A., et al (2022) **Softening the steps to gigantism in sauropod dinosaurs through the evolution of a pedal pad.** SCIENCE ADVANCES 8:doi.org/10.1126/sciadv.abm8280 (available as a free pdf)

Authors’ abstract: *How sauropod dinosaurs were able to withstand the forces associated with their immense size represents one of the most challenging biomechanical scenarios in the evolution of terrestrial tetrapods, but also one lacking robust biomechanical testing.*

*Here, we use finite element analyses to quantify the biomechanical effects of foot skeletal postures with and without the presence of a soft tissue pad in sauropodomorphs. We find that none of the models can maintain bone stresses that fall within optimal bone safety factors in the absence of a soft tissue pad.*



*Our findings suggest that a soft tissue pad in sauropods would have reduced bone stresses by combining the mechanical advantages of a functionally plantigrade foot with the plesiomorphic skeletally digitigrade saurischian condition.*

*The acquisition of a developed soft tissue pad by the Late Triassic-Early Jurassic may represent one of the key adaptations for the evolution of gigantism that has become emblematic of these dinosaurs.*

**Zoology.**

Griffiths, T.A. (2022) **‘Shout hurrah!’ New thoughts on the origin and meaning of the bat species name *Ia io*, created in 1902 by Oldfield Thomas FRS.** NOTES AND RECORDS 76:doi.org/10.1098/rsnr.2022.0006

*Author’s abstract: In 1902, British naturalist Oldfield Thomas discovered a new species of bat in a collection of specimens sent to him from China. He named the new species *Ia io*, thereby creating a species name that is four letters in length, the shortest possible name allowed under the rules for naming a new species.*

*In the time since, biologists have wondered why he chose this unusual name and what the name might mean in translation. The most widespread theory on the short name is that he was challenged by an American colleague to deliberately create the shortest species name possible.*

*The question of what the name might mean in translation is more problematic. ‘Ia’ has been thought by most taxonomists to be a meaningless word, but ‘io’ has been suggested to refer to a mythological Greek priestess named Io.*

*Herein, I show that the species name *Ia io* translates into ‘Shout hurrah!’ and demonstrate that the events in Oldfield Thomas's early professional life gave him an excellent reason for choosing this unusual species name in 1902.*

**Botany.**

Schreiber, M., et al (2022) **The greening ashore.** TRENDS IN PLANT SCIENCE 27:doi.org/10.1016/j.tplants.2022.05.005 (available as a free pdf)

*Authors’ abstract: More than half a billion years ago a streptophyte algal lineage began terraforming the terrestrial habitat and the Earth’s atmosphere. This pioneering step enabled the subsequent evolution of all complex life on land.*

*The past decade has uncovered that many traits, both morphological and genetic, once thought to be unique to land plants, are conserved across some streptophyte algae. They provided the common ancestor of land plants with a repertoire of genes, of which many were adapted to overcome the new biotic and abiotic challenges.*

*Two decisive endosymbiotic events, the emergence of eukaryotes followed by the further incorporation of a photosynthesizing cyanobacterium, laid the foundation for the development of plant life.*

*Increasing cellular complexity, the development of new body plans, new molecular adaptations, and constant colonization of novel habitats probably paved the way for plant evolution from fresh water to salt water and, at least 500 million years ago, to land.*

*The history of plant life, and particularly the greening ashore, is inseparably linked to the success of all life as we know it today.*

*Plant life enriched the atmosphere with oxygen and fixed CO<sub>2</sub>, thereby paving the way for the success of further life in this previously hostile habitat, and ultimately enabled the emergence of our own species.*

Leslie, A.B., and N.K. Bonacorsi (2022) **Understanding the appearance of heterospory and derived plant reproductive strategies in the Devonian.** PALEOBIOLOGY 48:doi.org/10.1017/pab.2021.44

*[The ultimate form of heterospory is seed plants, where pollen (small spores) mate with ovules (large spores) to create seeds.]*

Authors’ abstract: *The evolution of different spore size classes, or heterospory, is a fundamental reproductive innovation in land plants. The appearance of heterospory is particularly notable during the Devonian, when most known origins of the trait occur.*

*Here we provide a perspective on the evolution of heterospory during this time interval, particularly from the late Early Devonian through the Middle Devonian (Emsian to Givetian Stages; 408 to 383 megayears ago), which shows an unusually high concentration of heterospory origins.*

*We use theoretical considerations and compilations of fossil and extant spore sizes to suggest that the basic features of most heterosporous lineages, large spores and gametophytes that mature within the spore wall, are difficult to evolve in combination, because large spores disperse poorly but small spores cannot support a functional gametophyte developing within their walls.*

*Evolving spores between 100 and 200 microns in diameter appears to represent a particularly important barrier for the evolution of heterospory. We then discuss why this barrier may have been lower in the Devonian, noting that the appearance and spread of heterospory is coincident with the emergence of peat accumulating wetland habitats.*

*We suggest that more widespread wetland habitats would have generally lowered barriers to the evolution of heterospory by reducing dispersal limitation in larger spores.*

*Ultimately, we suggest that the initial evolution of heterospory may be explained by major changes in sedimentology, thought to have been driven by plant evolution itself, that increased the diversity of terrestrial depositional environments and led to a greater number of habitats where large spores could be successful.*

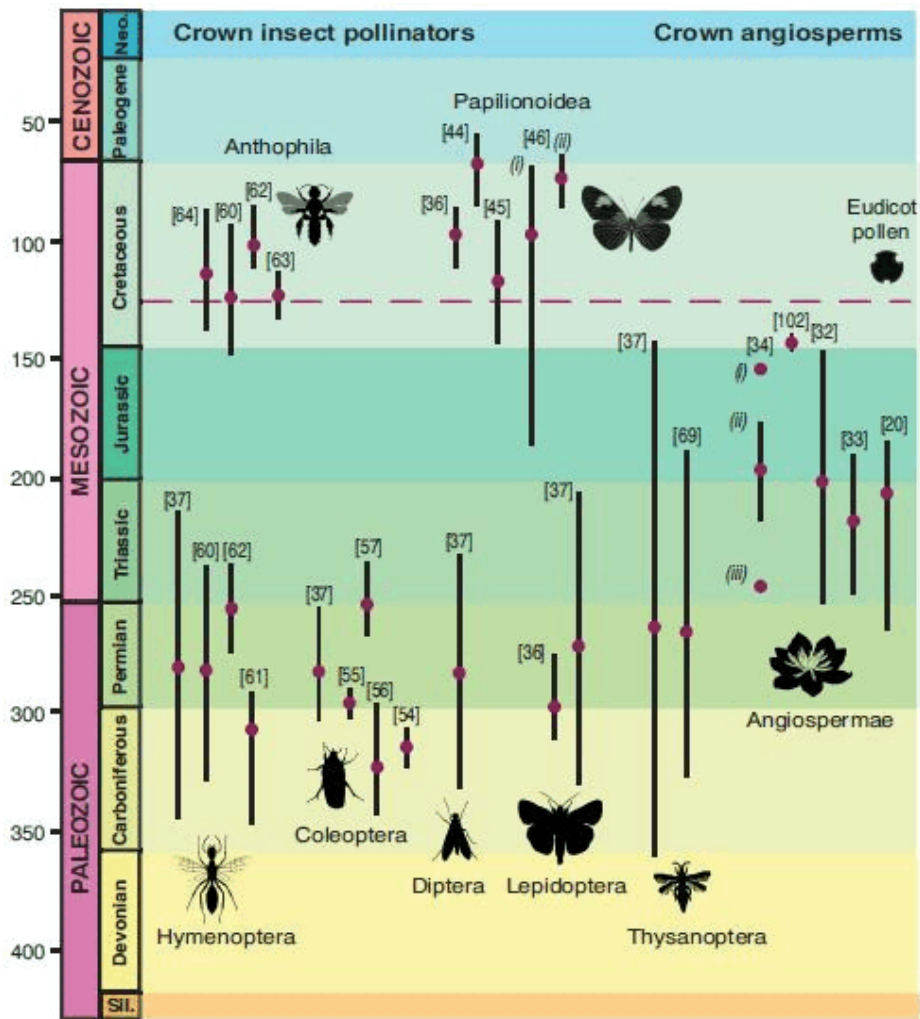
Asar, Y., et al (2022) **Early diversifications of angiosperms and their insect pollinators: were they unlinked?** TRENDS IN PLANT SCIENCE 27:doi.org/10.1016/j.tplants.2022.04.004 (available as a free pdf)

[Gymnosperms are seed plants such as conifers and cycads, which do not have flowers. Angiosperms are the flowering plants, which co-evolved with gymnosperms but didn’t succeed until after the asteroid ended the Cretaceous.]

Authors’ abstract: *The past decade has seen the discovery of many fossils of Mesozoic insects that pollinated gymnospermous plants. Much insect family diversity accumulated early in the evolutionary history of the group and plateaued during the Cretaceous, conflicting with the idea of a ‘Cretaceous Terrestrial Revolution’.*

*Recent fossil-calibrated molecular dating studies have found that the emergence of insect pollinator clades did not coincide with the initial emergence and diversification of angiosperms.*

*The Cretaceous-Paleogene mass extinction event significantly altered the global landscape, resulting in the formation of modern tropical rainforests and the decline of gymnospermous forests. These angiosperm-dominated rainforests supported the emergence of megadiverse insect communities.*





*The present-day ubiquity of angiosperm-insect pollination has led to the hypothesis that these two groups coevolved early in their evolutionary history. However, recent fossil discoveries and fossil-calibrated molecular dating analyses challenge the notion that early diversifications of angiosperms and insects were inextricably linked.*

*In this article, we examine*  
*(i) the discrepancies between dates of emergence for angiosperms and major clades of insects;*  
*(ii) the long history of gymnosperm-insect pollination modes, which likely shaped early angiosperm-insect pollination mutualisms; and*  
*(iii) how the K-Pg (Cretaceous-Paleogene) mass extinction event was vital in propelling modern angiosperm-insect mutualisms.*

*We posit that the early diversifications of angiosperms and their insect pollinators were largely decoupled until the end of the Cretaceous.*

[Chart is from this paper.]

**Carnivorous Plants.**

Lenz, A.K., and U. Bauer (2022) **Pitcher geometry facilitates extrinsically powered ‘springboard trapping’ in carnivorous *Nepenthes gracilis* pitcher plants.** BIOLOGY LETTERS 18:doi.org/10.1098/rsbl.2022.0106 (available as a free pdf)

*Authors’ abstract: Carnivorous pitcher plants capture insects in cup-shaped leaves that function as motionless pitfall traps. *Nepenthes gracilis* evolved a unique ‘springboard’ trapping mechanism that exploits the impact energy of falling raindrops to actuate a fast pivoting motion of the canopy-like pitcher lid.*

*We superimposed multiple computed micro-tomography images of the same pitcher to reveal distinct deformation patterns in lid-trapping *N. gracilis* and closely related pitfall-trapping *N. rafflesiana*. We found prominent differences between downward and upward lid displacement in *N. gracilis* only.*

*Downward displacement was characterized by bending in two distinct deformation zones whilst upward displacement was accomplished by evenly distributed straightening of the entire upper rear section of the pitcher.*

*This suggests an anisotropic impact response, which may help to maximize initial jerk forces for prey capture, as well as the subsequent damping of the oscillation. Our results point to a key role of pitcher geometry for effective ‘springboard’ trapping in *N. gracilis*.*

Fleischmann, A., et al (2022) **Attracted to feed, not to be fed upon: On the biology of *Toxomerus basalis* (Walker, 1836), the kleptoparasitic ‘sundew flower fly’ (Diptera: Syrphidae).** JOURNAL OF TROPICAL ECOLOGY 38:doi.org/10.1017/S0266467422000128 (available as a free pdf)

*Authors’ abstract: The complete life history of the kleptoparasitic ‘sundew flower fly’, *Toxomerus basalis*, is presented and illustrated. Adults of this species are photographed alive for the first time, including video recordings of larval and adult behaviour.*

*Adult flies of both sexes visit *Drosera* (sundews) and show territorial behaviour around the plants, avoiding the dangerous sticky traps and demonstrating recognition of their larval host plant.*

*Females lay eggs directly on non-sticky parts of the *Drosera* host plants, such as on the lower surface of the leaves and flower stalks, but apparently also on other plants growing in close proximity with the sundews.*

*The entire larval development of *T. basalis*, including all instar stages, occurs on sticky *Drosera* leaves, where the larvae freely and quickly move between sundew tentacles. They do not adhere to the sticky mucilage, probably because their body is also covered by a thin layer of slime.*

*They feed on captured, immobilized insect prey caught by the *Drosera* leaves, an interaction that can be considered true kleptoparasitism, as the larvae do not return nutrients to the plant, not even through their excretions, as predatory syrphine larvae do not defecate until they pupate.*

**Human Prehistory.**

Evershed, R.P., et al (2022) **Dairying, diseases and the evolution of lactase persistence in Europe.** NATURE 608:336-345

Authors’ abstract: *In European and many African, Middle Eastern and southern Asian populations, lactase persistence (LP) is the most strongly selected monogenic trait to have evolved over the past 10,000 years.*

*Although the selection of LP and the consumption of prehistoric milk must be linked, considerable uncertainty remains concerning their spatiotemporal configuration and specific interactions.*

*Here we provide detailed distributions of milk exploitation across Europe over the past 9,000 years using around 7,000 pottery fat residues from more than 550 archaeological sites. European milk use was widespread from the Neolithic period onwards but varied spatially and temporally in intensity.*

*Notably, LP selection varying with levels of prehistoric milk exploitation is no better at explaining LP allele frequency trajectories than uniform selection since the Neolithic period.*

*In the UK Biobank cohort of 500,000 contemporary Europeans, LP genotype was only weakly associated with milk consumption and did not show consistent associations with improved fitness or health indicators.*

*This suggests that other reasons for the beneficial effects of LP should be considered for its rapid frequency increase. We propose that lactase non-persistent individuals consumed milk when it became available but, under conditions of famine and/or increased pathogen exposure, this was disadvantageous, driving LP selection in prehistoric Europe.*

*Comparison of model likelihoods indicates that population fluctuations, settlement density and wild animal exploitation, proxies for these drivers, provide better explanations of LP selection than the extent of milk exploitation. These findings offer new perspectives on prehistoric milk exploitation and LP evolution.*

**Modern Humans.**

Clark, M., et al (2022) **Estimating the environmental impacts of 57,000 food products.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 119:doi.org/10.1073/pnas.2120584119 (available as a free pdf)

Authors’ abstract: *One barrier to enabling transitions to more environmentally sustainable food systems is the lack of detailed environmental impact information.*

*We provide an initial approach to overcome this barrier using publicly available information to derive first estimates of the environmental impact of >57,000 food products across four indicators: greenhouse gas emissions, land use, water stress, and eutrophication potential.*

*Pairing it with a measure of nutrition shows a tendency for more nutritious foods to be more environmentally sustainable, and that like-for-like substitutes can have highly variable environmental and nutritional impacts.*

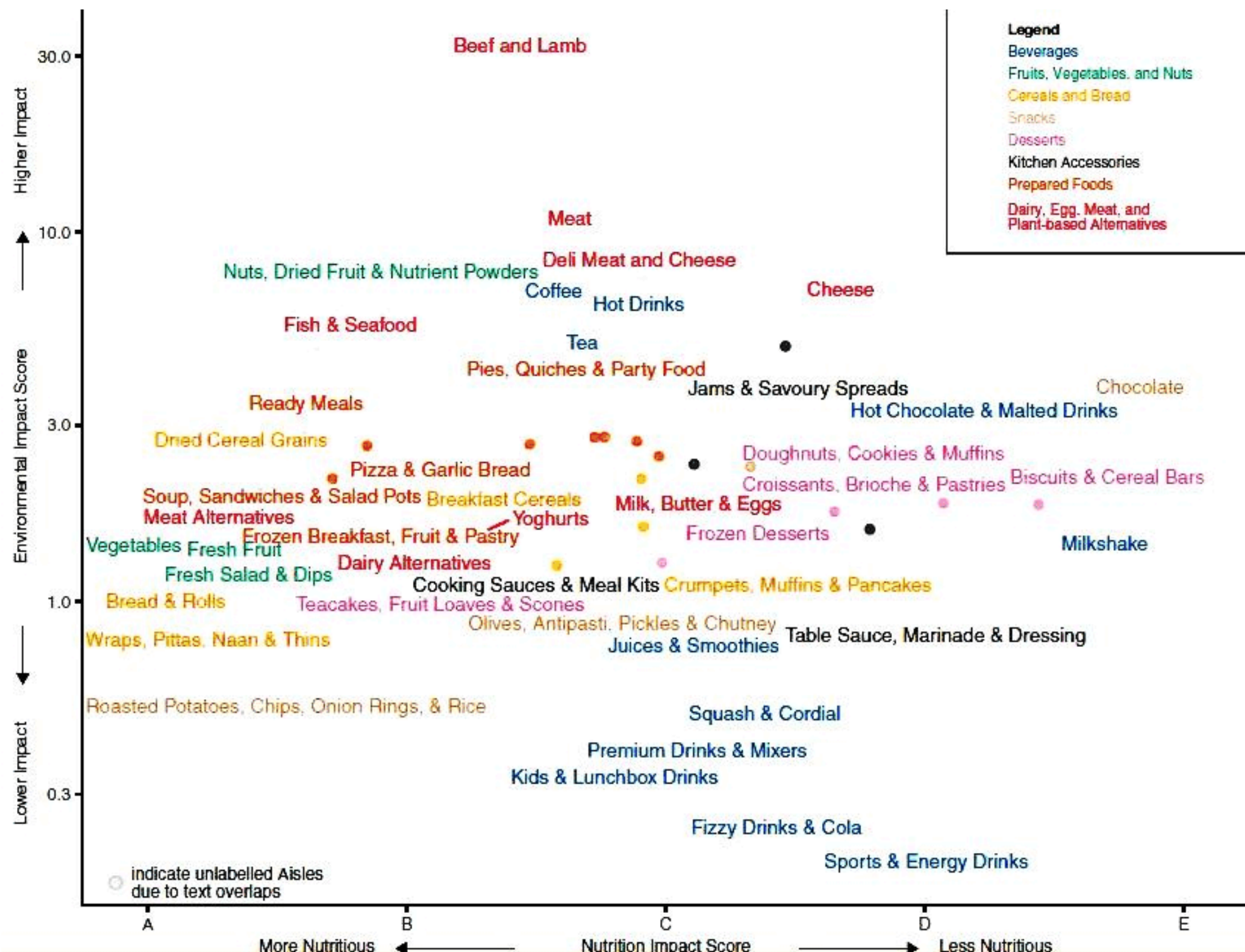
*While previous analyses compared the impacts of food commodities such as fruits, wheat, and beef, most food products contain numerous ingredients. However, because the amount of each ingredient in a product is often known only by the manufacturer, it has been difficult to assess their environmental impacts.*

*Here, we develop an approach to overcome this limitation. It uses prior knowledge from ingredient lists to infer the composition of each ingredient, and then pairs this with environmental databases to derive estimates of a food product’s environmental impact across four indicators: greenhouse gas emissions, land use, water stress, and eutrophication potential.*

*Using the approach on 57,000 products in the United Kingdom and Ireland shows food types have low (e.g., sugary beverages, fruits, breads), to intermediate (e.g., many desserts, pastries), to high environmental impacts (e.g., meat, fish, cheese).*

*Incorporating NutriScore reveals more nutritious products are often more environmentally sustainable but there are exceptions to this trend, and foods consumers may view as substitutable can have markedly different impacts.*

[Chart is from this paper.]





Hicklin, R.A., et al (2022) **Accuracy and reliability of forensic handwriting comparisons.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 119:doi.org/10.1073/pnas.2119944119 (available as a free pdf)

Authors’ abstract: *Forensic handwriting examinations are a critical part of the criminal justice system, seeking to determine whether handwritten documents can be attributed to specific writers by comparison to known exemplars.*

*This paper summarizes a 5-year research study designed to assess the accuracy and reliability of forensic handwriting comparison decisions, which is important in assessing scientific validity for admissibility in court.*

*Forensic handwriting examination involves the comparison of writing samples by forensic document examiners (FDEs) to determine whether or not they were written by the same person. Here we report the results of a large-scale study conducted to assess the accuracy and reliability of handwriting comparison conclusions.*

*86 practicing FDEs each conducted up to 100 handwriting comparisons, resulting in 7,196 conclusions on 180 distinct comparison sets, using a five-level conclusion scale.*

*Erroneous “written by” conclusions (false positives) were reached in 3.1% of the non-mated comparisons, while 1.1% of the mated comparisons yielded erroneous “not written by” conclusions (false negatives). False positive rates were markedly higher for non-mated samples written by twins (8.7%) compared to nontwins (2.5%).*

*Notable associations between training and performance were observed. FDEs with less than 2 years of formal training generally had higher error rates, but they also had higher true positive and true negative rates because they tended to provide more definitive conclusions.*

*FDEs with at least 2 years of formal training were less likely to make definitive conclusions, but those definitive conclusions they made were more likely to be correct (higher positive predictive and negative predictive values).*

*We did not observe any association between writing style (cursive vs. printing) and rates of errors or incorrect conclusions. This report also provides details*

*on the repeatability and reproducibility of conclusions, and reports how conclusions are affected by the quantity of writing and the similarity of content.*

**Technology.**

Campbell, O., et al (2022) **Surface damage from perpendicular and oblique bullet impacts in stone.** ROYAL SOCIETY OPEN SCIENCE 9:doi.org/10.1098/rsos.220029 (available as a free pdf)

Authors’ abstract: *Controlled experiments were conducted to investigate the surface damage caused by perpendicular and oblique impacts of bullets into sandstone and limestone targets.*

*Individual bullets fired in conditions simulating modern rifles at typical combat distances excavated craters with diameters from 22 to 74 mm and depths from 3 to 24 mm.*

*Limestone target craters were up to twice as large and deep as those in sandstone. These craters have a complex shape consisting of a central excavation surrounded by a shallow dish, compared to the simple bowl shape of most sandstone impacts.*

*Radial fractures extending to the edge of the target block were common in limestone targets. Impacts at an angle of 45° to the surface in both rock types result in asymmetric craters.*

*Two common types of intermediate cartridge (ammunition) were compared: the steel-tipped 5.56 × 45 mm NATO projectile generally produced larger and deeper craters than the 7.62 × 39 mm projectile that is commonly fired from AK-47 rifles, despite having approximately half the mass of the latter.*

*These results characterize the sort of damage that can be expected at many sites of cultural significance involved in contemporary conflict zones, and have important implications for their conservation.*

*For example, building stone with low tensile strength is likely to sustain more damage and be at risk of greater deterioration.*