



Newsletter #3- 5th May 2020



Amateur Geological Society of the Hunter Valley Inc.

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Contents

Editorial.	4
Annual Fees Reminder.	5
Science Videos.	5
Fascinating errors of judgement	11
PERIOD PALAEO PLANTS of SOUTH-EASTERN AUSTRALIA	
4. The RHACOPTERIS FLORA, (Winston Pratt)	12
PERIOD PALAEO PLANTS of SOUTH-EASTERN AUSTRALIA	
5. The GLOSSOPTERIS FLORA (Part 1) (Winston Pratt)	13
Light-Hearted Relief.	14
YouTube Geology in the background.	16
How Dangerous are Meteorites?	19
Goocy! Slimy! Colorful! What can it possibly be? (Chris Morton)	22
Mystery rock formation solved. (Brian England)	26
More waterfalls into the Sea - Faroe Islands.	27
Seawater into (and out of) Earth's deep interior (Brian England)	29
The Search For the "Lost" Allynbrook Antimony Mine (Brian England)	30
Discovering New Destinations: Minnie Water (Chris Morton)	34

Editorial

I'll start with an early reminder that Annual Fees are due by the end of the current financial year. Even if AGSHV are not holding meetings or conducting field trips, there are ongoing expenses to cover; insurance premium payments, website charges, and so forth. So please pay your Fee to keep AGSHV alive and well, and surviving, until we can fire up again with "business as usual". For further information see p 5.

So, here is some Arm Chair Geology, and some light-hearted stuff too. Geology is all around us; and even if we can't get out amongst it personally, it's there in "Virtual" fashion. I have included links to two **YouTube** clips of songs; both have plenty of geology in the visuals. See pp 9, 16 & 26.

President **Chris Morton** has forwarded **Winston Pratt's** most recent instalments of his **Palaeo Period Plants of South-Eastern Australia** series (see p 12-14). (Wouldn't this make a splendid theme for a future AGSHV meeting?)

Chris, and Secretary **Richard Bale** have sent me several other items; some I'll include in Newsletter # 3, others I'll hold over for later issues. (Many thanks Chris and Richard.) As usual, I've put in links to plenty of videos. This time I've drifted away from exclusively Geology topics into the wider field of Science. One of the videos shows effects that can be seen from satellites, effects caused by various nations' responses to the threat of the Coronavirus. It seems that less vehicular traffic these days has made for "cleaner" radio-astronomy signals too (see p 18).

Another theme I have included in the videos concerns certain huge Ice Age floods in western USA. These are large-scale manifestations of a theme I have touched on in previous Newsletters... past changes in stream systems, such as creeks around Esk, and Reynolds Creek at Moogerah Dam

There is something "hot off the press" (when I was writing this Newsletter). In *Meteoritics & Planetary Science* is a very recent (22nd April 2020) paper describing an old report from the Ottoman Turkish archives, concerning a man killed, and another paralysed, by a meteorite that fell in Iraq in 1888. See P 19.

Chris has contributed an article about some familiar "stuff" we have all seen in outcrop, stuff that could be dismissed easily as seepages of polluted ground water. This stuff has a surprising natural origin, and is worth looking out for. See p 22.

Brian England has found a good article on honeycomb weathering, work done by researchers in Prague, and published in *New Scientist*. See p 26; and a note about large scale movement of seawater into and out of Earth's interior (See p 29). He has also contributed report on a visit (with others) to find and explore the old "lost" Allynbrook Antimony Mine. See p 30.

Chris has also suggested that we have a regular feature... **Discovering New Destinations...** and has offered the first – Minnie Water, on the NSW coast, east of Grafton. See p 34. Here is an opportunity for members to promote their favourite destinations, and maybe get them onto the AGSHV Activity List. So, send in your favourites (Microsoft Word if possible, contact details on p 2 above) and I'll make this a regular feature. When "They" take the brakes off us in a few weeks, lots of us will be off like scalded cats. Let's have plenty of nice destinations lined up.

Members are contributing so much good stuff that I'm putting some of my own articles into my "Future Newsletter" folder, instead of the current Newsletter!

Annual Fees Reminder

Our Annual Fees for AGSHV Membership are due before 1st July 2020, which is our annual renewal date. Due to the Corona Virus, we have put off holding our usual AGM in July till later in the year. Depending on circumstances, this could be sometime in August to October, but we will advise our members when we know more. We still need all our members to pay their annual fees so that our club remains viable. Even though we are not holding regular meetings, we still have our annual insurance and IT expenses and probably others that generally crop up. As you all know, members must be financial to be able to vote in the AGM and also enjoy the benefits of our Society.

Early notification of fees and what the rates are was voted on at our last AGM:

- a. Fees to remain at \$35 for singles and \$60 for couples (at same address). All children under the age of 18 years are covered by the family fee.
- b. Fees for non-members on excursions are to remain at \$5. This fee is to cover their insurance costs. Non-members can attend 2 x 1-day activities for \$5 each time. Thereafter or multiday activities require full membership.
- c. University Student Membership Fee is to remain at \$20.

Deposit/transfer payment to our Newcastle Perm account: BSB: 650-30, Account: 984228007

Name: Amateur Geological Society of the Hunter Valley Inc. (Please quote family name as reference.)

Science Videos

This time I'm going broader than geological only...

I'll start with an introductory series of mini-lessons about basic geological principles (*Thanks Chris*):

Principles of Geology (The Sandwich Analogy) Episode 1: Superposition

or <https://www.youtube.com/watch?v=eDBEbpSKiao>

Principles of Geology (The Sandwich Analogy) Episode 2: Original Horizontality

or <https://www.youtube.com/watch?v=JBY8B31M5vo>

Principles of Geology (The Sandwich Analogy) Episode 3: Lateral Continuity

or <https://www.youtube.com/watch?v=2our-aNXpmg>

Principles of Geology (The Sandwich Analogy) Episode 4: Cross Cutting Relationships

or <https://www.youtube.com/watch?v=fmJx5xKu2vI>

Principles of Geology (The Sandwich Analogy) Episode 5: Baked Contacts

or <https://www.youtube.com/watch?v=BHdALsZGK1k&feature=youtu.be>

And two at a more advanced level:

Gold Bearing Fluids with Prof Stephen Cox: Part 1

or <https://www.youtube.com/watch?v=co8GGqzCzho>

Gold Bearing Fluids with Prof Stephen Cox: Part 2

or <https://www.youtube.com/watch?v=a2iEjXIUJEI>

This link is from **Charles Cockell**, to a site called **Life in the Universe Pandemic Series**
or <https://www.youtube.com/channel/UCBTwJSnAqZZczK7stBaYq5w/videos>

This opens a page of short lectures. As the page opens, the most recent lecture is on top; go to the bottom of the page if you want to start at No 1. *(Contributed by Chris Morton)*

Understanding how and when Antarctica became a frozen continent
or <https://www.youtube.com/watch?v=mwGh1wTT2b0>

Geologic Structure at the Bottom of the World: Highlights from Antarctic Seismology
or <https://www.youtube.com/watch?v=dvBsQHz463w>

Earth Matters - Antarctic Mysteries: Icy Clues to Earth's Past, Present and Future
or https://www.youtube.com/watch?v=nndQaY_ZrVk

How Doggerland Sank Beneath The Waves (500,000-4000 BC
or <https://www.youtube.com/watch?v=DECwfQQqRzo>

Megafood: how Britain became an island
or <https://www.youtube.com/watch?v=TW5HJWSpLWE>

In Our Time: S21/41 Doggerland (June 27 2019)
or <https://www.youtube.com/watch?v=wcubRIMqaEs>

Extreme Geological Events that you never knew existed.
or <https://www.youtube.com/watch?v=XRiD3Kl4hVA>

Target earth: the asteroid impact history of Australia - Dr Andrew Glikson, ANU
or <https://www.youtube.com/watch?v=VBeDHYO8Tf0>

Structural geology and GCAS: implications for gold systems in the central Gawler Craton
or <https://www.youtube.com/watch?v=A2YazuF3m5A>

Ancient Zealandia
or <https://www.youtube.com/watch?v=FIC0pVr7jwQ>

Rift! Geologic Clues to What's Tearing Africa Apart
or <https://www.youtube.com/watch?v=3jpbArY2L78>

Geoheritage and the UK's most Significant Geological Sites
or <https://www.youtube.com/watch?v=W6RDUCKmfjM>

Geology in Space: Meteorites and Cosmic Dust
or <https://www.youtube.com/watch?v=OMTI5fY4QW4>

Historical myths - Dr. John van Wyhe - TEDxNUS
or https://www.youtube.com/watch?v=mgDW_U1prQ

Debunking myths about evolution - John van Wyhe - TEDxNUS
or <https://www.youtube.com/watch?v=KvpQ5Lyah50>

How we found out evolution is true - John van Wyhe - TEDxNTU
or https://www.youtube.com/watch?v=18YwBwIK_no

The Cost of Teaching Creationism - Zack Kopplin - TEDxLSU
or <https://www.youtube.com/watch?v=7VuEKUmnUiU>

Beyond the "creation vs. evolution" debate - Denis Lamoureux - TEDxEdmonton
or <https://www.youtube.com/watch?v=QaeGfV-N2kM>

This one is fairly high-powered:

Subduction, rollback and decoupling: Mineral systems in southern Proterozoic Australia
or https://www.youtube.com/watch?v=BjAY16dki_E

You've seen the movie, now read the book: [Suprasubduction zone model for metal endowment at 1.60–1.57 Ga in eastern Australia](#) (this is the same story, presented as a paper published in Ore Geology Reviews.

Mapping ore deposits- the basic geological methods
or <https://www.youtube.com/watch?reload=9&v=iHDBPgeUqYU>

Mapping ore deposits- techniques
or https://www.youtube.com/watch?v=2p_ermCcs3A

Ice Age Floods - Lake Bonneville Flood
or <https://www.youtube.com/watch?v=ekpmCV5ZZU8>

Searching for The Great Bonneville Flood
or <https://www.youtube.com/watch?v=A67UUOfNFtI>

Dating the Ice Age Floods
or <https://www.youtube.com/watch?v=3wKOVZKimwg>

Bridge of the Gods Landslide
or <https://www.youtube.com/watch?v=FVZYzHGvDX4>

Flood Basalts of the Pacific Northwest
or <https://www.youtube.com/watch?v=VQhikemEyUo>

How 7,000 Years of Epic Floods Changed the World
or <https://www.youtube.com/watch?v=YWZgfPGtQEs>

Ice Age Floods, Lake Missoula, Bonneville Flood and the Columbia River Basalts
or https://www.youtube.com/watch?v=i1BFb_uYIFQ

One of my favourite sites for geology videos is Huge Floods; mainly about the western third of USA. Especially good are the "Two Minute Geology" clips hosted by Nick Zentner. I won't put in individual links to several videos, there is so much good stuff here. Just browse around in this website:
<http://www.hugefloods.com/>

Another site with a similar theme is Bruce Bjornstad's website. Click on the Ice Age Floodscapes **YouTube** Channel logo to get a wide ranging collection:
<https://www.brucebjornstad.com/>

A change of subject:

Brisscience (April 2016): What happened to Australia's Ice Age Megafauna?

or <https://www.youtube.com/watch?reload=9&v=8jmrYbU2gZQ>

(Posted by Geological Society of Australia Inc)

Here is presenter Gilbert Price's website: www.diprotodon.com and Twitter: [@TheFatWombat](https://twitter.com/TheFatWombat)

How about some Sydney Basin videos? Heads up you potential excursion leaders out there...

Stratigraphy - Looking at Siltstone Sedimentary Structures

or <https://www.youtube.com/watch?v=hG8VbdAQYwk>

Permian Triassic Extinction Event Boundary - Bulli Coal Measures

or https://www.youtube.com/watch?v=m-D_A3ILESA

Sediment Deformation Structures - Sydney Basin

or <https://www.youtube.com/watch?v=mDDjGt6Yuc>

Pebbly Beach Formation Geology - Sydney Basin

or <https://www.youtube.com/watch?v=q09NBuN6JKw>

Snapper Point Formation Geology - Sydney Basin

or <https://www.youtube.com/watch?v=dEzFsGmRZEE>

How Tall Did Glossopteris Grow? Large Fossilised Glossopteris Trees

or <https://www.youtube.com/watch?v=G5a7yCSXwks>

Here are some short videos from the “**Traveling Geologist’s**” website (*thanks Chris Morton*):
(That’s the way the Traveling Geologist spells travelling.)

Chasing Basalt in Iceland

or <https://www.youtube.com/watch?v=Yqy3pzWcvas&feature=youtu.be>

Getting high in the Himalaya

or https://www.youtube.com/watch?v=mFe0_gK1tEQ

Catching Granite Formation in Finland

or <https://www.youtube.com/watch?v=MxCS8srITXg&feature=youtu.be>

Volcano tour of New Zealand part 1: Tongariro Alpine Crossing

or <https://www.youtube.com/watch?v=77JBldEO7s8&feature=youtu.be>

Volcano tour of New Zealand part 2: Mount Taranaki

or <https://www.youtube.com/watch?v=YTlcyq2udTA&feature=youtu.be>

TGTV in the Alps

or <https://www.youtube.com/watch?v=6A9QNdqaFXU>

Ghanaian Granites and Atmospheric Oxygen

or <https://www.youtube.com/watch?v=hdiE1D1qhE0&feature=youtu.be>

Columnar Basalt - Geologist explains spectacular stone columns

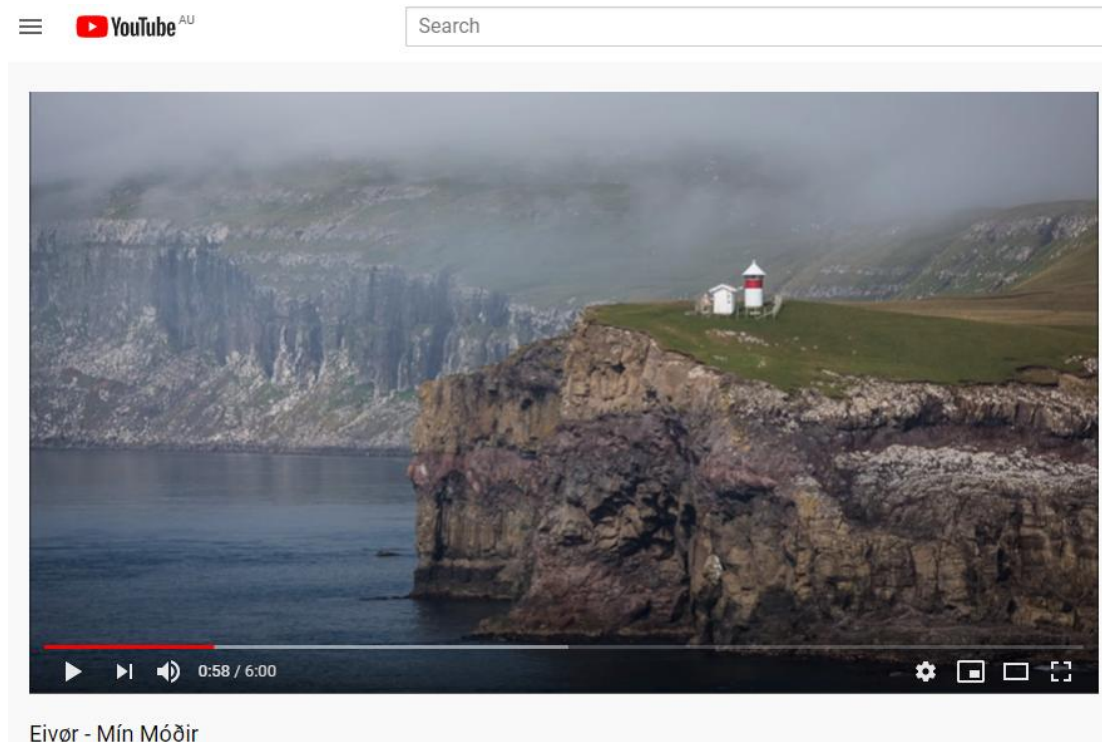
or <https://www.youtube.com/watch?v=FGwfjmAUM4w&feature=youtu.be>

Columbia River Basalt Feeder Dike

or <https://www.youtube.com/watch?v=YuvK9DFmSgU&app=desktop>

There is another good example of a feeder dyke that I've found in an unusual place. Eivør's (Eivør Pálsdóttir) **YouTube** video *Mín Móðir* (My Mother) has a series of images of the basaltic Faroe Islands (her birthplace and home). <https://www.youtube.com/watch?v=zm3wa2LtJQM>

One scene shows an inclined irregular (basalt?) dyke that transitions into a flow or sill:



Faroe Island cliffs. Note tan-coloured irregular inclined dyke (basalt?) running up from the lower right corner, and turning horizontal (a flow or sill) at the grassy slope in line with the lighthouse. This horizontal layer is visible in the next promontory, where it appears to have columns. Above the tan columnar layer is a rubbly grey layer. The lower half of the cliff (in that next promontory) is similar to the upper half; a tan columnar layer below a rubbly grey layer. (The grassy slope on the near promontory is a modern mini valley side; the top rubbly grey layer has been eroded away here.)

Individual basaltic lave flows often have a two-layer appearance; a lower columnar section, and a rubbly upper section, just like the two flows in the video. The lower columnar section is called the colonnade, and the upper rubbly portion is the entablature. Wouldn't it be nice if the viewpoint was a little to the left, showing the embayment between the two promontories. Anyhow it looks like the dyke transitions into the upper flow; if so, this is a feeder dyke exposed in the cliff.

Careful examination shows that that the feeder is near-horizontal at the lower far-right, so it is a "stepping-up" sill rather than a dyke.

The following is a series of videos put together for investors in the metallic minerals industry, and is just about the best I've seen for a non-technical audience:

ORE DEPOSITS 101 - Part 1 – Introduction

or <https://www.youtube.com/watch?v=e1voF9XxBPQ>

ORE DEPOSITS 101 - Part 2 - Layered Complexes, Kimberlites

or https://www.youtube.com/watch?v=GJ8r5da4_A0

ORE DEPOSITS 101 - Part 3 - Porphyries, Skarns & IOCG

or <https://www.youtube.com/watch?v=QMIHEI08xok>

ORE DEPOSITS 101 - Part 4 - Greenstone Gold

or https://www.youtube.com/watch?v=dmb_rMFND3A

ORE DEPOSITS 101 - Part 5 - Epithermal Deposits

or <https://www.youtube.com/watch?v=xYwLTIX3XAM>

ORE DEPOSITS 101 - Part 6 - Carlin Gold Deposits

or <https://www.youtube.com/watch?v=MnrXwiiYObs>

ORE DEPOSITS 101 - Part 7 - VMS and Sedex

or <https://www.youtube.com/watch?v=hlrHkIF6T3Y>

ORE DEPOSITS 101 - Part 8 - Witwatersrand Gold

or <https://www.youtube.com/watch?v=LRKk1HYTIH8&t=44s>

ORE DEPOSITS 101 - Part 9 – Uranium

or <https://www.youtube.com/watch?v=tdi3nuUMRfl>

ORE DEPOSITS 101 - Part 10 - Exploration Process

or <https://www.youtube.com/watch?v=GHyuJp2LXiY>


ORE DEPOSITS 101 - Part 11 - Mineral Reserves, Resources and Estimation

or <https://www.youtube.com/watch?v=cgkFf2LiCm8>

The obvious omission from this list is the Precambrian sedimentary iron ore deposits, otherwise called banded iron formations or BIFs. I haven't found any video to fill this gap properly.

Fascinating Errors of Judgment.

This was in one of Richard's emails of 27th April, the one with the 25 examples of Famous Last Words. Number 7 in the list was this:

7	"I must confess that my imagination refuses to see any sort of submarine doing anything but suffocating its crew and floundering at sea." — HG Wells, British novelist, in 1901
	

But two out of three ain't bad...

Wells' short story **The Land Ironclads**, first published in *The Strand Magazine* in Dec 1903 features huge tanks (large enough to carry an infantry company of ~100 officers and men, under the command of a Captain) in a fictional contemporary war. This was about 13 years before the first use of tanks at the Battle of Flers-Courcelette (Sept 1916).

His novel **When the Sleeper Wakes** (published first as a series in *The Graphic*, in 1898-1899) features dogfights between aeroplanes (which Wells called aëropiles); all this 4-5 years before Orville Wright's first flight in Dec 1903, and about 15 years before the first real dogfights in WWI.

**PERIOD PALAEO PLANTS of
SOUTH-EASTERN AUSTRALIA**

4. The RHACOPTERIS FLORA

Mid CARBONIFEROUS - Late CARBONIFEROUS (c. 335—300 Ma)

During this time the continental blocks which are now parts of North America, Britain, Europe and parts of Asia were located in low tropical latitudes. This promoted growth of the extensive, lush and densely forested swamplands which became the extensive coalfields of the Northern Hemisphere. However Southeastern Australia was now continuing southwards and also rotated through 90 degrees. The climate was becoming increasingly provincial with polar ice caps forming and expanding. In the Late Carboniferous, South-eastern Australia was experiencing periglacial conditions with deposition of fluvio-glacial sediments. The Giant Clubmosses were unable to survive here and only a few small lycopods remained. The Rhacopterids, seedferns with primitive leaf structure and venation, became the dominant vegetation form typified by *Rhacopteris ovata*. Two other forms representing the opposite ends of a range of forms also arose, *Dactylophyllum* and *Botrychiopsis*. The Rhacopterids, low bushy plants, had a tundra-like habitat and the occasional thin carbonaceous shales and poor coaly beds in the Late Carboniferous of South-eastern Australia probably formed in a similar environment to the modern peat bogs of northern Canada and Siberia. The specimens shown are of *Rhacopteris ovata*. Photos 1 & 2 from the Mingaletta Formation (c. 310 Ma), Kew, NSW, and Photo 3 from the Mt Johnston Formation (c. 333Ma), Paterson, NSW.

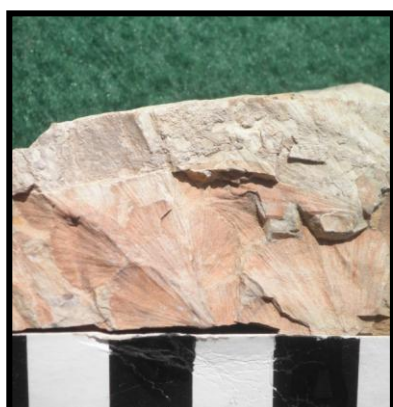


Photo 1



Photo 2



Photo 3

Rhacopteris ovata

**PERIOD PALAEO PLANTS of
SOUTH-EASTERN AUSTRALIA**

5. The GLOSSOPTERIS FLORA (Part 1)

PERMIAN (300 —252 Ma)

In South-eastern Australia from the Early to the Late Carboniferous was a period of significant tectonic events including the docking of the New England Fold Belt (NEFB) onto the Gondwanan part of the Supercontinent of Pangea via the Lachlan Fold Belt (LFB). The NEFB and the LFB became separated by extension and crustal thinning which initiated the Sydney—Gunnedah Basin at the commencement of the Permian, and which is now flanked by highlands of the LFB in the west and of highlands of the NEFB in the east. GLOSSOPTERID classification of genera is form based on leaf morphology as leaves are so plentiful on deciduous trees and leaves attached to branches and fruiting structures so rare. There is a spectrum of forms as follows: GLOSSOPTERIS (Photo 1) has a clearly defined mid rib consisting of several parallel veins. Between the leaf veins there are cross connecting veinlets forming a mesh or net venation. GANGAMOPTERIS (Photo 2) has no clearly defined mid rib and several parallel veins in the centre of the tongue-shaped leaf blade which may have a median groove and a few cross-connecting veinlets. PALAEOVITTARIA (Photo 3) has no mid rib, no median groove, almost parallel veins and rare cross connecting veinlets. NOEGGERATHIOPSIS (Photo 4) is not a Glossopterid but a Cordiate which is a common associate of the Glossopterids. It has an elongate strap-like leaf with strong parallel ribs which occasionally bifurcate so that the leaf sides slightly diverge. It is distinguished from Horsetails by its lack of nodes.

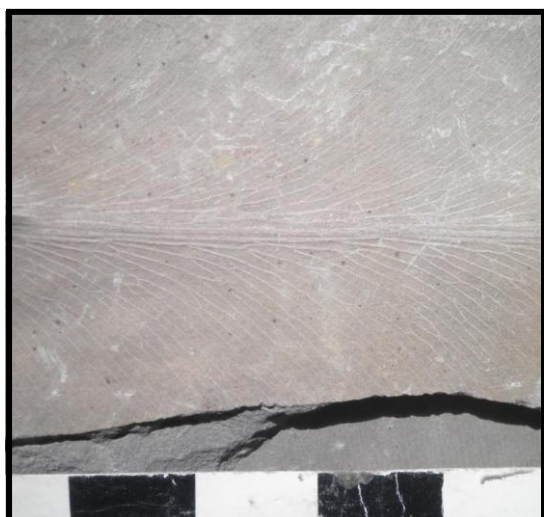


Photo 1. *Glossopteris*



Photo 2. *Gangamopteris*



Photo 3. *Palaeovittaria*



Photo 4. *Noeggerathiopsis*

Light-Hearted Stuff

First, have a look at what Jeff and Rory are doing (with appropriate social distancing, but not in Victoria):



VIDEO-2020-04-08-15-07-46.mp4

GOODBYE GRANDDAD.

Poor old Granddad's passed away, cut off in his prime,
He never had a day off crook - gone well before his time,
We found him in the dunny, collapsed there on the seat,
A startled look upon his face, his trousers around his feet,

The doctor said his heart was good - fit as any trout,
The Constable he had his say, 'foul play' was not ruled out.
There were theories at the inquest of snakebite without trace,
Of redbacks quietly creeping and death from outer space,

No-one had a clue at all - the judge was in some doubt,
When Dad was called to have his say as to how it came about,
'I reckon I can clear it up,' said Dad with trembling breath,
'You see it's quite a story - but it could explain his death.

'This here exploration mob had been looking at our soil,
And they reckoned that our farm was just the place for oil,
So they came and put a bore down and said they'd make some trials,
They drilled a hole as deep as hell, they said about three miles.

Well, they never found a trace of oil and off they went, post haste,
And I couldn't see a hole like that go to flamin' waste,
So I moved the dunny over it - real smart move I thought,
I'd never have to dig again - I'd never be 'caught short'

The day I moved the dunny, it looked a proper sight,
But I didn't dream poor Granddad would pass away that night,

Now I reckon what has happened - poor Granddad didn't know,
The dunny was re-located when that night he'd had to go.

And you'll probably be wondering how poor Granddad did his dash—
Well, he always used to hold his breath.... Until he heard the splash!!

Anon.

(Thanks Richard)



Scenic Videos, South Africa and Scotland

Some nice scenery; relax, and don't take the geology in the narration too seriously:

South Africa:

South Africa from Above - 6 Unique Journeys from Cape Town to Drakensberg inc. Garden Route (HD)

or <https://www.youtube.com/watch?v=wSARggPrYfk&t=179s>

Chapman's Peak Drive (South) - Cape Town, South Africa

or <https://www.youtube.com/watch?v=mxwKw0n-gKA&t=2s>

South Africa from Above - 10 Great Aerial Locations - inc. Kruger Park (HD)

or <https://www.youtube.com/watch?v=Yx28Vfq6S2E&t=1115s>

Drakensberg - South Africa - 2015, April

or <https://www.youtube.com/watch?v=ejKJgfXp4zE>

Route 62 HD -South Africa Travel Channel 24

or <https://www.youtube.com/watch?v=90ELji5-PPg>

Ireland:

Scotland from Above: Edinburgh to Fingal's Cave Route (HD)

or <https://www.youtube.com/watch?v=kG1gLCcxBcY>

Scotland from Above in High Definition - Isle of Skye to Ben Nevis (HD)

or <https://www.youtube.com/watch?v=enSXkLj9iuo>

Meetings and Work and Stuff

Is anybody out there going on-line for meetings? How did you go?

Every Meeting Ever

or <https://www.youtube.com/watch?v=K7aqjXFFQJU>

How to Make Work Better (Office Lifehacks)

or <https://www.youtube.com/watch?v=rqnFQvXrUgc>

How to Make Work Funner

or <https://www.youtube.com/watch?v=w8i8szZy7u0>

A Video Conference Call in Real Life

or <https://www.youtube.com/watch?v=JMOOG7rWTPg>

A Conference Call in Real Life

or https://www.youtube.com/watch?v=DYu_bGbZiiQ&feature=youtu.be

Email in Real Life

or <https://www.youtube.com/watch?v=HTgYHHKs0Zw>

Websites in Real Life

or <https://www.youtube.com/watch?v=yrFomOrE33Q>

Customer Service Calls In Real Life

or <https://www.youtube.com/watch?v=PpTTDfg4KLs>

Air Travel In Real Life

or <https://www.youtube.com/watch?v=lrICG1c1tWY>

TnT Airlines (Pre-Flight Video)

or <https://www.youtube.com/watch?v=-DEnyze4eds>

A Rental Car Success Story

or <https://www.youtube.com/watch?v=0FnlJ3GYus>

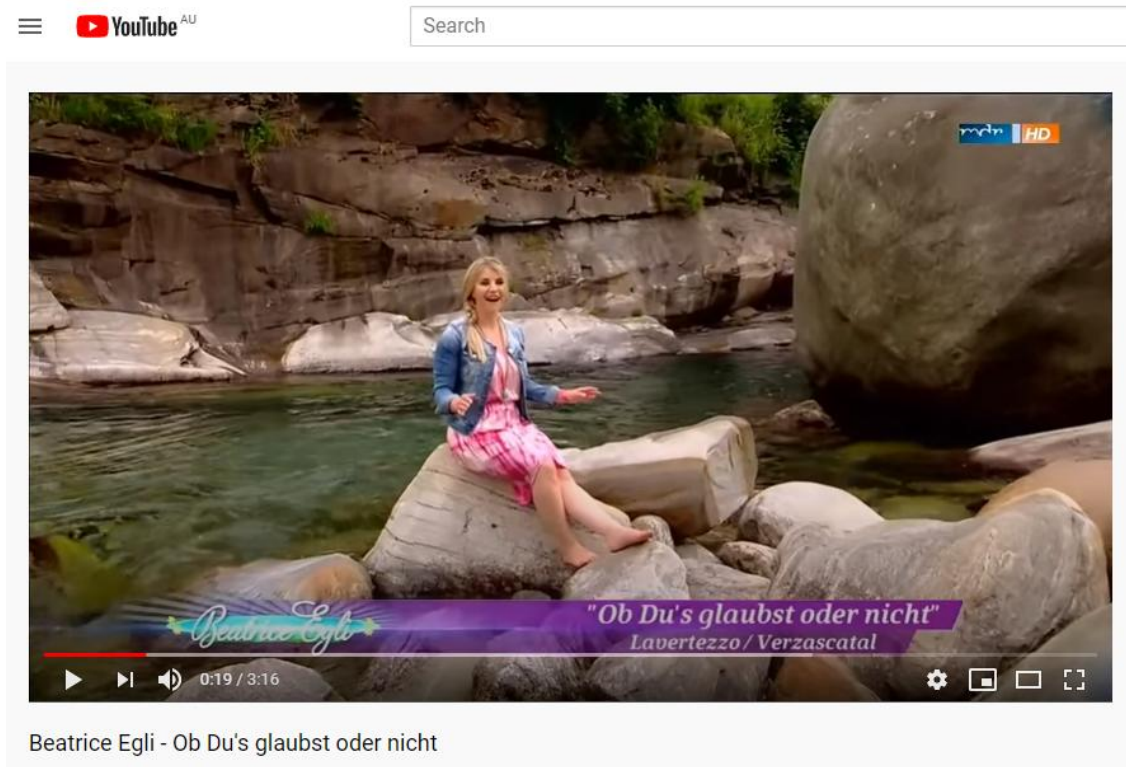
Every Hotel Ever

or <https://www.youtube.com/watch?v=gJPOOUReEH8>

YouTube Geology in the background

Here is a little challenge to anybody who's up for it. Watch this video of **Beatrice Egli** singing *Ob Du's glaubst oder nicht* straight through (no pauses), and see how much geology you notice during play. Then watch again, as slowly as you need, pausing and replaying as often as you like, and look for as much geology as possible (observation and deduction): (*Suggested answers next Newsletter.*)

https://www.youtube.com/watch?v=RyLLfp_DYV4



The image shows a screenshot of a YouTube video player. At the top left, there is a menu icon and the YouTube logo with 'AU' next to it. To the right is a search bar with the word 'Search' inside. The main video area shows a woman, Beatrice Egli, sitting on a large rock in a river. She is wearing a blue jacket and a pink and white patterned dress. The background consists of large, grey, layered rock formations and a river with greenish water. In the bottom left corner of the video frame, there is a logo for 'Beatrice Egli'. In the bottom right corner of the video frame, there is a purple banner with the text '"Ob Du's glaubst oder nicht" Lavertezzo / Verzascatal'. Below the video frame, there is a progress bar showing '0:19 / 3:16' and several control icons (play, volume, settings, full screen, etc.). Below the video player, the text 'Beatrice Egli - Ob Du's glaubst oder nicht' is displayed.

The effects of our reaction to *Coronavirus* can be seen from Space:

How Satellite Images Reveal the Global Impact of the Coronavirus
or <https://www.youtube.com/watch?v=sYc7mRdFbSk>

Another By-product of the Covid-19 Sit-In:

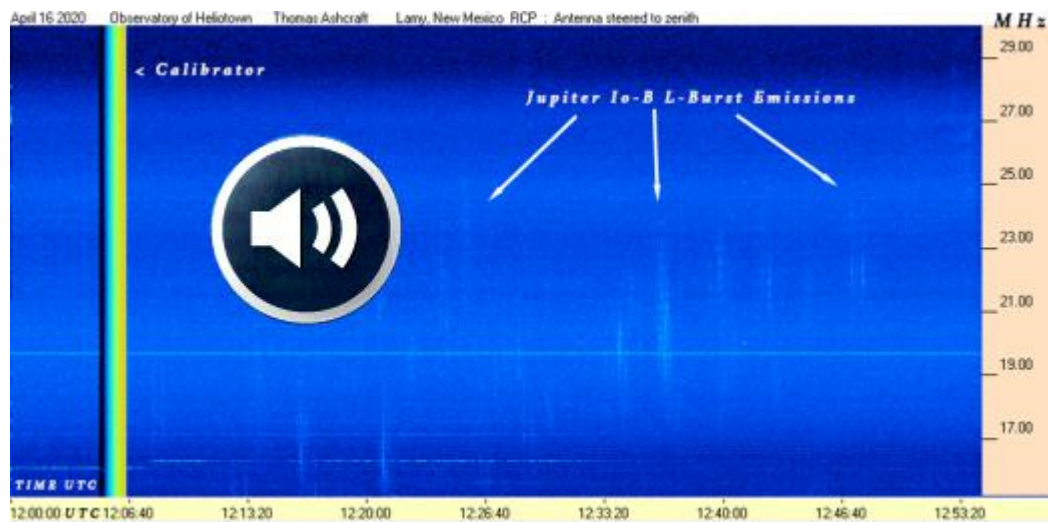
spaceweather.com

News and information about the Sun-Earth environment (27th April 2020)

<https://www.spaceweather.com/>

THE STRANGE EFFECT OF COVID-19 ON RADIO ASTRONOMY: A strange quiet has descended over the shortwave radio spectrum--and the reason might be COVID-19. Amateur radio astronomer Thomas Ashcraft noticed the effect from his observatory in rural New Mexico. "The quiet comes partly from Solar Minimum, but I believe it also comes from the relative calm of the COVID-19 lockdown. There is so much less truck, airplane and general machine-generated noise," says Ashcraft.

On April 16th he recorded a radio storm on Jupiter. Aside from the gentle "swoosh" of Jupiter bursts, [the recording](#) is almost completely free of normal static:



Above: a Jupiter radio storm. Turn up the volume and [listen](#) or take a look at [the dynamic spectrum](#).

The sounds you just heard are caused by natural radio lasers in Jupiter's magnetosphere. Electrical currents flowing between Jupiter's upper atmosphere and the volcanic moon Io can boost these emissions to power levels easily detectable by ham radio antennas on Earth.

Ashcraft has been monitoring natural radio emissions from Jupiter, the sun and meteors for many years--but never quite like now. "This may be a uniquely radio-quiet period in time," he says.

For more information about shortwave radio astronomy, and how you can do it yourself, check out [NASA's Radio Jove Project](#).

How Dangerous are Meteorites?

We know that an Impact was responsible for the End-Cretaceous mass-extinction (the one that “killed all the dinosaurs”); but an astronomer would call this an asteroid rather than a meteorite..

Also, the Tunguska Event (an air-burst) over Siberia on 30th June 1908 reputedly killed herds of reindeer and flattened forests, but no human fatalities were reported. And you could point out that the body was either a small comet or a small asteroid.

Then there was the Chelyabinsk Event (over southern Russia) on 15th February 2013, which caused an air-burst shock-wave that injured about 1,500 people (mainly by flying glass). The Event was caused by a meteor, and small meteorites were collected over subsequent months, so this became a genuine meteorite.

On 30th November 1954 a meteorite fell on Oak Grove Alabama, crashing through the roof and ceiling of a house, and hit Ann Hodges, who was hospitalised for a while with a severely bruised hip:



So far, no fatalities. Many books about meteors and meteorites repeat this view, maybe claiming that a dog was once killed, reportedly one owned by an Egyptian farmer, when a meteorite fell near Cairo on 28th June 1911.

There is now a published report of a well-documented fatality (and a severe injury to a second person). This is in the most recent issue of:



Earliest evidence of a death and injury by a meteorite

O. Unsalan, A. Bayatlı, & P. Jenniskens;

First Published: 22 April 2020

Abstract

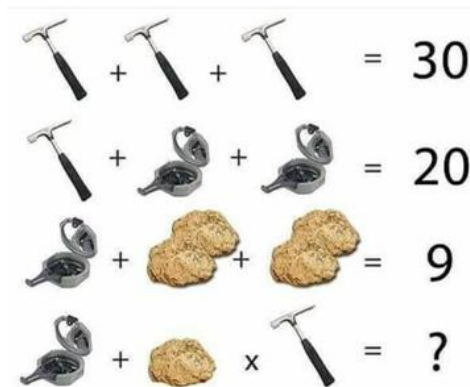
Our planet experiences falls of meteorites with different airburst and ground impact risk. Some of these meteors can survive after the atmospheric passage and fall into the ground. Although there are claims that people were hit and killed by meteorites in history, the historical records do not prove this fact so far. This issue might be due to the fact that either the manuscript was written in a language other than English or there is not enough interest in historical records. To the best of our knowledge, we show the first proof of an event ever that a meteorite hit and killed a man and left paralyzed another on August 22, 1888 in Sulaymaniyah, Iraq, based on three manuscripts written in Ottoman Turkish that were extracted from the General Directorate of State Archives of the Presidency of the Republic of Turkey. This event was also reported to Abdul Hamid II (34th sultan of the Ottoman Empire) by the governor of Sulaymaniyah. These findings suggest other historical records may still exist that describe other events that caused death and injuries by meteorites.

More: https://www.sciencemag.org/news/2020/04/archivists-uncover-earliest-evidence-person-being-killed-meteorite?utm_campaign=news_daily_2020-04-22&et rid=17039510&et cid=3298698

and <https://www.space.com/earliest-evidence-meteorite-killed-person.html>

and <https://phys.org/news/2020-04-terrible-luck-person-meteoriteback.html>

Now, some gentle mental exercise:



(Thanks Chris Morton)

What's the solution?

And something more sombre:



In November 2017, a statement titled "World Scientist's Warning to Humanity: A Second Notice" signed by over 1500 pre-eminent scientists from almost single country on earth asserted that "we have unleashed a mass extinction event the sixth in roughly 540 million years, wherein many current life forms could be annihilated or at least committed to extinction by the end of the century".

For the first time since the demise of the dinosaurs some 66 million years ago, the earth is entering a new wave of unequivocal events.

Cartoon by Kevin ~~Kal~~ Kallaugher.

(Thanks Chris)

So true:



The Australian Taxation Office suspected a fishing boat owner wasn't paying proper wages to his deckhand and sent an agent to investigate him.

ATO AUDITOR: "I need a list of your employees and how much you pay them".

Boat Owner: "Well, there's Clarence, my deckhand, he's been with me for 3 years. I pay him \$1,000 a week plus free room and board. Then there's the mentally challenged guy. He works about 18 hours every day and does about 90% of the work around here. He makes about \$10 per week, pays his own room and board, and I buy him a bottle of Bundaberg rum and a dozen Crown Lagers every Saturday night so he can cope with life. He also gets to sleep with my wife occasionally".

ATO AUDITOR: "That's the guy I want to talk to - the mentally challenged one".

Boat Owner: "That'll be me. What'd you want to know"?

(Thanks again Chris)

While Covid-19/Coronavirus is in the news, here are a few links to epidemiology talks. Most are about general principles; all but the last of the five predate the current pandemic (Covid-19 is the disease, Coronavirus is the organism):

Every new pandemic starts as a mystery | David Quammen | TEDxBozeman (May 2013)

or <https://www.youtube.com/watch?v=r11hHOya34>

Epidemics and the end of humankind | Rosalind Eggo | TEDxThessaloniki (Jul 2018)

or <https://www.youtube.com/watch?v=GkLlqobr3PY>

Mathematics of Epidemics | Trish Campbell | TEDxYouth@Frankston (Jun 2015)

or https://www.youtube.com/watch?v=eHlu6Vi_wxo

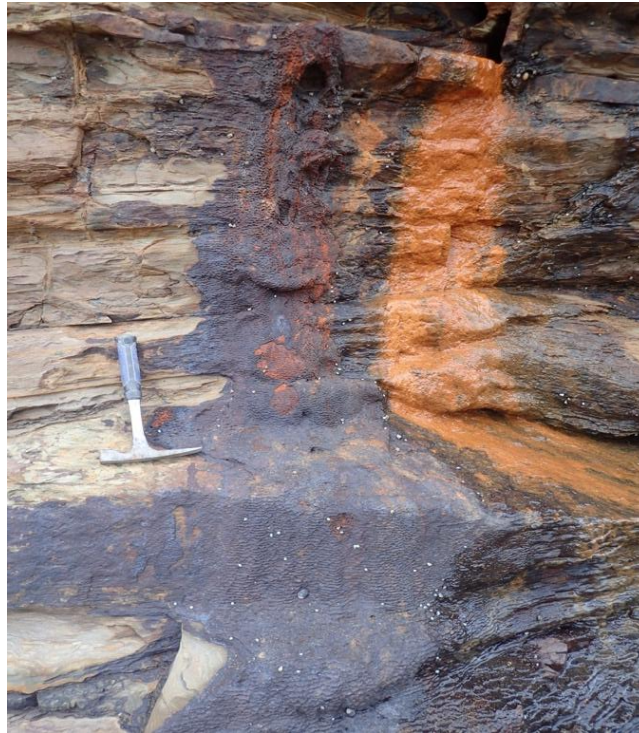
Preventing Worldwide Epidemics | Ronald K. St. John | TEDxCincinnati (Aug 2016)

or <https://www.youtube.com/watch?v=eLPjHzGBWe8>

Coronavirus Is Our Future | Alanna Shaikh | TEDxSMU (Mar 2020)

or <https://www.youtube.com/watch?v=Fqw-9yMV0sl>

Goey! Slimy! Colorful! What can it possibly be?



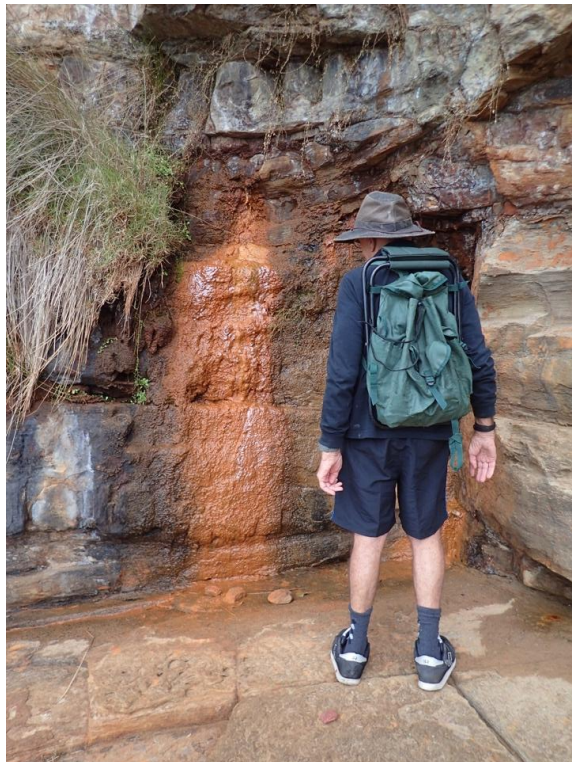
Some of these vibrant colours are natural, so here's a quick guide to help identify some of the possible sources that cause these unusual sights.

Environmental scientists encounter a lot of strange and colourful things in creeks. Orange slime, purple fluffy goo, and rainbow sheens on the water would all appear to be pollution problems, but often it is just a natural phenomenon.

Each of these things can be harmless bacteria just doing what they normally do, which is abnormally fascinating. If you suspect what you are seeing is not naturally occurring and a pollution source might be involved.

Orange Slime

A bright orange slime is often seen where groundwater seeps out of the ground. The slime is called "ferrihydrite" and is basically like rust that is made by bacteria. Iron-reducing bacteria underground turn insoluble iron into dissolved iron hydroxide molecules in the absence of oxygen. These dissolved iron molecules can flow in groundwater to the surface. After the dissolved iron hydroxide molecules flow to the surface, a different group of bacteria use oxygen to oxidize the iron and create an insoluble form of iron called ferrihydrite (the orange slime) as a by-product. This complex chemical relationship has been present on the earth for hundreds of millions of years, and although it looks gross, it is natural and harmless.



Winston Pratt observing ferrihydrite (orange slime) seeping out of rocky headland at Little Beach

These gooey orange slimes can be observed flowing along shallow water seeps, and rocky headlands along the coast.

Oily-Rainbow

This oily-sheen is made of a film of a rod-shaped bacteria called *Leptothrix discophora*. The bacteria oxidize dissolved iron and manganese for energy and secrete proteins and carbohydrates. They are lined up end-to-end within sheaths and are stuck together side-by-side in rows. Sunlight refracts off the sheaths, proteins and carbohydrates to make shiny rainbow colours. The bacteria stick to the surface of water with tiny donut-shaped structures on the sheaths. The way they are aligned and stick to the surface of the water causes the biofilm to float at the surface and “shatter” like glass when disturbed. Real oil is greasy and will stick together refusing to shatter like these bacteria. Sometimes these biofilms are present where iron and manganese in groundwater come to the surface, and sometimes they are wrapped around air bubbles in packs of leaves underwater. These are not bad bacteria, and in fact, they are beneficial because they process metals in water. They are beautiful, natural and harmless.



These oily-sheens floating on water are not oil.

Purple Powdery Fluff

A purple colouration that can develop in stagnant, well lit, waters may be a bacterial group known as “purple sulphur bacteria”. These organisms are capable of photosynthesis, which is why they need sunlight. They don’t use chlorophyll like plants, instead they use “bacteriochlorophyll” pigments as well as carotenoids which make the purple colour. Purple sulphur bacteria also require their water to have two key characteristics. The water must have hydrogen sulphide, and cannot have oxygen. They get their hydrogen sulphide from other bacteria that reduce sulphate in the water or soil rich in organic matter and devoid of oxygen. The purple sulphur bacteria are good because they take the hydrogen sulphide (stinky and toxic) and turn it into harmless elemental sulphur. The conditions must be just right for both types of bacteria to thrive. Just like the orange and rainbow bacteria, these organisms are natural and harmless.



Purple sulphur bacteria that can were observed along some creekside areas.

All of these bacteria thrive under very special conditions and depend on other bacteria for their survival. We usually associate life with oxygen, but these bacterial communities depend on a source of water that is devoid of oxygen. Creekside areas are complex, fascinating and wonderful places full of surprises and interesting biological and chemical phenomenon.

Reference: Adapted from,

<https://www.austintexas.gov/blog/goeey-slimy-colorful-what-can-it-possibly-be>

A web site in Austin, Texas. USA.

(Thanks Chris Morton)



[Click to watch video](#)

A video-clip from the website.

For details of a study of *Leptothrix discophora* sampled in the field, follow this link:

<https://www.microbiologyresearch.org/docserver/fulltext/micro/147/6/mic1471393uh.pdf?expires=1587536653&id=id&acname=guest&checksum=3BB9156C74105CA3848EA17446C32D9A>

Mystery rock formation solved

We have long known that the action of water and salt plus evaporation are behind honeycomb weathering, but new light has been cast on the process by researchers at Charles University in Prague. It seems the question we should ask is why the ridges get preserved while the hollows they enclose become eroded.

They focussed on the region just below the surface of the rock outcrop called the "evaporation front". There, water in the rock (adsorbed sea water in coastal areas or percolating groundwater in inland areas) escapes into the air through evaporation, leaving behind any salt (NaCl or halite) it was carrying in solution. Salt crystals form in the pores between the sand grains in the rock texture, forcing them apart. Of course the rock needs to be porous such as sandstone. This we know.

The evaporation front is invisible to the naked eye so the researchers added a fluorescent dye to the surface of the honeycomb texture. The evaporation front immediately became visible as a bright red stain. When only a little water is present, any slight protrusions stand out above the evaporation front meaning that water was evaporating from the low areas but not from the ridges. Areas of evaporation accumulated salt crystals and became eroded, increasing the depth of the hollows. Uneven surfaces of only a few mm difference in surface relief is enough to encourage the honeycomb structure to develop.

No mention is made of the action of wind which removes the loosened grains.

New Scientist 24 February 2018, page 18

Geomorphology.doi.org/ckmf

The photo below shows honeycomb weathering at the spectacular Richters Caves near Wyong. Field of view about one metre across.



Brian England photo.

(From Brian England)

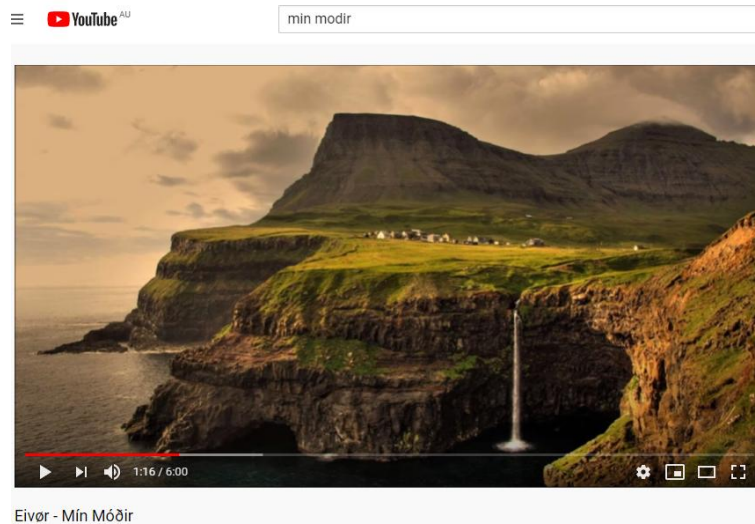
More waterfalls into the Sea - Faroe Islands.

I found more (images of) waterfalls with the unusual feature of dropping into the sea (see Newsletter #1), this time on the Faroe Islands. I was listening to/watching a YouTube track called *Mín Móðir* (My Mother), by **Eivør** (Eivør Pálsdóttir).

{The **eth** (/ɛð/, uppercase: Ð, lowercase: ð) is a letter used in Old English, Middle English, Icelandic, **Farøese** (in which it is called edd), and Elfdalian. It was also used in Scandinavia during the Middle Ages but was subsequently replaced with dh and later d. Farøese pronunciation of the ð depends on adjacent letter sounds; *Móðir* sounds a bit like “moweh”, because the ð is between two vowels.}

<https://www.youtube.com/watch?v=zm3wa2LtJQM>

The cliffs are formed in stacked basaltic lava flows, with a waterfall (Múlafossur) dropping directly into the ocean. It's a bit like Waterfall Bluff and Mfihlelo, examples from South Africa that I put in Newsletter #1.



Eivør - Mín Móðir

I opened Google Earth, went to the Faroe Islands, and started looking at photos posted by various people.

Google Earth



Múlafossur again.

Google Earth



Google Earth



Two different views of the same waterfall.

The Faroe Islands are in the North Atlantic in the middle of a triangle formed by Scotland, Iceland and Norway. They are the above-sea-level portion of a fragment of the North Atlantic Igneous Province (NAIP), also called the North Atlantic Large Igneous Province (NALIP), a basaltic province formed from eruptions in the Eocene ~60 Ma. It was broken up by sea floor spreading in the Paleocene ~55 Ma. Piles of basaltic flows, dolerite/basalt dyke swarms, and sill complexes are well represented. Fragment of the NAIP are found in Iceland, eastern Greenland, coastal Norway, Northern Ireland (*e g* Giant's Causeway), the Scottish mainland and islands (*e g* Fingal's Cave on Staffa), and other North Atlantic archipelagos, including the Faroe Islands.



Some “fun facts” about the Faroe Islands, and a couple of its people:

The Faroes are an autonomous territory of Denmark, and in the past have been a territory of Norway. Historical records indicate settlement by the Norse (Vikings) from ~800 AD; but archaeological findings suggest pre Viking inhabitants also, either Celtic or Scandinavian. Current population is about ~50,000. As relationships between the Scandinavian countries changed, so did possession of the Faroes. Norway took possession in 995. After the Kalmar Union (of the Kingdoms of Sweden, Norway and Denmark in 1397), control stayed with Norway. The Faroes were transferred to Denmark in 1816 when the Kalmar Union was dissolved following Napoleonic War rivalries (United Kingdom and Ireland plus Sweden, who were anti-French; against Denmark plus Norway, who had sided with France). When Denmark was invaded by Nazi Germany in WWII, British forces occupied the Faroes uncontested. Soon after WWII the Faroese voted for independence, but Denmark wasn't having any of that, and retained the islands as an autonomous territory.

Their traditional and legal language is Faroese (similar to Icelandic), derived from Old Norse (as is Icelandic), but schools are required to teach Danish, and many Faroese people are fluent in English. The economy is based on commercial fishing (and economic support from Denmark).

The 1903 Nils Ryberg Finsen was awarded the Nobel Prize in Physiology, for photo-therapy treatment of the disease lupus. Finsen was born in the Faroes, spent his early teens in a boarding school in Denmark, finished school back in the Faroes, then returned to Copenhagen for university studies, and a medical research career. When he was born (1860) the population of the Faroe Islands was about 10,000; and rose to ~15,000 by 1903 when he won the Nobel Prize. This gives the Faroese by far the highest proportion of Nobel Laureates in any sovereign population.

Eivør Pálsdóttir (see above) is a Faroese singer-songwriter-guitarist, who performs (as Eivør) in Faroese, Icelandic, Danish, Norwegian, Swedish and English. Her genres range from folk ballads to pop, jazz and rock, and occasional classical (including Icelandic and Faroese hymns). Her name reflects Faroese (also Icelandic) patronymic tradition. We can be sure her father's name is Pál (Paul); her own name reflects this, and she kept (by legal and cultural tradition, not just personal choice) that name after marriage. I don't know if she has any brothers, but I know that their last names would be Pálsen. Meanwhile, many other Faroese families use the Danish hereditary surname tradition (just like us).

Seawater into (and out of) Earth's deep interior

From **New Scientist 1 June 2019, page 6**

Seawater has been slowly draining into the Earth's interior for the past 230Ma, equivalent to a fall in sea level of at least 50 metres and possibly as much as 130 metres. However current estimates are that sea level is rising 10,000 times faster than the rate at which water is draining. Sea level is affected by many factors including a warming climate, melting ice sheets and glaciers, sea floor rocks becoming denser with age and sinking, etc. Another is subduction. As oceanic tectonic plates are dragged down beneath continental crust at Ocean trenches (destructive plate margins), trench sediments wet with sea water are also dragged down towards the mantle (to depths up to 700km). The loss of ocean water in this way depends on the speed of subduction and the number of active ocean trenches. This rate increased around 150Ma when Pangea began to break up. However this was masked by other processes such as sea floor sinking. If the oceans continued draining at the current rate they would empty in 12 billion years. Not to worry! The sun is expected to destroy earth in 5 billion years!

[Geochemistry, Geophysics, Geosystems.doi.org/c58r](https://doi.org/10.1016/j.gca.2019.05.018)

Apparently the authors have not considered the involvement of volcanic activity which returns a lot of this subducted sea water to the surface! *(Condensed from New Scientist by Brian England)*

The Search For the "Lost" Allynbrook Antimony Mine

A small ragtag group of adventurers assembled at the home of retired Maitland solicitor Frank Oakes in Lorn at 8:30 am on Thursday 7th November 2013 for a third attempt to find the "lost" Allynbrook Antimony mine near Gresford, one of the very few early metalliferous mines in the Hunter Valley. The group comprised myself, Joan Henley, Diane Kemp, David Atkinson (all members of AGSHV), plus Lindsay Gilligan (former Director of Geological Survey NSW) and a local from the Dungog area just called "Dave" who had an interest in potential mining properties.

We headed out to Gresford then on to West Gresford where we turned up the Carnarvon Road to cattle yards beside the Paterson River about 10km north of town. The mine was said to be located on the very steep and thickly vegetated slope on the opposite side of the road. We parked the cars just beyond the next road cutting where there was plenty of room to get off the road.

A small quarry here provided an insight into the local geology, exposing mudstones of the Carboniferous age (Visean) Flagstaff Formation. This was cut by thin vertical veins of white Quartz filling fractures, a likely miniature version of the hopefully nearby much larger vein mined for the antimony sulphide stibnite. The mudstone carried an extra bonus in the form of well preserved examples of the plant *Cyclostomata australe* (see photo).



Specimen of the Carboniferous age plant *Cyclostomata australe* 10cm across in mudstone from the road cut near the antimony mine. Brian England specimen.

We had morning coffee at the quarry before walking back down the road to begin our search, Frank carrying his old battered solicitor's briefcase containing his lunch. It must have looked quite strange, even sinister, this group of people in gumboots and armed with hammers following a man carrying a briefcase into the dense scrub!

While most of us surveyed the impossible tangle of lantana and scrub before us, Joan charged off into the bush regardless, so we thought we had better follow, although Lindsay and Frank held

back in the hope of finding an easier way up once the mine had been located. Within a few metres we came to a barbed wire fence. This was leaning downhill, presenting a bit of a challenge. But Joan got through so the rest followed. A few metres above the fence the dense lantana, most of which was dead, thinned and we soon came to a well defined track leading around the steep slope. Meanwhile "Dave" had entered the bush further down the road and called from high above us that he'd found something, so Joan and I followed his voice, climbing higher up the now impossibly steep rubbly slope. There was no sign of either snakes or leeches - too dry. Soon animal tracks were everywhere, making it easier to avoid the worst of the lantana. Struggling to keep our footing and trying to avoid being swallowed by lantana it took a few minutes to realise that the rubble we were climbing was in fact a mine dump, littered with chunks of mudstone veined by white Quartz.

Then we heard "Dave" yell that he had found an adit and within a few minutes we were standing in front of it, cut into an outcrop of dense mudstone and barely visible behind a tangle of vines. We cleared away the lantana to gain access but did not venture inside (see photos) even though despite minor collapses the tunnel seemed in excellent condition considering it had been dug around 1915. The 20cm wide mineralised shear zone (see photo of sample) containing swarms of white Quartz veins was visible in the roof. But the early miners had been thorough - there was no trace of stibnite anywhere. A few rusty bolts in the mudstone outcrop at the entrance were probably anchor points for a flying fox erected to take the ore down to the river bank.



Entrance to the adit of the Allynbrook antimony mine before clearing away the vines. Photo by Joan Henley.



Brian England at the portal of the Allynbrook Antimony mine.
Photo by Joan Henley.



Cross section of the stibnite bearing fracture filling riddled with white Quartz veins in brecciated mudstone Size is 20cm. Brian England specimen.

After taking photos and making notes we found an easier path back to the road by following another animal track to the right around the side of the slope till it opened out onto a grassy area. We then followed the slope down to a rough vehicle track leading to an unlocked gate beside the main road. Lindsay and some of the others had come up this way, avoiding wrangling with the lantana and Lindsay now headed up to the top of the hill to investigate two shafts but reported back that there was nothing of interest there.

So we had found the lost mine. A bit sore and weary but not sorry and certainly pleased with our success we headed back to East Gresford for a late lunch at the Beatty Hotel.

History of the Allynbrook antimony mine

The presence of antimony ore at the site was recognised back in 1854. The mine was first worked by Thomas Hancock of "Orange Grove" and his employees in 1906 under the registered name "Allynbrook Antimony Mining Syndicate". Hancock was an amateur geologist interested in minerals and he attended many of Edgeworth David's lectures and read his writings.

In 1907 40 tons of ore were produced averaging 19.7 percent antimony.

This was won from a 130ft shaft. An adit was driven into the north side of the hill for a distance of 233ft southerly then 85ft westerly, but only a small amount of the ore was found at the end of the adit suggesting that the stibnite occurred as isolated rich "bungs". In 1924 a shaft was sunk to 61ft over the end of the adit and 220ft above it on an outcrop of Quartz with Government aid but the ore found was very low grade. Another shaft was sunk 275ft to the south on a similar Quartz outcrop to a depth of 10ft.

In 1925 Hancock sent samples of Allynbrook antimony ore to the British Empire Exhibition at Wembley in England, for which he received a Certificate of Appreciation and bronze medallion in a red velvet lined case.

HANCOCK, H. Allynbrook antimony mine history recalled. The Maitland Mercury, June 30, 1999.

(Report by Brian England)

DISCOVER MINNIE WATER



(Photo D. Morton)

Minnie Water Beach & Rocky Headland



Minnie Water is a small coastal village completely surrounded by Yuraygir National Park.

The village is picture perfect when the Christmas Bells or the Flannel Flowers bloom in the surrounding parklands with over 120 species of wildflower identified around Minnie Water. The Tree of Knowledge lookout, on Minnie Water headland just 5 minutes walk

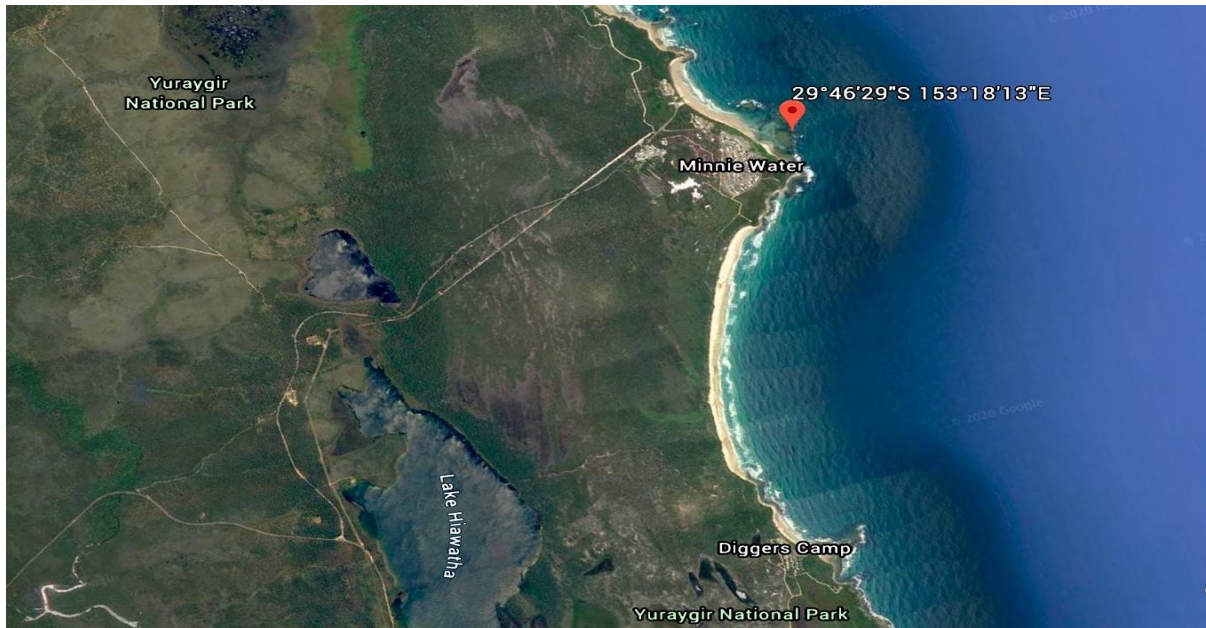
There are two short but picturesque walks in the national park: Angophora Grove Walk and Rocky Point Walk. The rock platforms extending seawards to Rocky Point offer hours of entertainment for those who enjoy examining geology along with the microcosm of marine life in tidal pools and rock crevices. Sea urchins, star fish, cunjevoi, coral and a variety of sponges and shells may be found in this area.

Minnie Lagoon is a very popular and beautiful spot for swimming, picnics and safe boat launchings. To find this spot, turn into Hiawatha Road, then left at Pipers Hill following the Waratah Reserve along to the Tree of Knowledge Lookout where there is a steep sealed road down to the lagoon.

Things to see & do

Main Beach is patrolled by Surf Life Savers during the holiday season. Other beaches in the area include Sandon Beach, a huge 10km long beach where the forest runs right to the sand, and Back Beach and Sandon and Main beaches have 4WD access.

photo D. Morton



(Google Earth map of Minnie Water NSW) .



The surrounding area includes Sandon, Diggers Camp, and Wooli, all of which also feature several beautiful beaches. Snorkelling is popular in the lagoon at the south end of Main Beach.

Surfing

Many of the beaches in the area are well known for excellent surfing conditions. In the off-peak season surfers love the uncrowded quality surfing breaks.

Rivers

The nearby pristine waters of the Sandon, Wooli and Clarence river systems attract fishermen, sailors, and swimmers. Canoeing along the rivers is a great for bird watching, swimming or fishing.

Fishing

Deep sea fishing is excellent all year round with safe and easy boat launching in the lagoon at the southern end of Main Beach. The whole area is part of the Solitary Islands Marine Park, and Sandon River does include some Sanctuary Zones where fishing is not allowed, so please check before throwing in a line!

National Park

The Yuraygir National Park surrounds Minnie Water and features excellent bushwalking, trail riding and bird watching areas. The local population of Emus is famous for wandering around the holiday park delighting guests, along with their friends the kangaroos, wallabies and beautiful birds. (Minnie Water Holiday Park) (Photo. D Morton)



(Photo. Di Morton)

History

- * Prior to European settlement the Yaegl tribe and their neighbours the Gumbaingirr Aborigines had lived in the area for thousands of years.
- * In the 1840s there is evidence of a massacre of Aboriginal people at Red Rock.
- * By the 1880s Europeans were settling in the Woolli district and oyster farming and fishing date back to 1885.
- * By the early 1890s the Woolli Woolli River was starting to attract holidaymakers mostly locals from the Clarence Valley.
- * Conflict with the local Yaegl people continued and was so violent that there is evidence of a large-scale massacre of Aboriginal people at Lake Hiawatha to the north of Woolli as late as the 1920s.
- * Woolli was officially declared a village in 1923.
- * In 1969 there was considerable sand mining in the area.
- * In the 1970s the entrance walls to the Woolli Woolli River were built to provide better navigation for fishing boats.

(Aussie Towns)



Geology

The wave cut rock platform consists of faulted, folded subvertical deep marine sediments that are a member of the Coramba Beds: 359 to 299 Ma Carboniferous. Lithofeldspathic wacke, minor siltstone, siliceous siltstone, mudstone, metabasalt, chert and jasper, rare calcareous siltstone and felsic volcanics. Deep marine - siliciclastic & biochemical. Coffs Harbour Association. In the New England Orogen province. (GSNSW-Seamless Geology of NSW)

Due to the lack of economic value, there is no geological information on this area. However, it is a great interpretive site.

(faulted/displaced subvertical deep marine sediments)



Deep marine sediment, are any deposit of insoluble material, primarily rock and soil particles, transported from land areas to the ocean by wind, ice, and rivers, as well as the remains of marine organisms, products of submarine volcanism, chemical precipitates from seawater, and accumulated on the seafloor.



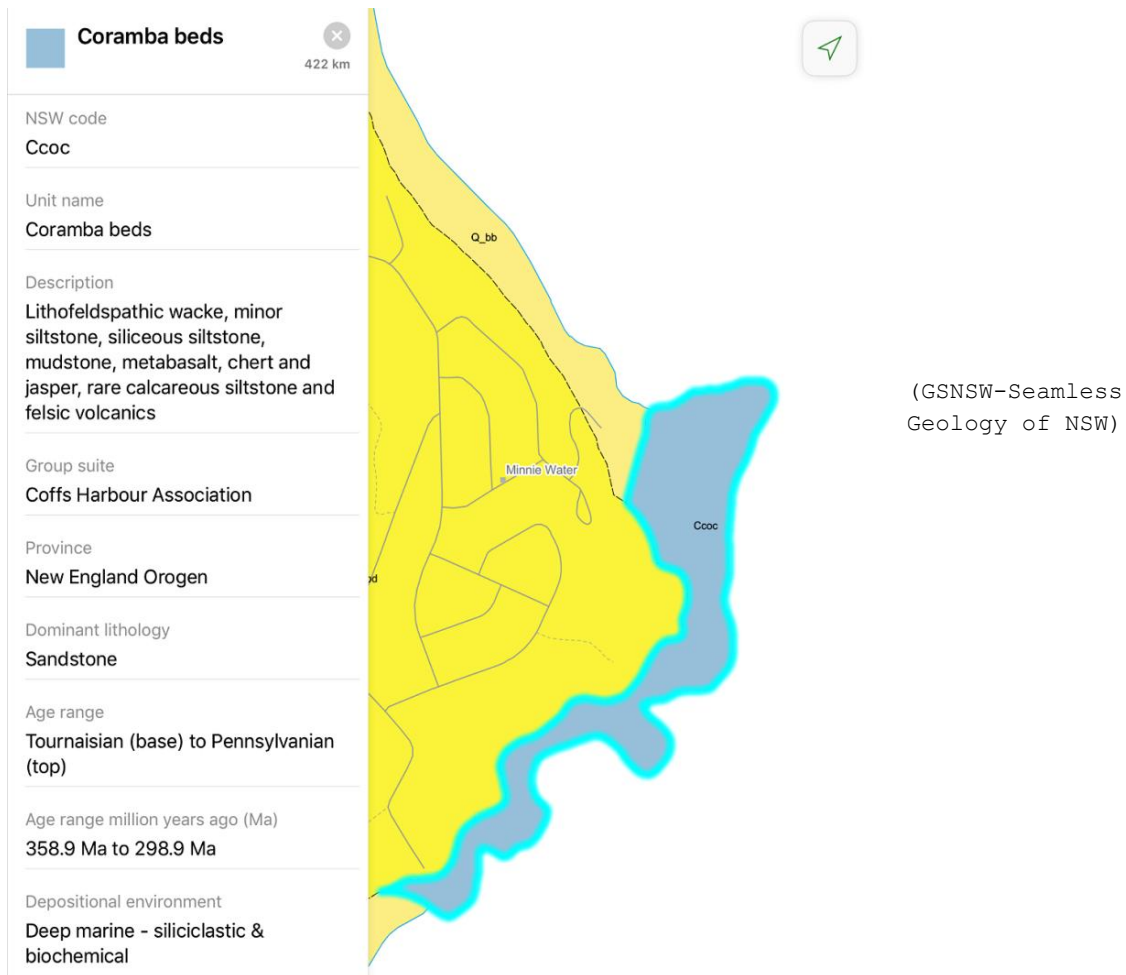
(Folded deep marine sediments caused by compression in association with the New England Fold Belt.)

All photos by D. Morton, unless otherwise specified.



(Weathered out concretion on wave cut platform)

(Photo. D Morton)



(GSNSW-Seamless Geology of NSW)

Resources:

Web addresses:

<http://www.aussietowns.com.au/town/wooli-including-minnie-waters>

<https://www.britannica.com/science/marine-sediment>

<http://www.clarencecoastholidayparks.com.au/minnie/about-minnie-water/p/66>

Google Earth

GSNSW-Seamless Geology of NSW

<https://www.visitnsw.com/destinations/north-coast/clarence-valley/wooli/attractions/minnie-water-beach>