

Shape the Future

Canyon Chatter Friends of Madera Canyon Newsletter March 2024



From the President

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VISIT OUR WEBSITE https://friendsofmaderacanyon.org/

On the cover: The Santa Rita Mountains looking north from space. This photo provides a different perspective the Santa Ritas look smaller and more vulnerable to human damage. The Tucson Basin is visble with the Santa Catalinas to the north west and the Rincons to the notheast. Google Earth Photo.

From The President March 2024

Gratitude.

As I meet more and more members of the Friends of Madera Canyon, I am struck by the many ways in which the magic of the Canyon affects people. A common theme: we all take away <u>gifts</u>; the splendor of nature in general, the various hiking experiences, the chance to see birds we might not otherwise see, the serenity of sitting by a flowing creek, the soul-satisfying distance from the frenetic pace of life away from the Canyon.

So, I see becoming a member of the Friends as a way to say thank you, not just to the Friends for its history of service, but for the ways in which you and I are moved by our experiences there.

For your saying thanks in the manner, I thank you.

At the end of March, FoMC will continue the tradition of acknowledging those volunteers who give the precious resource of their time in service of the Canyon. In greeting visitors, cleaning the picnic areas, helping to maintain trails, leading fourth graders and others on learning hikes, keeping records, serving on the Board and its committees and so on, FoMC members add their talent and time as further acts of gratitude for what the Canyon means to them.

For these additional acts of gratitude, I thank them.

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Regularly, FoMC receives financial contributions from folks who are able to give extra and are moved to support the on-going work of the Friends. Which of us is not inundated by appeals from myriad worthy and important causes to become donors?

To those who show their gratitude with contributions to FoMC, I thank you.

In varying degrees, we all have time, talent, and treasure to commit to that in which we believe. Whether your membership or service or financial contribution is the result of a sense of gratitude on your part or not isn't really the point. The point is, you've done it.

Speaking of Bees...

Five FoMC members participated for a second year as a practice audience for Sahuarita HIgh School Biotechnology student "presentations of learning" on February 29. Under the guidance of instructor Gavin Lehr, student teams constructed research projects, collected samples, generated data (including DNA results) and will report their findings later in the spring to an area-wide science symposium of high school students. Most of this year's projects focused on bees--what color attracts the most bees, the effect of sugar in water attracting bees, bee preference for man-made and non-man-made habitats, etc. The research skills acquired by these young naturalists is priceless!

Thank you. Daniel E. White



Bee Grateful

Volunteer Opportunities

Be an Ambassador in Madera Canyon

The Ambassador initiative, sponsored by the Friends of Madera Canyon, is looking for volunteers. Ambassadors are FoMC members who, when visiting the Canyon, act as a mobile information source. That is, an Ambassador mingles with other visitors dispensing useful tips and facts. The job involves hiking your preferred trails while wearing a Forest Service vest, making yourself approachable to visitors of the canyon. Training in the many features of Madera Canyon will be provided.For questions or to sign up, contact David Linn at linngvrhc@gmail.com.

Inventory the Social trails in inner Madera Canyon

Become familiar with the many trails in Madera Canyon. The Friends of Madera Canyon and the Forest Service are looking for volunteers to map the many unsanctioned "social" trails in the inner canyon.

The job involves walking canyon trails and using GPS technology to track these unsightly and unwanted trails for ultimate removal. Training in the use of smart phone GPS apps will be provided.

For questions or to sign up, contact David Linn at linngvrhc@ gmail.com.

Trail Maintenance in inner Madera Canyon

Expand your hiking skills to include trail maintenance in beautiful Madera Canyon. The Friends of Madera Canyon and the Forest Service are sponsoring volunteers to work at improving the trails in the inner canyon. Activities include brushing i.e., cutting away from the trail offending tree branches and bushes, and tread work i.e., improving the foot bed of the trail to reduce erosion and rock hazards. The job involves use of loppers, saws, shovels, and hoes and may be moderately strenuous. All activities will be under the supervision of trained FoMC members. For questions or to sign up, contact David Linn at linngvrhc@gmail.com.



Join the Cleanup Crew at Madera Canyon

Here's your chance to make a difference and make new friends. Help clean up the Madera Canyon every Monday morning by picking up trash, cleaning up grills and more. For more information or to sign up contact Colleen Verge at colleenverge@gmail.com

Event Announcements

The Friends of Madera Canyon will have a booth at the <u>Tucson Festival of Books</u> on March 9 & 10. This is a huge event that draws 125,000 attendees over that weekend on the UA campus. Over 300 authors will be on presenting author panels as well as exhibitors from other non-profits, bookstores and all sorts of literacy related activities. The Western National Parks has a large tent and stage area and we will be beside them along with Tucson Audubon and others.

We need volunteers to help to staff the booth and talk with Festival attendees about Madera Canyon and what the Friends do. Please email Hilary Hamlin at <u>hcphh@me.com</u> if you can volunteer for 2 or more hours that weekend. It is a wonderful event. Volunteer and then go see your favorite author.

FOMC will also have a booth at the Tubac <u>Hawk Watch</u> on Saturday, March 16. This is a one day event and the booths are available from 8am – 2pm in Ron Morris Park in Tubac. We need volunteers for that day as well.

These are two opportunities for FOMC to talk about what the Friends do to help to preserve and protect Madera Canyon and encourage more people to become members to support our activities as well as become volunteers. These are the last two Spring events where we will have a booth. The next big event will be in August at the Tucson Audubon Birding Festival.

Volunteer Breakfast March 23, 2024 LaPosada 7:30 AM.

Canyon Notes 2024 Spring Wildflowers

Doug Moore

As February transitions to March, spring comes to southeastern Arizona. After fortuitous and timely late fall and winter precipitation, indications of a good spring wildflower bloom abound. With abundant flowers in the low desert, it is time to watch a Madera Canyon wildflower show.

As of last week, the lower canyon above Proctor is starting to green up. Although the mesquite is still dormant, the cottonwoods along the creek are budding in green. Wolfberry and globemallow shrubs are all leafed out and will flower very soon. A verdant green carpet of "fuzz" spreads profusely over the ground as perennials sprout & spring annuals germinate.

The only flowers apparent last week were the minute blossoms of Desert Mistletoe in the tops of Warnock's Condalia shrubs growing below the Patsy Proctor Ramada. So tiny, these flowers were revealed by their sweet fragrance and, as "the only game in town", by the swarm of bee-mimic flower flies and a few Spring Azure blue butterflies enticed in for nectar.

On the ground, the deep green, parsley-like leaves of Desert Anemone are just starting to show, as are the long green onion-like leaves of Desert Hyacinth lilies. Tiny rosettes of leaves are sprouting everywhere, and many Mexican Gold Poppies, Blue Phacelia, and Spring Evening Primrose are already identifiable. Desert Chicory, Silver Puffs, Bajada Lupine, and more will not be far behind.

As we move through spring, different trees, shrubs, perennials, and annuals will flower, and the bloom will gradually move up into higher elevations in the canyon. It is always fun to note and follow the flowers up canyon- like watching for the scarlet Claret Cup Hedgehog cactus flowers on the Cliffside above the White House Bridge or brilliant Southwest Coral Bean clusters seeming to sprout from dead sticks between sunny granite boulders. All photographys by the author.

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1) Blue Phacelia bloom from Proctor Nature Loop Trail in 2018.



2) Desert Anemone flowers and foliage.





3) Southwest Coral Bean in bloom.



Education Program

Education Program

Spring, 2024

Doug Moore, Education Director

Spring is coming, and I've been working on a spring schedule of field trips and activities for students, adults, and FoMC members. Since COVID-19- and increasing school preoccupation with standardized test preparation in April, having our regular roster of local 4th-grade school field trips has become more challenging. But when you get lemons, the best alternative is to make tasty lemonade- so we're having a rather unconventional but full March and April schedule instead.

Keeping docent skills up and training new docents is always a priority. Our new docents will have training at Proctor on 3/14, followed by an all-docent training/ trail walk-around on 3/21. This allows everyone to be prepared and on the same page while also "reconning" the canyon and trail for what we can expect to find on the Proctor Loop this spring.

There will be two 4th-grade field trips- Santa Cruz Valley Montessori School from Amado will be attending for the first time, and Sopori Elementary School, a long-time partner, will be in the canyon on 4/25. There will also be two high school nature/ecology field trips this spring- Sahuarita HS is coming on 3/26 with 14 students and Walden Grove HS on 4/11 with 19 students. Adding a local high school connection to our "conservation through education" program has been an exciting upgrade!

We can't let the kids have all the fun! I have two walks with Quail Creek this spring, one on 4/24 and the other on a date to be decided. I also plan to "slip in" several nature/birdwatching field trips for FoMC members with the other activities. Watch for our e-mail blasts with dates and information.

Canyon Nature

FROM THE RESEARCH JOURNALS

A new moth with a type locality in Madera Canyon.

More that 100 species have been described with type specimens from Madera Canyon. The most recent is the geometrid moth *Prorella neremorata* described by Ferris and Russo in late 2023. By the time the new description was published the higher level classification had been revised and its name changed to *Eupithecia neremorata* (Ferris & Russo, 2023) by Schmidt & McGuinness (in Pohl & Nanz (eds.) 2023). *Eupithecia neremorata* is a member of the *remorata* group.



A new geometrid moth *Eupithecia neremorata* (Ferris & Russo, 2023), with a type locality in Madera Canyon. Photography by Charles Melton.

How to join Friends of Madera Canyon

Below are links to join as a new member, renew a membership and make a donation. Below are links to join as a new member, renew a membership and donate. The links will take you to a secure server to use a credit card or ACH transmission. Do you have any questions? let us know. If you prefer to help by writing a check, please make your check payable to Friends of Madera Canyon - mail to

FOMC PO Box 1203, Green Valley, AZ 85622-1203

Ferris, C.D. & J. Russo, 2023. Review of the Prorella remorata Group with Description of a New Species from Arizona (Geometridae: Larentiinae: Eupitheciini). Journal of the Lepidopterists' Society, 77(4): 226-234.

Pohl, G. R. and S. R. Nanz (eds.). 2023. Annotated Taxonomic Checklist of the Lepidoptera of North America, North of Mexico. Wedge Entomological Research Foundation, Bakersfield, California, xiv + 580 pp.

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A New Membership Renew a Membership Donate to FoMC



The Birding Report

HUMMINGBIRDS IN MADERA Part II

Last month, I put down here more or less subjective impressions of Hummingbirds in Madera Canyon. In this concluding part, I'll review more systematically the hummingbird species one can see in Madera and where and when in the Canyon one is most likely to.

Seventeen species of hummingbird are seen regularly in the United States, and of those, only one, the Buff-bellied Hummingbird of South Texas, has never been reported from the Canyon. Arizona is the best place in North America to see a variety of hummingbirds. And Madera Canyon, because of its varied habitats and the presence of feeders accessible to the public, is flat-out one of the three or four best places in Arizona to see hummingbirds. Eight species are, at least at some seasons, reasonably common here, and a dozen probably breed in the Canyon at least occasionally.

I'll divide the sixteen Madera Canyon hummingbird species into four not too scientific categories: (1) the Most Common, (2) the Big Ones, (3) the *Selasphorus* Species, and (4) the Rare Ones.

Most Common

Broad-billed Hummingbird, Cynanthus latirostris Anna's Hummingbird, Calypte anna Costa's Hummingbird, Calypte costae Black-chinned Hummingbird, Archilochus alexandri

The <u>Broad-billed Hummingbird</u> is surely the most-photographed bird in the Canyon. Except for the winter months, Broad-bills are the most common hummingbirds at the feeders at the Santa Rita Lodge, within feet of the waiting lenses of the hordes of photographers who have come to see them and the other birds for which the Lodge is famous. All hummingbirds are beautiful, but I'll venture that the male Broad-billed is the showiest of Madera's: bright red bill, black tail, shining blue throat and breast, flashing green overall. This is coupled with an aggressive temperament and, from March through into September, impressive numbers. Get too

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Broad-billed Hummingbird, Cynanthus latirostris National Parks Gallery

close to one of the Lodge's feeders during those months, and you're likely to be buzzed by a Broad-billed. Broad-bills are often seen away from the feeders during these seasons as well, the females on a nest back in the woods, if you're lucky; and one or more Broad-bills may stick around through the winter (though not this winter, seems like). A picture of a Broad-billed accompanied Part I of this article. I took it last spring on the deck behind the Lodge's gift shop.

<u>Anna's and Costa's Hummingbirds</u>, as the Latin names indicate, are closely related. Both are primarily of lower elevations; Anna's are the most common hummingbird in Tucson, Costa's in the desert scrub. But both come up as far as the grassland habitat around Proctor Road to breed, and Anna's, which don't really migrate, are the common hummingbird at the Canyon feeders in the winter. Male Anna's are notable for their hot pink throats and crowns, Costa's for their small size and flaring purple gorgets. Female Anna's have a bit of pink on their throats as well. The males of these two species, unusual for nonperching birds, sing a high twittering song when they're on-territory in breeding season.

<u>Black-chinned Hummingbirds</u> are the counterpart of the Ruby-throat of the East, and look very similar, being to my eye a little longer and slimmer, and with a very slightly longer bill and darker throat. From April to September, Black-chinned are usually the second most common hummingbirds in the Canyon, though not so numerous at the feeders, and not as showy as the Broad-billed.

The Big Ones

Rivoli's Hummingbird, *Eugenes fulgens* Blue-throated Mountain Gem, *Lampornis clemenciae*

<u>Rivoli's Hummingbird</u> (accent on the first syllable of Rivoli) used to be the Magnificent Hummingbird, and was recently renamed, split off from a Central American relative that had until now been considered a subspecies. Magnificent is indeed appropriate to a Rivoli's, first of all, though not only, for its size. Where most of the Canyon hummingbirds weigh out at three or four grams, a Rivoli's is all of seven - and instead of a paltry three inches long, it's all of five! It's also handsome overall, with a very long bill and, in the male, an iridescent green throat and purple crown and, in the female, a distinctive eyestripe. Though Rivoli's is uncommon in the winter in the Canyon, it seems to be the one species that can be counted on to come to the feeders throughout the year, if only in small numbers at any season. And here's a pair of trivia to impress the neighbors: Rivoli's was named for a 19th-century Italian duke, an amateur ornithologist - and Anna's Hummingbird was named for his wife! Blue-throated Mountain Gems are not common in the Canyon, but are certainly impressive to see. ("Mountain Gem" replaced the simple Hummingbird in this species' name only recently, so the nomenclature would correspond to the other species of its genus farther south in Mexico.) They're even a little bigger than Rivoli's, and the most aggressive of Arizona's hum-

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Anna's Hummingbird, Calypte anna United States Fish and Wildlife Service



Costa's Hummingbird, Calypte costae

Photographer Unknown

mingbirds; everything else makes way for a Blue-throated at the feeders. Rivoli's, in contrast, will give way to many smaller birds. The Blue-throated seems to like the feeders at the Madera Kubo, as well as the Lodge's, perhaps because the woods are denser at the Kubo. Grayish overall, the male has of course a blue throat, the female a pair of white eye-stripes. (Careful: the iridescent green throat of the male Rivoli's can look blue in some lights.)

Selasphorus Species

Broad-tailed Hummingbird, Selasphorus platycercus Rufous Hummingbird, Selasphorus rufus Allen's Hummingbird, Selasphorus sasin Calliope Hummingbird, Selasphorus calliope

You can see from their Latin names that these four species belong to the same genus, *Selasphorus*, from the Greek for "light-bearing." All show varying degrees of red or rufous plumage.

Broad-tailed Hummingbirds breed at higher elevations throughout the western mountains in this country, including in the upper Canyon. They're of medium size and their wings are so constructed they give off a distinctive sharp whistle: you can hear a Broad-tail coming. They've green upper parts – yes, a relatively broad tail – and the male has a squarish rose-red throat patch. The female, also green above, has rufous-tinged underparts, showing more of that color, I think, than either of the next two species. Like the other North American species in this genus, Broad-tails are migratory, and are commoner in the Canyon in the fall before they go on south. All the regularly seen hummingbird species are commoner in the fall, since breed Inventory the Social trails in inner Madera Canyon

Rufous and Allen's Hummingbirds are very closely related. The Rufous males have red gorgets and are a fiery orange-red overall. Allen's are the same, except their backs are green. (The books say, however, that perhaps 10 percent of Rufous males also have green backs.) Females and juveniles of the two species generally fall into the "not safely distinguishable in the field category" of the bird guides. Primarily, the two can be distinguished by their differing ranges. Rufous are mountain-breeders, going as far as Alaska; Allen's are a species of the California coast. Neither breeds in the Canyon, and very probably only the Rufous are seen here during spring migration, in March and April. Rufous are commoner in fall than in spring, as they return from the north, and then they are joined by a small proportion of migrating Allen's, on their way south as well.

Calliope Hummingbirds are North America's smallest bird. Generally green above and pale below like the others in this category, Calliope males have a distinctive streaky red-purple gorget, and Calliope females resemble other females in the genus. But they're little, with particularly short tails and bills. They breed in the central and Canadian Rockies for the most part, and are more often seen in the Canyon in the fall than the spring. Then watch closely at the feeders, and you may well see a Calliope venture cautiously to take a few sips.



Black-chinned Hummingbird, Archilochus alexandri

Photographer Unknown



Rivoli's Hummingbird,

Eugenes fulgens

Photography by Alan Schmierer

The Rare Ones

Violet-crowned Hummingbird, *Amazilia violaceps* White-eared Hummingbird, *Hylocharis leucotis* Lucifer Hummingbird, *Calothorax lucifer* Berylline Hummingbird, *Amazilia beryllina* Plain-capped Starthroat, *Heliomaster constantii* Ruby-throated Hummingbird, *Archilochus colubris*

These six species of hummingbird are rare in the Canyon; they're simply not present most of the time, and you can't expect to see any of them even in late summer, the prime season for both common and less common species. Moreover, except for the Berylline, these birds may appear at a Canyon feeder for one day only, and not again for months or years. The rarities here are listed more or less in declining order by the likelihood that they'll be seen in Madera.

<u>Violet-crowned Hummingbirds</u> are probably seen once or twice a year at Canyon feeders, but may breed here fairly regularly. The Paton Center for Hummingbirds down in Patagonia is famously the place to see these handsome birds, pure white underneath, brown above, and with long red bills and purple crowns. The two sexes are similar. Violet-crowned are quite large, though not as burly as either Rivoli's or the Blue-throated.

White-eared hummingbirds are not, I believe, seen every year in the canyon, in part because they rarely seem to come to feeders. They're found high up in oak-pine woods, and more often in the Huachucas, especially Miller Canyon, than in the Santa Ritas. They somewhat resemble Broad-billed Hummingbirds, of a similar size and with red bills. But both sexes have a broad white eye- (or ear-) stripe and the male has a purple face and throat.

<u>Lucifer Hummingbirds</u> are found more in grassland habitat than in the Canyon proper, especially (or only) if there are numerous ocotillos present in the grassland as well. They do come to feeders, however, and are occasionally seen at the Lodge. They're a real treat to see, too: small, with a long, curved bill, the males have a long, pointed purple gorget, and the females have underparts of a handsome buffy color. Lucifers sometimes nest in Box Canyon just to the north of Madera, and they might be looked for at or just below Proctor Road, especially when the ocotillos there are in bloom.

<u>Berylline Hummingbirds</u> are, in my limited experience, the common hummingbird in Mexico City. But not here. Although they've bred in the Canyon once or twice, it's said, a Berylline is not seen in Madera every year. When one is, however, it's likely enough it will hang around the Lodge feeders, somewhat shyly, for months, giving everybody a look. Like the Blue-throated, Beryllines seem to like the feeders at the Madera Kubo about as well. Both sexes are bright green overall, but have rufous coloring in the wings and tail. The male has a green gorget as well, and a buffy belly. There's been at least one Berylline around the middle Canyon in each of the last four years – but they're not really to be depended on here.

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Blue-throated Mountain Gem, Lampornis clemenciae Photographer Unknown



Broad-tailed Hummingbird, Selasphorus platycercus Photography by Bill Ratcliff <u>Plain-capped Starthroats</u> aren't seen here every year either, and are one of the species that may be seen once or twice in a season and then not again. They're striking birds, though: lanky, overall brown with a rosy throat and a bill longer than any other. I don't believe they've ever been reported breeding here and they usually show up only late in the summer or into early fall. I've never seen one in this country.

<u>Ruby-throated Hummingbirds</u> – the hummingbird in the East – has only been seen, and at very long intervals, twice or maybe three times in the Canyon: a true accidental, in other words. Ruby-throats are very closely related to Black-chinned Hummingbirds; it would probably only be safe to call a Ruby-throated male so far out of range as one seen in Arizona would be – females or juveniles are just too similar to Black-chinned.

And that's the List: to birdwatchers one of the prime charms of Madera Canyon. By the time this column appears, it'll be March, with hummers returning to the Canyon in numbers: get out and watch'em!



Rufous Hummingbird, Selasphorus rufus Photography by Tom Koerner/USFWS



Allen's Hummingbird, Selasphorus sasin National Parks Gallery



Calliope Hummingbird, Selasphorus calliope inaturalist.org http://commons.wikimedia.org/

Bob Pitcher



Violet-crested Hummingbird, Amazilia violaceps iNaturalist



White-eared Hummingbird, Hylocharis leucotis Photograaphy by Charles J. Sharp



Lucifer Hummingbird, Calothorax lucifer Photography by https://www.flickr.com/people/17004938@N00 Greg Schechter]



Berylline Hummingbird, Amazilia beryllina By Charles J. Sharp - Own work, from Sharp Photography, sharpphotography.co.uk, CC BY-SA 4.0,



Plain-capped Starthroat, Heliomaster constantii Photography by Greg Lasley

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Ruby-throated Hummingbird, Archilochus colubris National Parks Gallery



The Editor's Desk

Mining, Nature, & Humans

"Nature is the source of all true knowledge. She has her own logic, her own laws, she has no effect without cause nor invention without necessity."

Leonardo da Vinci

Science creates knowledge while others use false information as knowledge for manipulation. Unfortunately the confusion this creates only serves the manipulators. Heavy metals are toxic to organisms - these are elements like mercury, lead, chromium, cadmium, arsenic and others.

Drinking water tainted with heavy metals—specifically, arsenic, cadmium, nickel, mercury, chromium, zinc, and lead—is a serious health risk. Using heavy metals in industrial processes and/or materials, such as alloys and color pigments, can expose workers to these metals. But drinking tainted water is the primary way that humans are exposed to heavy metals in detectable amounts. The health problems that can arise from this include cancer and increased risk of diabetes, neurological damage, kidney injuries, and cardiovascular abnormalities. It is known that the general mechanism underlying heavy metal-induced toxicity is the generation of reactive oxygen, which leads to oxidative damage and unfavorable health outcomes. As a result, the use of water tainted with heavy metals is contributing to high rates of illness and death worldwide.

On 20 February I attended the hearings held by the Arizona Department of Environmental Quality. The 200 people who attended were there because they understand the problem of heavy metals in their water supply.

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The Copper World Mine project at the north end of the Santa Ritas will undoubtedly release toxic metals that will find their way into the

aquifer, contaminating the water and making it unuseable for future generations. It will also find its way into the food chain. This is not hyperbolic.

Evidence for metal extraction dates from 8,000 YBP (years before present) in the Near East. Since then, mining and smelting activities have developed almost everywhere humans have settled, resulting in the emission of unexpectedly large amounts of metals into the environment.

The Romans observed the consequences of metals on human health 2100 YBP, with Lucretius, pointing out "the ill effects in the miners' complexions and writing, "How deadly are the exhalations of gold mines!" Thus the negative impacts of mining and smelting on miners, animals, and the environment were recognized long ago. In 2100 YBP, Vitruvius wrote that springs from mining areas were very harmful, while Pliny the Elder, 1900 YBP noticed silver mine emissions affect all animals.

Recently, Camizuli et al. (2018) showed that mines inactive for hundreds of years still harm wildlife today. They (Camizuli et al.) measured cadmium, copper, lead, and zinc concentrations in topsoils and wood mouse kidneys from sites in France's Cévennes and Morvan areas. The maximum levels of metals in these topsoils are one or two orders of magnitude greater than those commonly reported mean values in European topsoils. The transfer of metals from the soil to animals is effective. The lead concentration (and to a lesser extent, cadmium) in wood mouse kidneys increased with soil concentration, unlike copper and zinc, providing direct evidence that lead emitted in the environment several centuries ago is still available to free-ranging mammals today. The negative correlation between kidney lead concentration and animal body condition suggests that historical mining activity continues to play a role in the complex relationships between trace metal pollution and health.

Here is a link to the video clips from the February 20 hearings.

Camizuli, E., Scheifler, R., Garnier, S. et al. 2018. Trace metals from historical mining sites and past metallurgical activity remain



bioavailable to wildlife today. Science Report 8, 3436 https://doi. org/10.1038/s41598-018-20983-0)

To the right. Photo of the Morenci Mine. By Stephanie Salisbury - IMG_4218, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=34971474

A new book on paleoislands. Islands in Deep Time: Ancient Landscapes Lost and Found, by Markes E Johnson, Columbia University Press, New York (2023), \$30.00, 312 pages (paperback), ISBN: 978-0231212182.

In southern Wisconsin, cropland encircling hilltops reveal themselves to be the weathered remains of an ancient island. Standing at the top of a flooded mountain rising from a drowned continental shelf is an island in the Yellow Sea that is popular with Korean tourists. The shadow of a seascape from the Silurian era is visible from a Genghis Khan shrine perched on a mountain in Inner Mongolia. When one looks closely, one can see that 450 million years ago, the borders of Hudson Bay, where polar bears patrol the Arctic tundra, were covered in tropical coastline covered in coral.

To discover the remnants of ancient islands, geologist Markes E. Johnson asks readers to embark on a voyage across deeptime. Hetravelstotwelvelocationsworldwide, peeringboth above and below the current waterlines to discover how historical landscapes have been maintained. This book reconstructs how "paleoislands" appeared under various climatic conditions and environmental restrictions, spanning 500 million years to the



Cambrian through the Pleistocene 125,000 years ago. Discovering remnants of ancient ecologies, Johnson highlights the intricacy of island ecosystems and the significance of protecting these noteworthy locations.

Inviting and accessible, this book is a travelogue that takes readers through time as well as space. Islands in Deep Time shares the adventure of exploring striking locations across geologic eras and issues a passionate call for their conservation.

In his twelve instances, Johnson uses the geological term "monadnock," which is named after the first of his examples, Mount Monadnock in New Hampshire. A monadnock is an isolated rocky hill, ridge, or small mountain that rises suddenly from a gently sloping or almost flat surrounding plain.

Johnson has the ability to see and explain issues from several angles. By doing this, he recreates how "palaeoislands" would have looked under various environmental restrictions and climatic situations (such hurricanes) (as displayed by the palaeoflora and fauna of the former beach and shallow seas, now found as fossils). In doing so, he skillfully gives his readers a tour through deep time to illuminate

the geological remnants of former islands. Furthermore, he demonstrates how anyone interested in geology can start to piece together an island's past existence.

While this volume primarily focuses on traditional ocean islands, it does include some discussion of sky islands.



The Last Page



The image suggests one reason why the Santa Ritas are called sky islands. The middle section of the Santa Ritas, Mt. Wrightson is the tallest peak on the left, Mt. Hopkins is the tallest peak on the right. in the foreground is the Santa Cruz Valley. The photograph was taken from the Santa Catalina Mountains north of Tucson. Photographer is unknown. Photo from the U.S. National Archives.

> Send comments, articles, & announcements to: Friends of Madera Canyon Chatter Editor email: FOMC.Chatter@gmail.com