TAR HEEL ROCKHOUND

SEPTEMBER 2025

Catawba Valley Gem & Mineral Club, Inc.

2025 Officers and Committees

President:	Tracie Jeffries 828-430-1341	Education:	George Max 828-328-9107
Vice President:	Joan Glover 828-446-7633	Show Chairman:	Dean Russell 828-303-1448
Treasurer:	Terry Russell 828-303-1563	Scholarship:	George Max 828-328-9107
Secretary:	Dean Russell 828-303-1448	Field Trip:	Tina Lakhotia 727-688-1068
Editor:	Tracie Jeffries 828-430-1341		

Club Address: PO Box 2521, Hickory NC 28603-2521
Regular Meetings: Second Tuesday, 7:00 PM
St. Aloysius Catholic Church, 921 2nd St. NE Hickory, NC
Annual Dues: Family, $25, Individual, $18

The purpose of the Club is to increase the individual's knowledge of the earth sciences and to aid in the development of lapidary and related arts and skills; to promote fellowship and exchange of ideas; to hold exhibitions, contests, lectures, and demonstrations for educational purposes; to help interest more people in the gem and mineral hobby; and to capture and preserve the beauty of nature, the arts, and the works of man.

CATAWBA VALLEY GEM AND MINERAL CLUB, INC.

Web Master: Mike Streeter

http://www.cvgmc.com

Editor: Tracie Jeffries,
3118 Barus Street, Valdese, NC
botanynerd89@gmail.com

INSIDE

PRESIDENT'S REPORT

Hello Fellow Members,

I just have a few items of information and a heads up for activities/events for the remainder of the year.

- I would like to thank everyone who participated in our silent auction last month. It was very successful and raised over 300$ towards the Wildacres Scholarship. If you are interested in the Wildacres Scholarship please fill out an application. The deadline is December 8th. If you need another application let me know.
- I would also like to thank David I. for volunteering to help with the Facebook advertising for next years' show.
- We need to finalize our logo and saying for the club t-shirts. So far the top three sayings are:
    - Rockhounds Rock!
    - "Just one more rock, I promise"
    - Geology Really Rocks
- The board will meet in October to discuss several important issues. One issue is, how can we attract and retain new members. If you have ideas or suggestions please share them with a board member.
- The October meeting will be our annual picnic. This is always a great time to eat, relax, and enjoy each other's company. More information will be coming soon.
- November will be club elections. We will need a definitely new president and new board members. Please consider serving a position in the club.
- December will be our annual Christmas party and club auction.

I will not be at next months' meeting, but I look forward to hearing about the Kentucky trip and seeing everyone in October!

Sincerely,
Tracie J.

CVGMC MINUTES FOR AUGUST 12th, 2025

The August 12, 2025 meeting of the CVGMC was called to order by President Tracie J. at 6:10 PM to start the Silent

Auction.

Visitors – None

Program: Harry Polly – “Labor Day Kentucky Trip Memories”

Minutes: A motion was made by Harry P. and seconded George M.by to accept the July 8, 2025 minutes. Motion was passed by the Club.

Treasurer Report: Bank balance was reported.

Education Committee: Tracy J. did two presentations.

Show Committee:

1. The next CVGMC Annual Show will be March 6-8, 2026. We will return to the Hickory Room. (The room where the Oct 2024 show was.)

2. The Club needs someone to take over the Facebook advertising for next year’s show.

Field Trip Report: Check your emails for information on field trips.

Old Business:

1. Slade H. needs numbers for Kentucky Trip

2. Discussed CVGMC t-shirts.

New Business:

1. Oct. 14 CVGMC Annual Picnic information to be in a future email.

2. The Club needs a Field Trip organizer.

3. CVGMC needs volunteers for the Board of Directors, and other positions.

4. The Club needs to do an inventory of the CVGMC stock in the trailer and in members houses.

Announcements:

1. A Club member has been in the hospital and is now in a rehab facility.

2. Ron R. mentioned a possible collection area.

3. A long time Club member passed on June 10th . A motion by George M., seconded by Harry P. to donate $100.00 to the EFMLS Scholarship in her honor. Motion by was passed by the Club membership.

Closing of Business: The meeting was adjourned at 8:21 PM

Respectfully submitted,

Dean Russell, Secretary

SEPTEMBER PROGRAM

TBA

GEOLOGY MADE EASY: WHAT ARE STROMATOLITES?

By Tracie J.

According to an article in the Online Journal of Biological Sciences, stromatolites are, “ layered biochemical accretionary structures formed in shallow water by the trapping, binding, and cementation of sedimentary grains in biofilms (specifically microbial mats), especially cyanobacteria” (Resource 1). While the Geological Society of America defines stromatolites as, “ layered organo-sedimentary structures reflecting complex interplays between microbial communities and their environment …” (Resource 2). According to these sources, and numerous others, to be a stromatolite it must:

- Be formed by microbial organisms,
- Grow by accretion,
- Be layered, and
- Be sedimentary.

STROMATOLITES ARE FORMED BY MICROBES:

Let’s look at each of these components in more detail. When defining stromatolites, terms such as ‘biogenic formation’, ‘organo-sedimentary’, and ‘microbialite’ are commonly used. These terms refer to the fact that stromatolites are sedimentary structures formed by living organisms, specifically microscopic bacteria. The bacteria form a thin living layer referred to as a microbial mat or biofilm, which is a complex community of microbial species. The ‘stromatolite’ is technically the non-living sedimentary structure formed by the action of microbes. This sedimentary structure is what becomes lithified and preserved; therefore, Stromatolites are trace fossils. Trace fossils are geologically preserved evidence of ancient life and/or its behavior. Examples of trace fossils include preserved footprints, nests, burrows, coprolite, and gastroliths. But occasionally, within the layers of the stromatolites, microfossils are found that provide evidence of their biogenic origins (See Image 1).

The oldest Stromatolite fossils, found in Western Australia, are approximately 3.48 billion years old. These earliest Stromatolites were probably formed by chemoautotrophs such as sulfate-reducing bacteria. Around 2.5 – 2.7 BYA, photosynthetic bacteria, such as Cyanobacteria, appeared and became the prominent species forming the microbial mats on Stromatolites. They are commonly called ‘blue-green algae’, and were the first organisms to produce oxygen. They often

live in complex bacterial communities and take on various forms such as single cells, filamentous chains, or colonies. (See image 2).

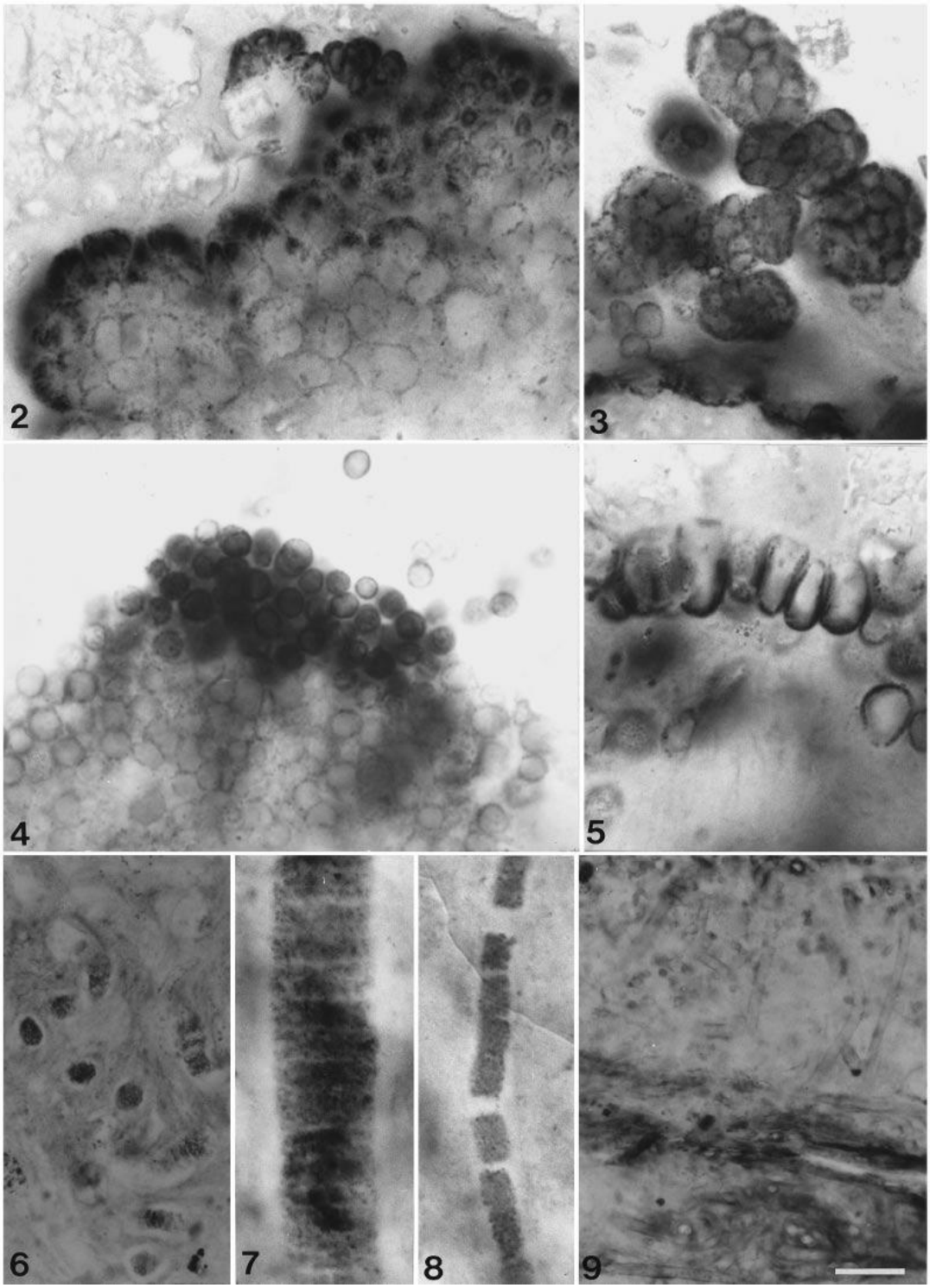

IMAGE 1: Micrographs of fossil cyanobacteria. These bacteria are approximately 1400 million years old, and where found in silicified Stromatolites from China.

https://www.tandfonline.com/doi/pdf/10.1080/09670269910001736402

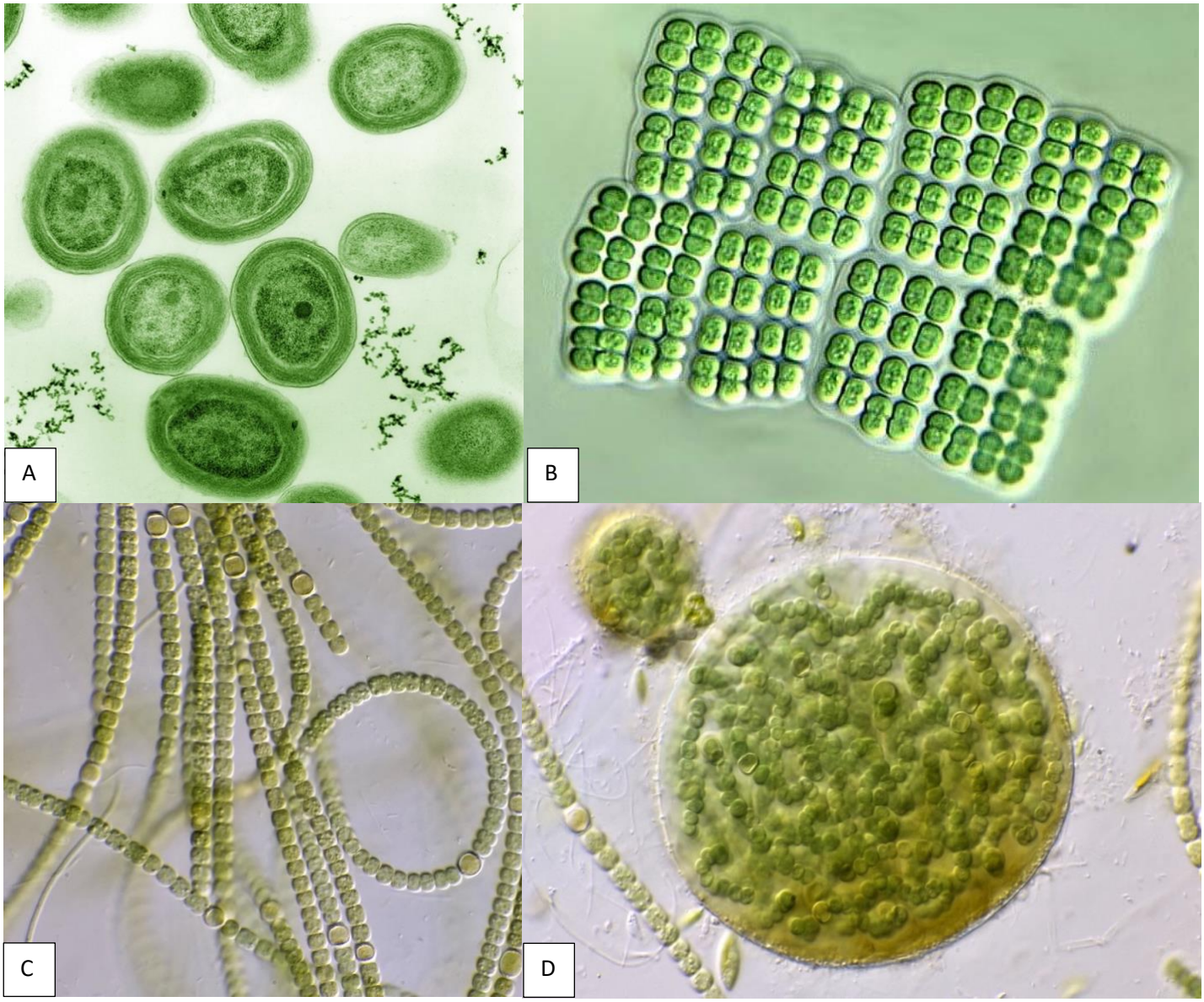

IMAGE 2: Cyanobacteria have a wide variety of growth forms. They may be single cells (A), form various types of colonies (B and D), or form filamentous chains of cells (C).

https://microscopyofnature.com/cyanobacteria, https://www.planetary.org/space-images/cyanobacteria-under-the-microscope,https://cfb.unh.edu/phycokey/Choices/Cyanobacteria/cyano_colonies/MERISMOPEDIA/Merismopedia_Image_page.html

HOW DO MICROBES FORM STROMATOLITES?

Stromatolites grow by accretion, that is, they grow gradually layer by layer. Having layers is an critical characteristic of Stromatolites and aids in their identification. The exact way they grow varies depending on several factors, but a generalized explanation is illustrated below (See Diagram 1). The growth is slow and it may take 2000 – 3000 years to grow 1 meter in height. Typical Stromatolites (living and dead) average between 1-2 feet (0.3 – 0.6 meters). Larger

examples are unusual, especially the 20 foot (6 meter) tall giant Stromatolites found in the Capitol Reef National Park, Utah.

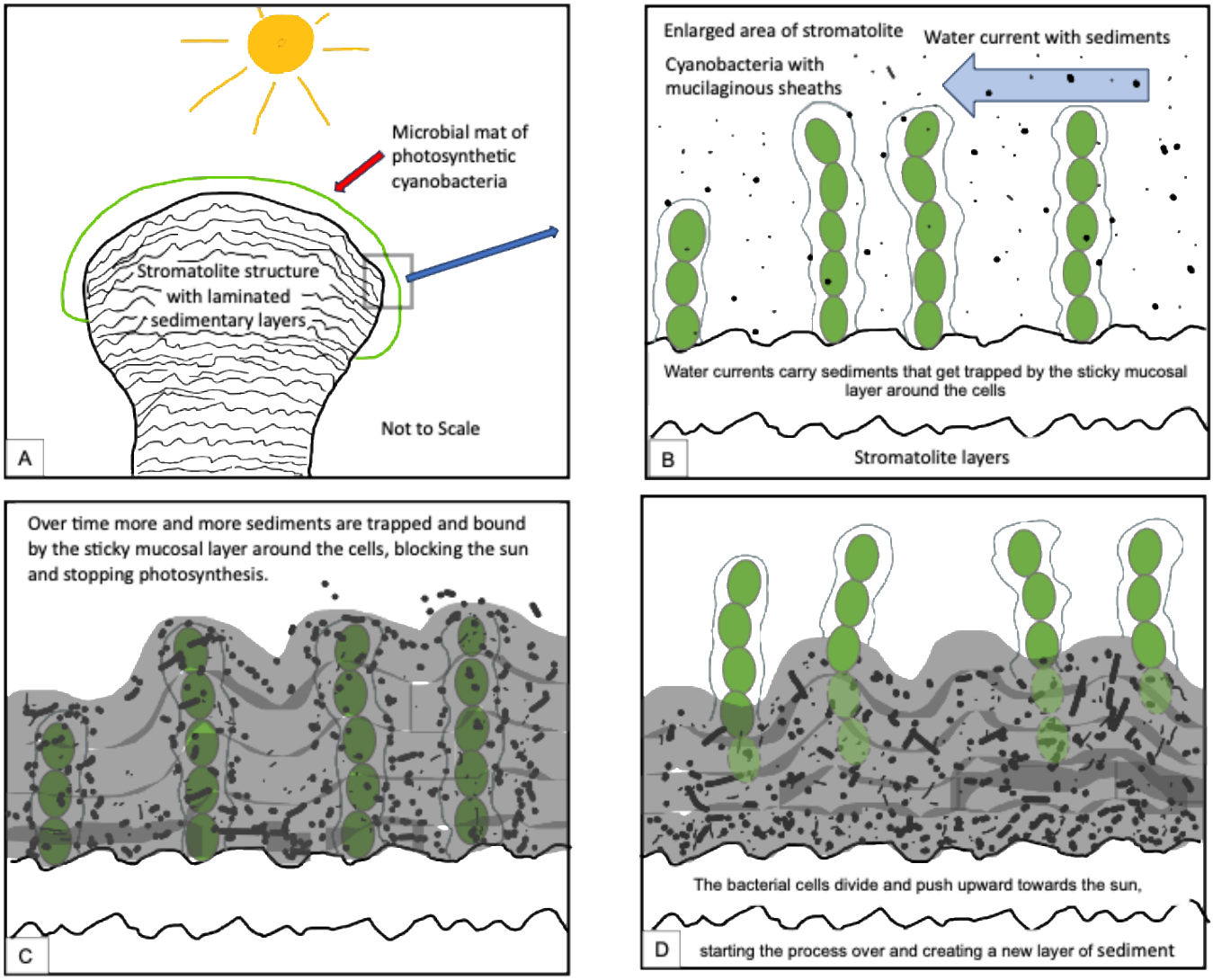

DIAGRAM 1:

Figure A – A Stromatolite with its' photosynthetic microbial mat.

Figure B - Chains of Cyanobacteria carrying on photosynthesis. Note that currents carry sediments that get trapped on the sticky mucus-like sheath around the cells.

Figure C - Over time the sediments become so thick they block out the sun and the Cyanobacteria can no longer do photosynthesis.

Figure D - In response, the Cyanobacteria divide and new cells are pushed upward to reach the sunlight. This creates a new layer of sediments and the Stromatolite grows in size! The process repeats!

STROMATOLITES ARE SEDIMENTARY STRUCTURES WITH LAYERS:

As discussed above, Stromatolites grow slowly, layer by layer. Layers are a major characteristic of Stromatolites (See Images 3-5). Depending on the types of sediments that were trapped, and the fossilization process, Stromatolites may be silica based and preserved as chert or jasper, or composed of carbonates such as limestone.

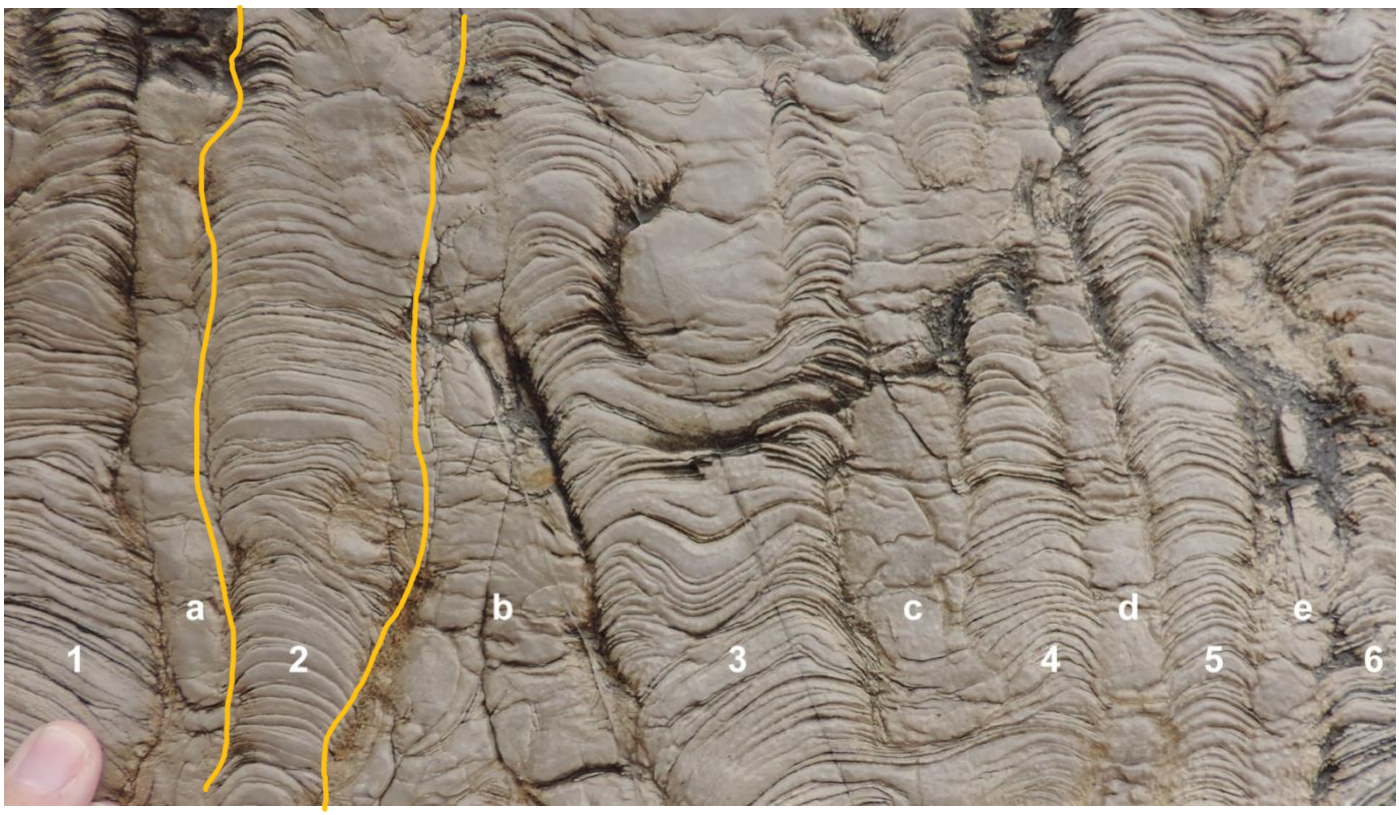

IMAGE 3: Columnar Stromatolites are noted by 1-6, while a – e show sediments that filled in between the colonies. Note that 1-6 show definite laminations. These Stromatolites are 1.4 BYO are from North China.

https://www.google.com/url?sa=i&url=https%3A%2F%2Fonlinelibrary.wiley.com%2Fdoi%2F10.1111%2Fsed.12336&psig=AOvVaw0EU_4ygK0lL_VL4CUNPRZL&ust=1755980488500000&source=images&cd=vfe&opi=89978449&ved=0CBkQjhxqFwoTCKjJsK-fn48DFQAAAAAdAAAAABAE

IMAGE 4: A beautiful polished Stromatolite slab from Bolivia. Note the numerous lamella, indicating layers of growth.

IMAGE 5: Two images of polished stromatolite slabs. The image on the left is a longitudinal section of a stromatolite showing the multiple layers of growth and deposition. This sample is in the Houston Museum of Natural History. The image on the right is a 9 inch cross section of a stromatolite colony, from Russia, approximately 800 Million Years Old (https://www.fossilera.com/fossils/9-wide-fossil-stromatolite-colony-800-million-years-old)

STROMATOLITE MORPHOLOGY:

Stromatolites have a wide variety of growth patterns. The morphology depends on factors such as water depth, strength of currents and tides, sediment types, and species of microbes. There are many forms discussed in the literature, but basic shapes include domes, columns, cones, planar (flat sheet-like), and digitate (finger-like) (See Diagram 2). However, describing the morphology of some Stromatolites is still difficult due to many variations within the basic shapes, distortions caused by geological processes over time, and as colonies grew, they often merged, obscuring the original shape.

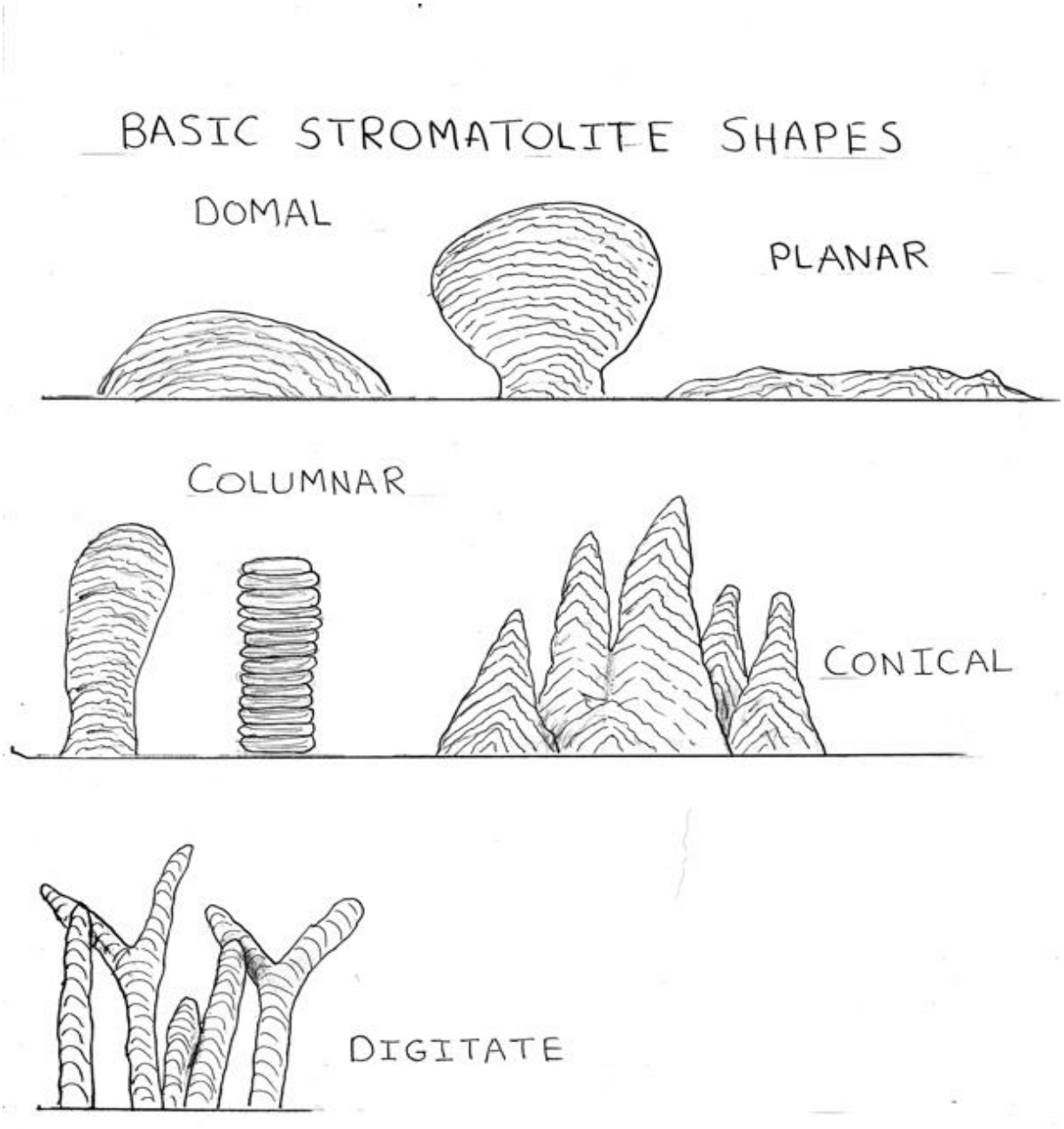

DIAGRAM 2: Basic Stromatolite growth forms are illustrated above.

WHY ARE STROMATOLITES IMPORTANT?

Stromatolites are studied by scientists for multiple reasons.

Stromatolites are the oldest fossils ever discovered, and their continued existence provides scientists with valuable insight into the earliest forms of life and the evolution of life.

Cyanobacteria- based Stromatolites helped create our oxygen-rich atmosphere. Earth's early atmosphere was a mix of toxic gases, such as methane and ammonia, and there was no free oxygen gas. As time passed, some cells, such as Cyanobacteria, evolved the ability to do photosynthesis. The oldest Cyanobacteria-based Stromatolite fossils are approximately 2.7 billion years old. The process of photosynthesis creates and releases oxygen.

PHOTOSYNTHESIS

$6\ CO_2 + 6\ H_2O \longrightarrow C_6H_{12}O_6 + 6\ O_2$

Carbon Dioxide + Water Glucose + Oxygen

- Initially, free oxygen was only in the water, where it was quickly involved in various reactions. But between 2.5 and 2.4 billion years ago, there was enough free oxygen for levels to start building up in the atmosphere. This increase in atmospheric oxygen triggered an event known as the "Great Oxidation Event." Ironically, organisms hadn't had time to adapt to the newly formed oxygen-rich atmosphere causing a mass extinction event.

- Free Oxygen gas (O_2) allowed the formation of the ozone layer (O_3), which protects organisms from harmful ultraviolet radiation. This eventually permitted life to leave the protection of water and adapt to land.

- Oxygen reacted with the methane gas in the early atmosphere, creating carbon dioxide and water. Methane is a greenhouse gas that traps heat from the sun. Carbon dioxide is also a greenhouse gas, but methane is 10x more effective at trapping heat. So, as oxygen levels increased, methane levels decreased, and the temperature dropped. This most likely led to the first ice age, about 2.3-2.2 billion years ago.

$CH_4 + 2\ O_2 \longrightarrow CO_2 + 2\ H_2O$

Methane + Oxygen Carbon Dioxide + Water

- With oxygen, organisms were able to evolve aerobic respiration, which generates energy more efficiently. With improved metabolism (higher energy yields), organisms could become multicellular, larger, and more complicated.

- The production of oxygen also aided in the formation of massive iron deposits. Almost 70% of our iron deposits were formed during this period (See Images 6 and 7).

IMAGE 6: Above is a sample of a banded iron formation (BIF). The red bands are red chert (jasper) and darker bands are usually hematite or magnetite. https://www.britannica.com/science/banded-iron-formation

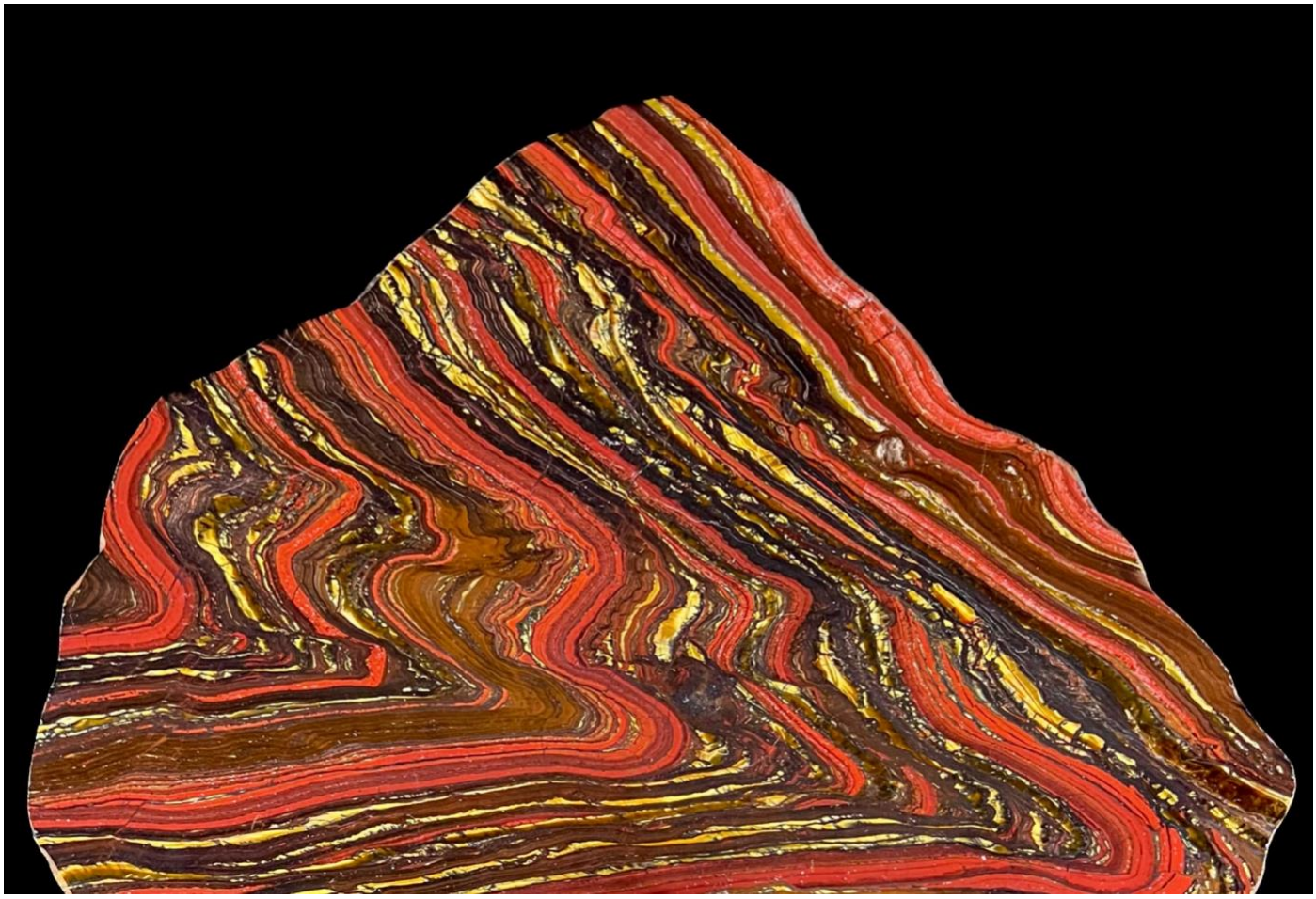

IMAGE 7: A beautiful example of banded iron. This colorful sample is also known as Tiger Iron due to the alternating bands of Jasper, Hematite, and Tiger Eye. This rock formed between 2 to 2.5 billion years ago and is from Western Australia. https://www.unearthedstore.com/products/large-tiger-iron-slab-slice-australia?srsltid=AfmBOor5iychW1EhAcbLPjOLD1ipMXAIsiv-F1nLzxiEiwa8feFL06OV

LIVING STROMATOLITES:

Did you know that Stromatolites still exist today! They are often referred to as ‘living fossils’. Living fossils are living organisms that are also represented, seemingly unchanged, in the fossil record. Examples include the Coelacanth, Maidenhair Tree (Gingko Tree), Horseshoe Crab, and Goblin Sharks (See Image 8). Stromatolites are not as common as they were in the geological past, and today they are restricted to a few unique habitats around the world. An exceptional site is Hamelin Pool in Shark Bay, Australia (See Image 9). The site is a designated World Heritage Site to protect the Stromatolites and other unique species. Stromatolites can exist there due to several factors:

- The bay has restricted water flow
- Hamelin Pool is shallow
- The water is hypersaline

- And it is very hot

All of these conditions create an inhospitable environment for many marine organisms, especially mollusks, which like to graze on the microbial mats of the Stromatolites. Consequently, the Stromatolites can thrive in this relatively invertebrate-free area. Living Stromatolites can also be viewed at Exuma Sound in the Bahamas, Lagoa Salgada in Brazil, and Tierra del Fuego in Chile (See Image 10). There are also populations of freshwater stromatolites. One impressive example is the Stromatolites in Pavilion Lake, Canada (See Image 11).

IMAGE. 8: A living Horseshoe Crab is on the left and a fossilized Horseshoe Crab is on the right. The Fossil is from a limestone deposit in Germany. http://www.extinctblog.org/extinct/2023/9/2/living-fossils

IMAGE 9: Stromatolites in Shark Bay, Australia. These Stromatolites exhibit a dome-shaped growth pattern. https://www.sharkbay.org/place/hamelin-pool/

IMAGE 10: Stromatolites at Lago los Cisnes, Tierra del Fuego. These Stromatolites have a conical shape.
https://jasonfrels.com/2023/05/06/stromatolites-of-tierra-del-fuego/

IMAGE 11: Freshwater Stromatolites or Microbialites growing in Lake Pavilion. The towers vary in size but can be as tall as 9 feet (1.5-2.7m) in height and 4 feet in width at the base. These show a conical growth pattern. tapehttps://old.xray mag.com/content/pavilion-lake

FOSSIL STROMATOLITES:

Stromatolites were the dominant life form on Earth for over 2 billion years. Over time, their numbers decreased, but they never went extinct. With such a long existence, there are plenty of Stromatolite fossils worldwide. Below are examples of Stromatolites from the United States (Images 12 – 18).

Image 12: Stromatolites at Grinnell Glacier in Glacier National Park, Montana.

https://upload.wikimedia.org/wikipedia/commons/4/44/Stromatolites_at_Grinnell_Glacier_%284120043754%29.jpg

IMAGE 13: Stromatolite Fossil from Wyoming

James St. John
(jsj1771) https://www.flickr.com/people/jsjgeology/

IMAGE 14: Numerous layered, columnar stromatolites can be seen in a Precambrian limestone roadcut along the 'Going-to-the-Sun Highway' in at Glacier National Park, Montana, USA.
https://commons.wikimedia.org/wiki/File:Stromatolites_in_limestone,_Going-to-the-Sun_Highway,_Glacier_NP.jpg

IMAGE 15: Lester Park near Stromatolites Saratoga Springs, New York was created to protect its unique geological features. When you walk through the park you are basically walking across a 490 million year old seabed. The park offers an unique opportunity for the general public to see Stromatolites and other fossils.

https://commons.wikimedia.org/wiki/File:Stromatolites_%28Hoyt_Limestone,_Upper_Cambrian;_Lester_Park_Road_outcrop,_W_of_Saratoga_Springs,_New_York_State,_USA%29_11_%2815200834042%29.jpg

IMAGE 16: Cenozoic aged Stromatolite fossils along the Apalachicola Rive at Alum Bluff Florida. This is the top of a large dome-shaped Stromatolite. https://blog.wfsu.org/blog-coastal-health/2017/02/geologists-view-apalachicola-river-shark-fossils-rocks/

IMAGE 17: Mary Ellen Jasper was first discovered in the Mary Ellen Iron Mine in St. Louis County, Minnesota. It is a unique rock due to its vibrant colors and it often contains Stromatolite fossils. Note the layered reddish Stromatolites and the green matrix between them.

https://ar.pinterest.com/pin/367324913355637299/

Image 18: An incredible 9 x 6 inch slab of Mary Ellen Jasper collected northwest of Lake Superior. Note the numerous digitate Stromatolites.

https://commons.wikimedia.org/wiki/File:Fiery_orange_Mary_Ellen_%28stromatolite%29_jasper.jpg

PSUEDO STROMATALITES

Buyer beware, some rocks sold as Stromatolites are not authentic! Sandstone concretions from Morocco are often advertised and sold as Stromatolites on eBay, Etsy, and at Gem and Mineral shows (See Image 19). Superficially, they look similar to some Stromatolite formations, but these flower-like concretions are a mix of sand and Barite, hence a similarity to Barite Roses. The effect is enhanced by surface erosion of the sand. Furthermore, when cut and polished, they show no laminated sedimentary layers as seen in true Stromatolites. Although the sandstone concretions are not Stromatolites, they are geologically interesting, and the presence of Barite causes many to fluoresce and exhibit phosphorescence.

IMAGE 19: A flower-like Barite-Sandstone concretion, a common pseudo -stromatolite.

https://www.fossilera.com/minerals/4-2-flower-like-sandstone-concretion-pseudo-stromatolite--2?srsltid=AfmBOopNya9K4KLT_54Koo_3vX-APj-2Gt-cKTTkY0Wb5uR0Lhs7j6fr

Another example of a pseudo-stromatolite is Kambaba Jasper, also known as Kabamba, and Crocodile Jasper (See Image 20). This rock has a major identity crisis because it is neither a Stromatolite fossil nor a Jasper. Kambaba Jasper is a unique volcanic Rhyolite found only in the Bongolava region of Madagascar. However, there are many sites that still refer to it as a Stromatolite.

IMAGE 20: A bowl carved from Kambaba Jasper. Note the green matrix and black eyes, this distinguishes it from a similar rock, Nebula Stone, from Mexico. Nebula stone has a dark matrix with green eyes. Photo by Tracie J.

RESOURCES:

1. Petrescu, F. I. T. & Ungureanu, L. M. (2022). About the Cyanobacteria and Stromatolites. *OnLine Journal of Biological Sciences*, *22*(1), 87-111. https://doi.org/10.3844/ojbsci.2022.87.111

2. https://www.geosociety.org/GSA/News/pr/2022/22-66.aspx

WHAT'S HAPPENING IN OUR AREA

WHAT	WHEN	WHERE
Forsyth Gem and Mineral Club Show	Sept. 5 – 7 Sept. 26 -28 Hours: Fri/Sat 10am - 6pm Sun 11am - 5pm	Dixie Classic Fairgrounds Educational Building Address: 421 27th St NW Winston-Salem, NC Website: http://www.forsythgemclub.com/
Mineral, Gems, and Jewelry Extravaganza	Sept. 26 -28 Hours: Fri/Sat 10am - 6pm Sun 10am - 5pm	National Guard Armory Address: 2025 Spartanburg Hwy National Guard Armory East Flat Rock
GTS Gift and Jewelry Show	Oct. 3 - 5	Greensboro Coliseum Complex, 1921 W Gate City Blvd, Greensboro, NC
Leaf Lookers Gemboree	Oct. 17 – 19 Hours: Fri/Sat 10am - 6pm Sun 10am - 4pm	Macon County Community Building Address: 1288 Georgia Rd Macon County Community Building Franklin, NC
G&LW Gem Show	Oct 28 -29	WNC Agricultural Center, 765 Boylston Highway, Asheville, NC

The image part with relationship ID rId56 was not found in the file.

Tar Heel Rockhound

Official Publication of

Catawba Valley Gem and Mineral Club, Inc.

Volume 55 Number 9

Club Meetings

2nd Tuesday of Month, 7:00PM

St Aloysius Catholic Church

921 2nd Street NE Hickory, NC

Tar Heel Rockhound
Tracie Jeffries Editor
PO BOX 2521
Hickory NC 28603-2521
http://www.cvgmc.com/

GEM AND MINERAL CLUB, INC.
Catawba Valley
HICKORY, NORTH CAROLINA
Organized 1969

AFMS