

OPUNTIA 352

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

HIDDEN HISTORY ON THE ELBOW RIVER

photos by Dale Speirs

Calgary was founded at the junction of the Bow and Elbow Rivers. Further upstream on the Elbow River was a separate settlement, originally known as Rouleauville, and today called Mission, where the Roman Catholic church predominated. The area is off the main streets and is a quiet suburb in the centre of Calgary. It was one of the first annexations by Calgary as it began growing. Below is a typical view of the Elbow River in the Mission district, the kind of place where parents let their young children splash around in the shallow waters on a hot day.



The Canadian Pacific Railway built the transcontinental railroad through Calgary in 1883, which is still there and is the south boundary of the downtown core (seen in the distance where the skyscrapers are).

In 1911, the Canadian Northern Railway, today the Canadian National Railway, built a spur into the Mission district from its main line and located its terminal at the other end of this bridge. When the line was abandoned in the 1970s, it became a pedestrian bridge.



Looking downstream from the bridge.



The CNoR terminal has been preserved as an arts centre.



The other end of the terminal was originally a parish hall which the CNoR bought from the Saint Mary's diocese and converted to the terminal.





This is the only piece of original track preserved, which was part of a siding.

Across the street from the railway terminal is Saint Mary’s Cathedral. It makes the local news every Easter when parishioners start out here carrying or dragging crosses, and march the Stations of the Cross around the neighbourhood.



SIGNS, SIGNS, EVERYWHERE A SIGN
photos by Dale Speirs

A few views around Calgary. Smartphone cameras are very handy indeed.
Below: Apparently the purchase of recreational trucks makes one illiterate.



Seen at the Saddledome arena during the 2016 Calgary Stampede. One of many such doors.



Seen at an office building in the Beltline district. I couldn't spot the parking lots for white folk or mixed races.



**IF YOU AREN'T SQUAMOUS,
THEN WHY ARE YOU TRYING TO BE ELDRITCH?: PART 4**

by Dale Speirs

[Parts 1 to 3 appeared in OPUNTIA's #298, 333, and 340. Issues #22 and 63.1A have related articles on H.P. Lovecraft.]

The Book Of The Names Of The Dead.

A central prop of the Cthulhu Mythos is the NECRONOMICON, a grimoire of nasty spells that, if used, will cause the spell caster to attract the personal attention of the Elder Gods in all the wrong ways. According to H.P. Lovecraft, it was written by Abdul Alhazred, the mad Arab. The original Arabic title was KITAB AL AZIF, which became NECRONOMICON in translation to Greek or Latin. Lovecraft invented the NECRONOMICON as a plot device but inserted it so skillfully into his stories that some fans thought it was a real book.

Just as there are a few Star Wars fans who genuinely believe The Force exists and was not a plot device invented by a Hollywood screenwriter, so it is that some HPL fans thought the book was real. Nature abhors a vacuum, and it didn't take long for fakers and jokers to begin churning out NECRONOMICON copies for the market.

The book title never existed until HPL invented it as a plot device. Numerous fake references have been concocted to antedate him and make it seem he was citing an actual ancient tome. The book was supposedly written by Alhazred, but that word does not exist in the Arabic language and is a nonsense name.

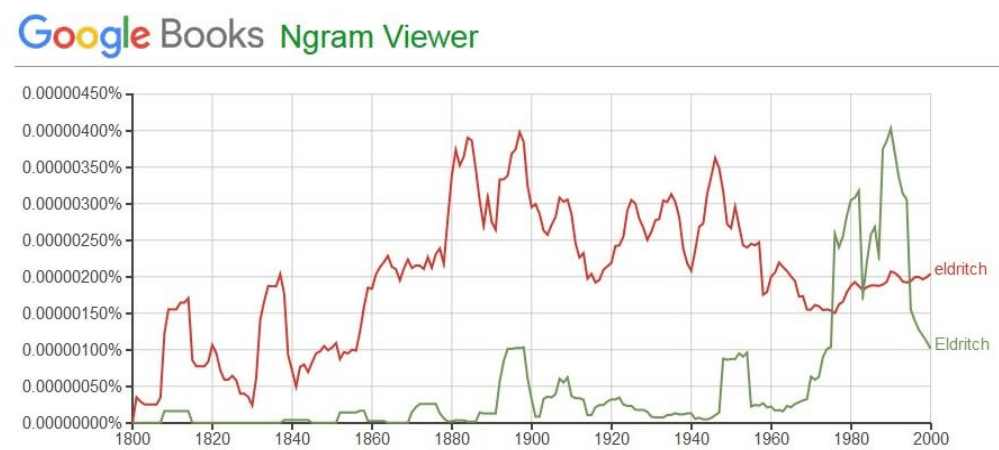
The first reference in print to the NECRONOMICON was HPL's story "The Hound", which appeared in WEIRD TALES (1924 February), where he published much of his fiction. It appeared in twelve more of his stories over the years. The theme was that it was a book not to be read, for its magic was more likely to harm the user than help.

Out of curiosity, I checked Google's Ngram service, which counts how often a word appears in its scanned library and charts it. One can hover the cursor over the graph and draw up the references. It is a useful research tool, and I highly recommend it. The chart for the word "Necronomicon" is shown here.

Google Books Ngram Viewer



For the fun of it, I also searched the word “eldritch” on Google Ngram.



THE NECRONOMICON FILES (2003, revised edition) by Daniel Harms and John Wisdom Gonce III is a history of all the various editions of the book, as well as hoaxers who convinced a few gullible marks that it was real magic. There is no belief so idiotic that you can’t get at least a dozen people to believe.

The book opens with an introduction pointing out that many fake NECRONOMICONs exist because there is a demand for them. Some people want to believe that HPL was writing about a real book, and others are only too happy to make money off that belief.

HPL wrote a history of the NECRONOMICON in 1927 to help him keep the continuity straight. Alhazred was from what is today Yemen, visited Babylon and Memphis, and put much of the lore he collected into a grimoire titled AL AZIF. He died in A.D. 738 when he was torn apart by an invisible monster. His book survived him and was later translated into Greek and Latin under the title NECRONOMICON. It was banned in most countries and very few copies survived. The best known one was in the library of Miskatonic University, at Arkham, Massachusetts.

Other pulp fiction writers borrowed NECRONOMICON for their stories, such as Robert E. Howard (creator of Conan the Barbarian), Clark Ashton Smith (sword and sorcery), and Robert Bloch (author of PSYCHO). HPL didn’t mind at all, and it was one of the earliest shared worlds in the pulps. HPL did quite

a bit of ghost-writing and editorial revision for other authors, and from time to time inserted references into their stories about the NECRONOMICON. This confused some readers, who thought the book must be real because so many different authors were mentioning it.

During the 1930s and 1940s, fans and dealers had fun by inserting fake listings for NECRONOMICON into catalogues and bibliographies. The first imitation actually published was L. Sprague de Camp’s 1973 version of AL AZIF, written in a fictional Arabic dialect called Duriac. Other versions then followed from assorted small presses and fanzine publishers.

The NECRONOMICON version that caused the most trouble was a supposed translation appearing in 1977 under the pseudonym Simon. The introduction to this book mixes true ancient history, plausible falsehoods, and garbled mythology in such a manner as to dupe a large number of gullible readers, mostly occult aficionados who were not in SF fandom. Bear in mind that the reader of such a book was usually not aware of critical literature about it, and did not read fanzines. With no countervailing evidence, such readers would accept the book at face value.

The Simon NECRONOMICON was published by a New York City occult shop, whose owner and publisher kept changing the story about how the manuscript was found and translated. It doesn’t follow HPL’s description but seems to have been copied from Sumerian mythology.

Harms and Gonce then list and comment on a long line of NECRONOMICONs by various authors. If you are a completist collector of Lovecraftiana, then this will be of interest, but for the casual reader such as myself, one’s eyes tend to glaze over. There are also extended investigations of who said what about whose version of NECRONOMICON, what mistakes the publishers made, and what sections were plagiarized from what mythology. HPL would be dumbfounded at the NECRONOMICON industry.

The final third of the book looks at how the NECRONOMICON was treated by Hollywood in movies and television. You can already guess how. Like Edgar Allen Poe stories and Sherlock Holmes, HPL’s stories have suffered at the hands of Hollywood. The common practice was to use the title of the story and a few names of characters and little else, but certainly not the plot. Most of the appearances of the NECRONOMICON are minor parts of the film or television show. Harms and Gonce go into lengthy detail about them over many pages.

A reverse example is where HPL's story "The Case Of Charles Dexter Wood" was victimized by Roger Corman. The movie was given the title THE HAUNTED PALACE because it was thought that an Edgar Allen Poe title would be a better seller than HPL. In that movie, the NECRONOMICON was a folio size book bound in red buckram with silver hasps, gold-leaf titles, and gilt-edged pages. It was everyone's idea of what a grimoire should look like. No trade paperback edition here.

The book concludes with a reprint of HPL's letter "History of the NECRONOMICON", in which he lays out the basics of his mythology of the tome.

Names Of The Dead From The Past.

THE NECRONOMICON (1996) edited by Robert M. Price is an anthology of short fiction, extracts from fake NECRONOMICONs, and essays thereon. The editorial foreword is an essay written in humanities academic jargon, and may be safely skipped. The stories are taken from old fanzines and obscure pulps decades old, which few have seen. This anthology serves a useful purpose in bringing together such hard-to-find items into a more convenient modern book.

"The Terrible Parchment" by Manly Wade Wellman is a self-referential fanzine piece reprinted from an old zine. The author's latest copy of WEIRD TALES arrives with a genuine page of the NECRONOMICON tipped in. He and his wife read the text out loud. Too late they realize that in doing so, they had brought the parchment to evil life. The parchment chases them around their apartment, trying to make them read the words that will bring Cthulhu into our universe. Only holy water stops it.

"Dr Xander's Cottage" by Martin D. Brown is a short-short about a newspaper reporter investigating mysterious disappearances in the village of Elwood. They suspect Dr Xander, trail him to a cottage, find a room full of monsters, and flee. When they return with the police, the cottage is in flames. This is more an outline than a narrative, the kind that someone would send to an editor as a query letter.

"The Mantle Of Graag" is a 1941 fanzine story by Frederik Pohl, Henry Dockweiller, and Robert Lowndes. A group of young men in a summer house in Maine find an antique book. No, not the NECRONOMICON but it does mention it. They go on a treasure hunt and find a chest containing a giant white

worm. Madness follows then and later, and they all meet horrible ends. The story falls flat because little is described beyond saying "The horror, the horror!" and how everything was just so eldritch.

"Settler's Wall" by Robert Lowndes has the narrator and his friend lost on the back roads of Maine. They stop for a rest by a mysterious grey wall ten feet high. Deciding to go for a walk along it, they find themselves back at their car without having turned a corner. Nothing can go over the wall. When they climb up for a look, they see the same road and countryside on the other side.

The two men get advice and help from the locals, who want to solve the mystery as much as they do, and are hoping fresh minds will help. There is a passing mention to AL AZIF when they research the wall but the story has nothing to do with NECRONOMICON. The wall, which was there before the first settlers, disappears during the 1938 hurricane. On that note, the story ends.

"The Howler In The Dark" by Richard L. Tierney revolves around ancient castle ruins in Duncaster, with the arrival of strangers up to no good and the mysterious disappearance of locals. An outsider named Irving Hamilton visits the strangers in the castles and notices they have a copy of NECRONOMICON. Events lead on as one might expect, with slobbering creatures in the depths below the castle and an eldritch twist ending.

"Demons Of Cthulhu" by Robert Silverberg is about a library assistant at Miskatonic University who helps steal a NECRONOMICON from the Special Collections but then keeps it for himself. He summons one of the demons in the book, with results that the reader can easily anticipate. Here's a useful tip: when summoning or banishing a demon, make certain you are reading from the correct page.

"The Castle In The Window" by Steffan Aletti begins with the discovery of a house window that looks into the past, created in 1807 with rites from the NECRONOMICON. The creator went mad, as they so often do, and the window was boarded over and forgotten. Two centuries later, the window is uncovered and of course no good comes of it. A man falls through the window and lands in 1243 A.D., where he is naturally taken to be a demon. He will not repent of his fantastic tale of coming from eight centuries hence. The authorities therefore have no choice but to put him to the pyre.

“Concerning The Forthcoming Inexpensive Paperback Translation Of The NECRONOMICON Of Abdul Alhazred” by John Brunner is set in Arkham, Dorset. Jasper Wharton, the local librarian, inherits a library of antique books. He is plagued by graduate students and university professors who want the books. One of them is going to publish the NECRONOMICON in a cheap paperback edition. An appalling thought, like giving a loaded gun to a 4-year-old child. Wharton tries to stop its publication but fails. No one believes him.

“The Adder” by Fred Chappell starts off with a bookstore owner coming into possession of a copy of AL AZIF. Not having any proper security for it in his store, he hides it under an old reprint paperback of Milton’s poems. When he later checks the book, he discovers its covers are becoming new and bright again, and the faded typography has darkened to black ink. The Milton paperback has undergone strange changes to its text. Not just the one book, but all Milton poems everywhere, as if by magic.

The bookseller’s uncle comes to the rescue by placing the AL AZIF into contact with a holy book, which reverses the spell. As the two men congratulate each other on a job well done, they notice too late that a fly resting on the AL AZIF had picked up a speck of its ink from the grimoire and was now contaminated with the evil. It escapes out the window ... to breed. An interesting concept and a well-written story.

“Preface To The AL AZIF” by L. Sprague de Camp was the introduction to his imitation NECRONOMICON. The book was visual, with blocks of pseudo-Arabic script repeated in calligraphy that was just meaningless scribbles. The Preface is a fake history of how it was found in an obscure village in northern Iraq. Three Iraqi scholars in a row mysteriously disappeared while transcribing it. The reader is warned.

“The NECRONOMICON: The Dee Translation” by Lin Carter is a series of episodes by Alhazred, each of which ends in eldritch horror. Too many people learn the hard way that there are things man was not meant to know. Repetitive, and the fake Arabic diction does not make for easy reading.

“The Sussex Manuscript” by Fred L. Pelton was so bad that even August Derleth refused to print it. The work is written in the Ye Olde English style that never existed except in hack-written stories. It is reprinted here for the historical record and little else. I skimmed through it in a hurry. “Why Abdul Al Hazrad Went Mad” by D.R. Smith is another unreadable translation of part of the

NECRONOMICON. The story, as I skimmed over it, brought in Marcus Antonius to defeat the Old Ones by calling on Jupiter to smote them with lightning.

This anthology has “History Of The NECRONOMICON” by HPL himself, in which he outlines the back story. Writers of Cthulhu Mythos pastiches should read this first.

The anthology concludes with two pseudo-academic scholarly articles. “The Life Of The Master” by David St. Albans is a biography of Abdul Alhazred written by one of his students and supposedly translated by St. Albans. Robert M. Price then follows with a lengthy dissertation “A Critical Commentary On The NECRONOMICON” which discusses the book as if it were real. On that point, the anthology concludes. All told, an interesting read.

Incidental Appearances.

“The Adventure Of The Arab’s Manuscript” by Michael Reeves (2013, in the anthology SHADOWS OVER BAKER STREET) is about the search for a manuscript titled AL-AZIF, of which the NECRONOMICON is only an abridged copy. Holmes and Watson are hired to track it down before someone

reads it and uses its evil knowledge to summon the Elder Gods, a thing greatly to be avoided.

Librarians don’t know how lucky they don’t have such a book in their collection.



STEPHEN LEACOCK: PART 3
by Dale Speirs

[Parts 1 and 2 appeared in OPUNTIA's #64.1A and 351.]

Exaggeration.

Leacock liked to use exaggeration in many of his stories, taking a commonly-accepted premise and running it off the cliff. *FRENZIED FICTION* (1917) is a collection of such stories, best read one or two at a time. “My Revelations As A Spy”, the narrator of whom tries to convince the reader he lives a life of danger. In actual fact, he can’t find out what’s going on, and no spy agency wants the trivial data he does manage to collect.

“The Prophet In Our Midst” is the kind still with us, making vague predictions that can be interpreted in any direction, especially after the fact. That is the standard practice of psychics and prophets, then and now.

“In Dry Toronto” is a story that will baffle non-Canadian readers but is funny enough for us Canucks. It is a demonstration that some humour does not cross borders. For all that Toronto pretends to be a cutting-edge, world-class city, the rest of Canada begs to differ. It is said that the only thing holding the Canadian Confederation together is mutual hatred of Toronto. It wasn’t any different in Leacock’s time, and actually even worse since Toronto back then had blue laws of the most prudish kind. Nowadays Toronto does whatever was fashionable in Manhattan last year. [Pause for letter of comment from Lloyd Penney.]

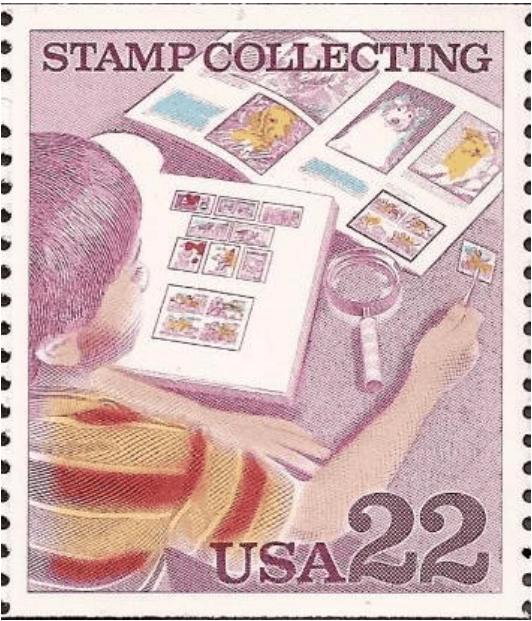
OVER THE FOOTLIGHTS (1923) spoofs the theatre stage and silent movies of that era, as well as old and incoming fads. A brand-new technology of that time was broadcast radio, only just beginning to spread across Canada. “Radio: A New Form Of Trouble” was written when Leacock was in his fifties, so he takes on the persona of a grumpy old man who doesn’t understand the technology and doesn’t approve. “... *it is no use telling me that by means of radio, I would be able, seated comfortably in my own armchair to hear the Pittsburgh orchestra. I know it. I don’t want to.*”

When the Internet was spreading into public consciousness in the late 1990s and early 2000s, it was publicized as an electronic encyclopedia that would educate the public. People would use it as a source on information and self-education would bloom. Remember the phrase “Information Superhighway”? Haven’t

heard that one in a long time. As you know, Professor, the Information Superhighway turned in a carnival, where users spend their time libeling each other on blogs, playing games that either involve blowing things up or capturing cute little cartoon characters, or downloading pornography.

Leacock had that figured out for radio. Not the porn, but the loud brassy comedy shows, soap operas, bang-bang-bang murder mysteries, and game shows. A few listeners might tune in to hear the Pittsburgh orchestra, but most preferred AMOS AND ANDY or CALLING ALL CARS.

Television wasn’t heard of in that era, but it proved to be radio with pictures in more ways than one. If you go through this essay and substitute the word “Internet” for “radio”, it would be perfect for our modern times. In the 1920s, radio fans were everywhere, and magazines on the subject sold out at the news agents. Leacock grumbles about radio enthusiasts constantly chattering about it. The spread of the World Wide Web was simply ringing changes on the bells.



SHORT CIRCUITS is a 1928 collection, of which the best story is “The Stamp Album World”. One of the ways in which philatelists justify the stamp collecting hobby is that it teaches geography. Leacock runs with that and points out that if geography is judged by stamp production, then the world looks different than we believe because the tiny tropical islands and jungle republics churn out so many postage stamps with high face values.

“The principal countries of the world are Cochin-China, the Gilbert Islands, Somali Land, the Gaboon, the Cameroons, Nankipu, Johore, and Whango-Whango. Alongside of these great stamp areas are others of less importance, whose stamps are seldom if ever worth more than four cents, such as the United States, Great Britain, Canada, France, etc.”

“If Only We Had The Radio Sooner” looks at what the Norman Conquest might have been like if the citizenry could listen to a blow-by-blow report from Hastings on the radio. (And remember, radio broadcasting was still being born when Leacock first wrote this story.)

“Announcer: Battle of Senlac. Second quarter. Change of ground. Duke William has won the west end. The Normans make a rush against the left centre. Hand-to-hand scrimmage with Harold’s front line. Many knights unhorsed and out of the game. Several men hurt on both sides.”

The idea was often done by many others, both seriously (YOU ARE THERE!, a 1947 to 1950 CBS radio series) and humourously (Ronald Knox, in Leacock’s time, as a BBC announcer describing an angry mob attacking Broadcasting House).

The Dismal Science.

Leacock’s day job was Professor of Political Economics at McGill University in Montreal. He published a number of books on the subject aimed at the general public which are completely obsolete today but are an interesting snapshot of history. They dealt with issues that loomed large in their time but are insignificant now, just as the political issues of today will fade with time.

THE UNSOLVED RIDDLE OF SOCIAL JUSTICE (1922) begins as follows: *“These are troubled times. As the echoes of the war die away the sound of a new conflict rises on our ears. All the world is filled with industrial unrest. Strike follows upon strike. A world that has known five years of fighting has lost its taste for the honest drudgery of work. Cincinnatus will not go back to his plough, or, at the best, stands sullenly between his plough handles arguing for a higher wage.”*

“The wheels of industry are threatening to stop. The labourer will not work because the pay is too low and the hours are too long. The producer cannot employ him because the wage is too high and the hours are too short.”

Leacock summarizes the situation at a time when there was a brief depression that ended a couple of years after this book was published. Governments resolved that there would be no more such events and that they would manage the economy, as a result of which the next depression lasted a full decade. But Leacock didn’t know that at the time. He summarizes the problems of the era,

when industry suffered a mis-match between a flood of labour as Johnny came marching home again, high commodity prices because Johnny didn’t want to go back to the farm and raise livestock, and lack of demand for goods because Johnny didn’t have the money.

Leacock writes at length about the fallacies of socialism, and singles out Edward Bellamy’s famous utopian novel LOOKING BACKWARD, still selling well back then after three decades in print. Leacock pointed out that nowhere has socialism prevented people from gaming the system. Bureaucrats thrive under socialism, as do the lazy ones who know how to live off government largesse. But he also notes that the every-man-for-himself individualism of the Victorian era did not work either. The welfare queens are parasites, but those who need honest help should not be left to die in back alleys.

Every nation has to maintain a delicate balance between the two forms of government. The first duty of every politician, socialist or capitalist, is to be re-elected, which means that voters must be bribed with their own money. This inevitably leads to inflation (which is a hidden tax) and declining production of real goods (which is how wealth is created). After the voters can’t stand it anymore, which takes decades to sink in, the reaction sets in and Maggie Thatcher appears. The economy runs in two-generation cycles, sometimes called the Kondratieff long wave, and every third generation has to suffer the mistakes of their parents and grandparents before the cycle reverses.

BACK TO PROSPERITY (1932) was published as the Great Depression shifted into third gear. It would only be eliminated by the next war, when governments who had no money for public relief suddenly found billions for armies. This book was aimed at the forthcoming Empire Conference, back when Britain had an empire, was Great, and was economically important on the world stage. In today’s society, the politically correct have standards which they think will last forever, just as the establishment of 1932 had standards they thought would always be axioms.

The world was on a gold standard at the time. Products worldwide were priced in gold, currency exchange rates were compared against gold, and international debts were settled in the actual physical metal. Gold imposes discipline, but even then politicians were fighting to eliminate that discipline. They wanted to be re-elected, and since the general public had no discipline, this meant the gold standard had to go. It took a long while before it did, though.

Without the gold standard, currency became colourful bits of paper printed in increasing quantity to pay for all the programmes the public wanted, no matter what the damage would be in the future. That is why the gold standard can't be brought back, because all the largesse the public expects as a right would disappear. So would inflation, which is a hidden tax on the lower and middle classes that most people don't understand, but that won't change either.

Leacock considers various economic problems, such as trade tariffs (which reduce economic activity and increase unsold surpluses) and the bimetallic question (which became moot in 1965 when gold and silver were no longer used in coins). In 1932 when Leacock wrote this book, Hitler was unknown outside the beer halls. Leacock correctly identified that war reparations were a problem; they should be cancelled to allow Germany to recover prosperity. The French wouldn't allow that, and we know what happened next.

Leacock also supported wide-open immigration into relatively empty countries such as Canada and the USA as a means of soaking up surplus production. One of the causes of the Great Depression was that scientific improvements in agriculture and manufacturing produced massive surpluses that couldn't be sold because poor folk elsewhere couldn't buy them. If those poor folk were moved to countries where they could improve their lives and be able to buy such products, then deflation would be eased.

Much of the book shows clearly that what a generation thinks are timeless issues will fade away. Leacock was much concerned about maintaining the Empire, the one that would last forever but died a decade after Leacock did. So it is that Brexit will become as obscure to the next generation as the bimetallic question is to ours.

The Dismal Art.

HOW TO WRITE was composed by Leacock in 1942 and published in the year of his death in 1944. He was a bestselling author for decades, so it behooves us to pay attention to his advice. Much of it is the usual advice that too many would-be writers ignore even today.

The theme that runs through this book is to write in a conversational style. Not dialect or lower-class, but what average educated people use. Dialect is tiresome to read, especially since it seems to have a lot of apostrophes and missing letters. Archaic English is even worse. Slang dates very rapidly, and

the word meanings change such that a later generation may not understand them. "Groovy" was hip for about one month back in the Sixties. Now it is an embarrassment, like those old photos of us in bell-bottom candy-cane pants.

Padding of novels was a problem back in Leacock's day and is now worse than ever thanks to word processors. He mentions elaborate descriptions of buildings and scenery. Today the problem is what we call infodumps, detailed descriptions of equipment, planets, space travel methods, and whatever else the author can dump in to pad the word count. Frequently we read "As you know, Professor" lectures. If I were a professor, I'd look around for the nearest blunt instrument and shut up the impudent jerk telling me something I knew back when I was a graduate student.

This book is not the standard type of instructional textbook that might be supplied to Creative Writing 101 students down at the community college. Leacock practices what he preaches. The book is an extended conversation, as if the topic had come up after a barbecue and everyone was sitting in the back yard digesting their smokies and pulled pork. It would be worthwhile reprinting today. Of course the people who needed to read it the most wouldn't.

HUMOUR AND HUMANITY (1938) is a book-length analysis of how to write humour. Again, it was written at the end of a long and successful career in doing it for paid publication. Written humour first must be considered as an expression of words and ideas. Without properly chosen words, and without ideas that can sustain a piece, the humour will not work. We have all read short stories that were just padded-out vignettes, and the standard in fantasy today is to take a novella and pad it out to a ten-volume trilogy.

There is a difference between humour based on a situation, and that based on a character, the latter being more sustainable. Leacock also discusses comic verse, which has its own rules and is harder to write because it must be compressed into a few lines. He mentions another aspect of written humour often overlooked, craftsmanship. Just because it is to be a funny piece is no excuse to do slapdash work.

SEEN IN THE LITERATURE

Badro, J., J. Siebert, and F. Nimmo (2016) **An early geodynamo driven by exsolution of mantle components from Earth’s core.** NATURE 536:326-328

Authors’ abstract: “Recent palaeomagnetic observations report the existence of a magnetic field on Earth that is at least 3.45 billion years old. Compositional buoyancy caused by inner-core growth is the primary driver of Earth’s present-day geodynamo, but the inner core is too young to explain the existence of a magnetic field before about one billion years ago. Theoretical models propose that the exsolution of magnesium oxide, the major constituent of Earth’s mantle, from the core provided a major source of the energy required to drive an early dynamo, but experimental evidence for the incorporation of mantle components into the core has been lacking. Indeed, terrestrial core formation occurred in the early molten Earth by gravitational segregation of immiscible metal and silicate melts, transporting iron-loving (siderophile) elements from the silicate mantle to the metallic core and leaving rock-loving (lithophile) mantle components behind.”

“Here we present experiments showing that magnesium oxide dissolves in core-forming iron melt at very high temperatures. Using core-formation models, we show that extreme events during Earth’s accretion (such as the Moon-forming giant impact) could have contributed large amounts of magnesium to the early core. As the core subsequently cooled, exsolution of buoyant magnesium oxide would have taken place at the core-mantle boundary, generating a substantial amount of gravitational energy as a result of compositional buoyancy. This amount of energy is comparable to, if not more than, that produced by innercore growth, resolving the conundrum posed by the existence of an ancient magnetic field prior to the formation of the inner core.”

Scharfa, C., and L. Cronin (2016) **Quantifying the origins of life on a planetary scale.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 113:8127-813

Authors’ abstract: “We discuss a variety of microscale factors and their role in determining macroscale abiogenesis probabilities on suitable planets. We also propose that impact ejecta exchange between planets with parallel chemistries and chemical evolution could in principle amplify the development of molecular

complexity and abiogenesis probabilities. This amplification could be very significant, and both bias our conclusions about abiogenesis probabilities based on the Earth and provide a major source of variance in the probability of life arising in planetary systems.”

“We also cannot not rule out the possibility that abiogenesis occurred on Earth because of interactions between mutually exclusive building blocks that together acted to dynamically increase the evolvable information content of the prebiosphere. In other words, it is possible that the building blocks of life today are the product of a combination of actions of earlier sets of building blocks that could not cross-assemble (shadow and nonshadow chemistries) but that could, together, generate the necessary complexity and selection for organic abiogenesis.”

Anglada-Escudé, G., et al (2016) **A terrestrial planet candidate in a temperate orbit around Proxima Centauri.** NATURE 536:437-440

Authors’ abstract: “At a distance of 1.295 parsecs, the red dwarf Proxima Centauri (Alpha Centauri C, GL 551, HIP 70890 or simply Proxima) is the Sun’s closest stellar neighbour and one of the best-studied low-mass stars. It has an effective temperature of only around 3,050 kelvin, a luminosity of 0.15 per cent of that of the Sun, a measured radius of 14 per cent of the radius of the Sun and a mass of about 12 per cent of the mass of the Sun. Although Proxima is considered a moderately active star, its rotation period is about 83 days and its quiescent activity levels and X-ray luminosity are comparable to those of the Sun. Here we report observations that reveal the presence of a small planet with a minimum mass of about 1.3 Earth masses orbiting Proxima with a period of approximately 11.2 days at a semi-major-axis distance of around 0.05 astronomical units. Its equilibrium temperature is within the range where water could be liquid on its surface.”

Cooper, G., and A.C. Riosa (2016) **Enantiomer excesses of rare and common sugar derivatives in carbonaceous meteorites.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES 113:E3322-E3331

Authors’ abstract: “The majority of biological sugars and their derivatives contain higher abundances of the D mirror-image forms relative to the L forms. For example, nucleic acids are composed of only D sugars. Carbonaceous

meteorites can potentially assist in understanding the long-sought origin of such phenomena; They preserve a record of the earliest (about 4.5 Gy) chemical processes in the Solar System. To date, there have been no systematic studies of D/L (i.e., enantiomer) ratios of meteoritic sugar derivatives. In multiple meteorites, we demonstrate that rare and common sugar acids contain large excesses of the D enantiomer. Such data indicate that early meteoritic compounds may have influenced the enantiomer profile of subsequent biological sugars and their derivatives.”

“Biological polymers such as nucleic acids and proteins are constructed of only one, the D or L, of the two possible nonsuperimposable mirror images (enantiomers) of selected organic compounds. However, before the advent of life, it is generally assumed that chemical reactions produced 50:50 (racemic) mixtures of enantiomers, as evidenced by common abiotic laboratory syntheses. ... In multiple carbonaceous meteorites, we show that both rare and common sugar monoacids (aldonic acids) contain significant excesses of the D enantiomer, whereas other (comparable) sugar acids and sugar alcohols are racemic.”

Speirs: Many molecules are chiral, that is, they have a left-handed form (levo or L) and a right-handed form (dextro or D), both of which have the same chemical formula but are arranged differently. For reasons not yet known, life forms do not have a 50-50 balance between the two, but often favour one mirror image form over the other.

Reinhard, C.T., et al (2016) **Earth’s oxygen cycle and the evolution of animal life.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 113:8933-8938

Authors’ abstract: *“The emergence and expansion of complex eukaryotic life on Earth is linked at a basic level to the secular evolution of surface oxygen levels. However, the role that planetary redox evolution has played in controlling the timing of metazoan (animal) emergence and diversification, if any, has been intensely debated. Discussion has gravitated toward threshold levels of environmental free oxygen (O₂) necessary for early evolving animals to survive under controlled conditions. However, defining such thresholds in practice is not straightforward, and environmental O₂ levels can potentially constrain animal life in ways distinct from threshold O₂ tolerance. Herein, we quantitatively explore one aspect of the evolutionary coupling between animal*

life and Earth’s oxygen cycle, the influence of spatial and temporal variability in surface ocean O₂ levels on the ecology of early metazoan organisms. Through the application of a series of quantitative biogeochemical models, we find that large spatiotemporal variations in surface ocean O₂ levels and pervasive benthic anoxia are expected in a world with much lower atmospheric pO₂ than at present, resulting in severe ecological constraints and a challenging evolutionary landscape for early metazoan life. We argue that these effects, when considered in the light of synergistic interactions with other environmental parameters and variable O₂ demand throughout an organism’s life history, would have resulted in long-term evolutionary and ecological inhibition of animal life on Earth for much of Middle Proterozoic time (about 1.8 to 0.8 billion years ago).”

“Proterozoic marine environments would have been characterized by O₂ levels that departed strongly from background mean pO₂, and the oxygen demand and marine habitat of different life history stages could present physiological bottlenecks that are currently poorly known for basal metazoan organisms. Indeed, microfossil evidence for metazoan life stages adapted for large-scale dispersal across inhospitable environments may represent a paleontological signal for such ecosystem oxygen stress during the Late Proterozoic. In this light, our results strongly suggest that the distribution of O₂ within the ocean-atmosphere system played a significant role in structuring evolutionary innovation and ecological success among early animals.”

Liu, A.G. (2016) **Framboidal pyrite shroud confirms the ‘death mask’ model for moldic preservation of Ediacaran soft-bodied organisms.** PALAIOS 31:259-274

Author’s abstract: *“The mechanisms by which soft-bodied organisms were preserved in late Ediacaran deep-marine environments are revealed by petrographic and geochemical investigation of fossil-bearing surfaces from the Conception and St. John’s groups (Newfoundland, Canada). Framboidal pyrite veneers are documented on fossil-bearing horizons at multiple localities. The pyrite is interpreted to have formed via microbial processes in the hours to weeks following burial of benthic communities. This finding extends the ‘death mask’ model for Ediacaran soft-tissue preservation to deep-marine settings. Remineralization of pyrite to iron oxides and oxyhydroxides is recognized to result from recent oxidation by meteoric fluids in the shallow subsurface. Consideration of other global Ediacaran macrofossil occurrences reveals that*

pyrite is observed in association with Ediacaran macrofossils preserved in all four previously described styles of moldic preservation (Flinders-, Conception-, Fermeuse- and Nama-type). This suggests that replication of external morphology by framboidal pyrite was a widespread mechanism by which soft-bodied organisms and associated organic surfaces were preserved, in multiple facies and depositional environments, 580 to 541 million years ago. The extensive global burial of pyrite in medium- to coarse-grained clastics and carbonates is a previously unrecognized yet potentially significant geological sink of iron and sulfur, and may have contributed to rising atmospheric and marine oxygen concentrations across the late Ediacaran interval.”

Speirs: The Ediacaran period was 600 to 542 megayears ago at the dawn of multicellular life. What this study represents is that fossilization could occur very fast under certain conditions, within hours or weeks of the organism's death.

Wah, M.E., and Andrew W. Murray (2016) **Multicellularity makes somatic differentiation evolutionarily stable.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 113:8362–8367

Authors’ abstract: “Many multicellular organisms produce two cell lineages: germ cells, whose descendants produce the next generation, and somatic cells, which support, protect, and disperse the germ cells. This germ-soma demarcation has evolved independently in dozens of multicellular taxa but is absent in unicellular species. A common explanation holds that in these organisms, inefficient intercellular nutrient exchange compels the fitness cost of producing nonreproductive somatic cells to outweigh any potential benefits.”

“We propose instead that the absence of unicellular, soma-producing populations reflects their susceptibility to invasion by nondifferentiating mutants that ultimately eradicate the soma-producing lineage. We argue that multicellularity can prevent the victory of such mutants by giving germ cells preferential access to the benefits conferred by somatic cells. The absence of natural unicellular, soma-producing species previously prevented these hypotheses from being directly tested in vivo: to overcome this obstacle, we engineered strains of the budding yeast *Saccharomyces cerevisiae* that differ only in the presence or absence of multicellularity and somatic differentiation, permitting direct comparisons between organisms with different lifestyles. Our strains implement the essential features of irreversible conversion from germ

line to soma, reproductive division of labor, and clonal multicellularity while maintaining sufficient generality to permit broad extension of our conclusions. Our somatic cells can provide fitness benefits that exceed the reproductive costs of their production, even in unicellular strains. We find that nondifferentiating mutants overtake unicellular populations but are outcompeted by multicellular, soma-producing strains, suggesting that multicellularity confers evolutionary stability to somatic differentiation.”

Xue, J., et al (2016) **Belowground rhizomes in paleosols: The hidden half of an Early Devonian vascular plant.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 113:9451-9456

Authors’ abstract: “The colonization of terrestrial environments by rooted vascular plants had far-reaching impacts on the Earth system. However, the belowground structures of early vascular plants are rarely documented, and thus the plant-soil interactions in early terrestrial ecosystems are poorly understood. Here we report the earliest rooted paleosols (fossil soils) in Asia from Early Devonian deposits of Yunnan, China. Plant traces are extensive within the soil and occur as complex network-like structures, which are interpreted as representing long-lived, belowground rhizomes of the basal lycopsid *Drepanophycus*.”

“The rhizomes produced large clones and helped the plant survive frequent sediment burial in well-drained soils within a seasonal wet-dry climate zone. Rhizome networks contributed to the accumulation and pedogenesis of floodplain sediments and increased the soil stabilizing effects of early plants. Predating the appearance of trees with deep roots in the Middle Devonian, plant rhizomes have long functioned in the belowground soil ecosystem. This study presents strong, direct evidence for plant-soil interactions at an early stage of vascular plant radiation. Soil stabilization by complex rhizome systems was apparently widespread, and contributed to landscape modification at an earlier time than had been appreciated.”

Tweet, J., K. Chin, and A.A. Ekdale (2016) **Trace fossils of possible parasites inside the gut contents of a hadrosaurid dinosaur, Upper Cretaceous Judith River Formation, Montana.** JOURNAL OF PALEONTOLOGY 90:279-287

Authors' abstract: "Tiny sinuous trace fossils have been found within probable gut contents of an exceptionally preserved specimen of a hadrosaurid dinosaur, *Brachylophosaurus canadensis*, from the Judith River Formation of Montana. Approximately 280 examples of the trace fossils were observed in 19 samples of gut region material. The tubular structures typically are about 0.3 mm across. Many have thin calcareous linings or layers, and some exhibit fine surficial striae. At least two dozen of these trace fossils share walls with adjacent tubular traces, and this association can extend for several millimeters. While the trace fossils share some characteristics with fine rhizoliths, these features are most consistent with tiny burrows, or possibly body impressions, of worms (vermiform organisms) of uncertain biologic affinity."

"Such trace fossils have not been reported previously, and herein described as *Parvitubulites striatus* n. gen. n. sp. Either autochthonous (parasites) or allochthonous (scavengers) worms may have created the trace fossils, but taphonomic factors suggest that autochthonous burrowers are more likely. Several lines of evidence, such as constant diameters and matching directional changes, suggest that the paired trace fossils were made by two individuals moving at the same time, which implies sustained intraspecific contact. *Parvitubulites striatus* provides a rare record of interactions between terrestrial, meiofaunal-sized, soft-bodied invertebrates and a dinosaur carcass. The evidence that the worms may have parasitized a living hadrosaur and subsequently left traces of intraspecific behavior between individual worms adds unique information to our understanding of Mesozoic trophic interactions."

Harcourt, A.H. (2016) **Human phylogeography and diversity.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 113:8072-8078

Author's abstract: "*Homo sapiens* phylogeography begins with the species' origin nearly 200 kya in Africa. First signs of the species outside Africa (in Arabia) are from 125 kya. Earliest dates elsewhere are now 100 kya in China, 45 kya in Australia and southern Europe (maybe even 60 kya in Australia), 32 kya in northeast Siberia, and maybe 20 kya in the Americas. Humans reached arctic regions and oceanic islands last, arctic North America about 5 kya, mid- and eastern Pacific islands about 2 to 1 kya, and New Zealand about 700 y ago. Initial routes along coasts seem the most likely given abundant and easily harvested shellfish there as indicated by huge ancient oyster shell middens on

all continents. Nevertheless, the effect of geographic barriers, mountains and oceans, is clear."

"The phylogeographic pattern of diasporas from several single origins, northeast Africa to Eurasia, southeast Eurasia to Australia, and northeast Siberia to the Americas, allows the equivalent of a repeat experiment on the relation between geography and phylogenetic and cultural diversity. On all continents, cultural diversity is high in productive low latitudes, presumably because such regions can support populations of sustainable size in a small area, therefore allowing a high density of cultures. Of course, other factors operate. South America has an unusually low density of cultures in its tropical latitudes. A likely factor is the phylogeographic movement of peoples from the Old World bringing novel and hence, lethal diseases to the New World, a foretaste, perhaps, of present day global transport of tropical diseases."

Jopp, T. A. (2016) **After us, the deluge: German miners' experience with pay-as-you-go pensions and the intergenerational contract before the great inflation.** ECONOMIC HISTORY REVIEW 69: 972–998

Author's abstract: "Many public pension insurance schemes today use the pay-as-you-go financing mechanism. This mechanism is vulnerable to an ageing population, which puts pressure on the intergenerational contract implicit in these schemes and raises the question as to how they might be eroded. This is not a new problem, and to put it into historical perspective, this article studies the intergenerational contract that formed the core of the Prussian miners' invalidity insurance in the nineteenth and the early twentieth century (1861–1920). With the so-called *Knappschaften*, miners relied on what was probably the most comprehensive and advanced occupational pension system existing in Germany around the time when Bismarckian social insurance was established. Financed via the pay-as-you-go mechanism, the miners' pension funds faced stress from their ageing memberships early on, and this potentially undermined their ability to maintain intergenerationally fair pensions."

Speirs: A lot of Millennials are in for a shock when they go to collect their pensions a few decades from now.

