It is the time of year to think about other people, cultures, and traditions as we celebrate the holidays. Many will rely on coffee and tea to keep their engines firing through both the fun and stressful times of the season. As winter progresses, warming up with hot cocoa becomes a popular pastime. For us at BRMC, it is also a time to reflect on the past year's successes and the hopes for the upcoming year. As we plan for the future, many cups of coffee and tea will be consumed to power our creative process.

We focus on our newsletter and our articles constantly throughout the year. We are always looking for unique studies that relate directly to the Bull Run Mountains, but at the same time looking at the larger global scale of environmental treasures and issues. Recently, I revisited an article on agricultural research that seems timely as we prepare our hot beverages.

With the global economy, many of us have access to ever finer teas, coffee, and cocoa. Many of the world’s best regions for these plants involve growing and harvesting these products where they grow in the optimal conditions. Often these products grow best in mountainous regions where the plants grow on terraced hillsides. This is especially true for both coffee and tea. In the article, the author interviews scientists working to analyze how climate change will affect tea plants. The scientists are studying the effect that changes in weather patterns driven by a changing climate are having on the taste of tea from southwestern China’s Yunnan province, famed for its world-class tea production (Larson, 2015).

The amount of rainfall and its timing is a major factor in both the quality and quantity of tea produced. During the dry part of the growing season, the plant builds up the prized phytochemicals responsible for its taste. When the summer monsoons arrive, which brings 80% of the year's rainfall, the quality of the tea drops within 5 days because of big shifts in the plants’ chemistry. Land temperature increases faster than ocean temperatures, and the gradient between the two is what drives the monsoon system. If the gradient increases with higher temperatures on land, it is believed that the summer precipitation will increase, over a shorter time span, with a lengthening of the dry season. This change not only affects our palates, but it directly affects the farmers.

The tea harvested during the dry part of the growing season with the richer taste and antioxidants that are linked to improved health fetches $200 more per kilogram than the tea harvested during the rainy season. So, for farmers a longer dry season could be a benefit, while more rain could yield more quantity of the less desirable tea. A possible win on both ends as the greater amount of high quality tea, combined with a greater quantity of the less desirable tea, could increase farmers’ income. (continued on pg. 7)
Winter Birding

The summer song of the Wood Thrush has flown the bare woods; the small brown and white-speckled bird has departed for its winter migration to Central America. In one night, the thrush will fly over the Gulf of Mexico to its winter grounds, and not until next spring will the males appear again in our woods, followed in a day or two by the females.

This time of year it is the smaller Hermit Thrush in our local woods, and the chickadees and red bellied woodpeckers that appear at our winter bird feeders. Winter is a particularly good time to start paying attention to the birds—the trees are bare of leaves, birds are visible in the canopy, and the cold winter air always seems to magnify calls through the woods. Winter must have always called attention to bird populations, for it was during the winter that hunters would head out for a holiday tradition of competitive bird hunting, a tradition known as the Christmas “Side Hunt,” according to the Audubon Society.

On Christmas Day in 1900, however, a new tradition was established by ornithologist Frank M. Chapman—a Christmas Bird Census. Since then, the annual Christmas Bird Count organized by Audubon has become one of the largest citizen scientist efforts, spanning the entire North American continent for over a hundred years. Birds are one of the most reliable reminders of animal life on the landscape, and with just a bit of an introduction, any enthusiastic volunteer can hit the ground running and participate in a count.

This December there are several locally organized Christmas Bird Count circles taking place between December 14th and January 5th. Each circle sends out various groups to cover their respective area and compiles their data at the end of the day to report back to the Audubon Society. Prince William Conservation Alliance will be leading a Nokesville circle; Audubon VA is organizing a Manassas-Bull Run group, and the Plains, Virginia is running a count in Fauquier County as well.

With the data from the last hundred years of Christmas Bird Counts and several other surveys, the Audubon Society has created maps that track the changing patterns and bird populations across the North American continent, with some of these data actually informing the Environmental Protection Agency’s 2012 report on climate change. Over the next 50 years, the wood thrush’s range is expected to shift further north into Canada, based on current trends, and only the very southern tip of its range still covers Virginia. This is an overall trend seen in many bird population studies. Benjamin Zuckerberg and Karine Princé tracked 38 common species, including blue jays, Carolina wrens, and goldfinches, in a 28-year citizen science project similar to the Christmas Bird Counts and found that these bird populations shifted north by an average of 7 kilometers a year (Cubie 2015).

The manner in which climate change is actually affecting, and has affected, our own Virginian backyards is the topic of Stephen Nash’s book, Virginia Climate Fever. The ecological flow of species like the wood thrush and blue jays across the State in response to a changing climate is one of the significant changes we will see over the next few decades. In February, Mr. Nash will be speaking at BRMC’s Annual Fundraiser and discussing these changes and the reality that climate change will be for us. We hope you will be able to join us for what promises to be an interesting opportunity to learn more about our landscape and backyards.

References:

HIKE WITH A NATURALIST
1st Thursday of Every Month at 9 a.m.
Join a professional naturalist and discover some of the flora and fauna of the local region. We will meet at the Mt. House before carpooling/travelling to nearby preserves & parks for the day’s hike. This program is free; all are welcome.

WINTER NATURE CAMP
December 22nd & 23rd
Thursday & Friday, 9a.m.—4p.m.
Join BRMC for a winter adventure and learn more about the winter woods. Birds are more easily seen in leafless trees and sounds are magnified in the winter stillness. Dress for the weather—snow makes the day all the more fun. Appropriate for children ages 7-12.
Pre-registration required.
Members: $100/non: $150

VOLUNTEER HOLIDAY PARTY
December 27th, 2016—Tuesday, 6p.m.-8p.m.
BRMC invites all our volunteers to a Mountain House Holiday party to celebrate and show our appreciation for all of your efforts. It doesn’t matter if you came to one trail workday, or every night of Safari—we want to say thank you! We will provide beverages; please bring your favorite holiday dish to share.
Please RSVP to info@brmconservancy.org

CULTURAL & NATURAL HISTORY OF BROAD RUN CREEK
January 14th, 2017—Saturday, 10a.m.—noon
Join BRMC and Turn the Mill Around Campaign as we delve into the rich history of Broad Run Creek. We will explore its early history winding through Thoroughfare Gap and follow the Creek through time as natural and unnatural features impacted to where it now flows today. We’ll also head out into the field and learn about the ecology of this historical stream.
Pre-registration required.
Members: $15/non: $20

GEOLOGICAL EVOLUTION OF THOROUGHFARE GAP
January 22nd, 2017—Sunday, 1p.m.-3p.m.
Speaker: Charlie Grymes, Prince William Conservation Alliance
The rocks at the top of Thoroughfare Gap were once an ocean beach. The core of the Blue Ridge was buried as much as five miles underground. Dinosaurs walked on the reddish rocks that lie underneath Haymarket. The dark rocks exposed at The Plains were hot volcanic lava. Join us to learn the stories about what’s below our feet and above our heads!

ORIENTEERING WORKSHOP
January 28, 2017—Saturday 10a.m.-noon
Ever looked at a compass and wondered how its north-pointing needle is supposed to help you get home? We’ll learn about true versus magnetic north, calculating declination, how to read a topo map, and then of course, how to use the compass to navigate the outdoors.
Pre-registration required.
Members: $10; non: $15
If you ever looked at a plant or animal and wondered how it ended up here, then you have already begun your journey into the science of biogeography. Plants and animals indeed are the most conspicuous and reliable keepers of earth’s history. Physicists have been theorizing since Einstein in an attempt to unify general relativity with quantum mechanics. Scores of books, newspaper articles, and media attention have followed and charted their efforts. All while biogeography, the unifying theory of life and earth, has been known and advanced for over 150 years by some of the greatest scientists in history. Yet, it has remained obscure, if not completely unknown, to most people.

Biogeography unites the theory of life and the geosciences. While the trend in science has been toward specialization, biogeographers swim upstream as they combine many disciplines to explain the distribution of life on earth. The geosciences, including plate tectonics, climatology, and oceanography, explain the physical pressures and limitations to both survival and movement of life on earth, while evolution explains how these pressures resulted in the present plant and animal distributions we see today.

In a paper written by Alfred Russel Wallace in 1858, he postulated the Sarawak Law: “Every species has come into existence coincident in both space and time with pre-existing closely allied species.” This paper was truly the beginning of modern biogeography (McCarthy, 2009). The question then became what is the driving force behind this law. The answer had come to Charles Darwin in 1838 and to Alfred Wallace by 1859 after each read Thomas Malthus’s “An Essay on the Principles of Population”. In a world of limited resources and constant environmental pressures, those traits that allowed for greater reproductive success would be passed on and those that were deleterious would be pruned. It took to the 1950’s and the discovery of DNA to understand how the traits were passed or pruned.

We all have heard of the tree of life, but a better analogy may be looking at life and earth entwined together like a system of roots that in space and time could be followed from any root tip (analogous species) backwards through every junction until you ultimately ended up at the first growth. Within the root matt, each species is most closely related to those directly along its own rootlet. This creeping root mass of gene flow passes over the continents, oceans, and islands. Over time and with careful analysis, this root matt begins to be understood. With genetic analysis, some persistent puzzles start to be solved and an ever-deeper understanding of life on our planet comes together.

To continue the analogy, at times due to plate movements, the root matt would be torn apart, but continue to grow on separate continents. Effectively isolated from each other, the original ancestors would face different selective pressures leading to speciation. This can be seen looking at the Aplocheiloid or killifish of India, Madagascar, Africa, and South America that were all part of the Gondwana continent 130 million years ago (mya). A volcanic ring (Continued on pg. 5)
(Continued from pg. 4) began breaking up Gondwana 125 mya creating the southern ocean ring and marooning Antarctica at the southern pole. As Gondwana separated, the Gondwanan killifish ancestor speciated into the Indo-Malaysian-Madagascar ancestor and the African/South American ancestor. The African/South American ancestor split into the South American ancestor that led to the 7 current species of killifish on South America and the African killifish ancestor. The African killifish ancestor was then split by the Dahomey Gap that separates Africa from east to west leading to 6 current West African species and 6 current East African species. More recently, the Indo-Malaysian-Madagascar ancestor was split into 2 Indo-Malaysian species and 2 Madagascar/Seychelles species. It is interesting to note that genetic analysis of species such as the killifish confirms that even though Madagascar is just off the coast of Africa, its species are more closely related to India. This matches with seafloor analyses that show that the seafloor between Africa and Madagascar is dramatically older than the seafloor of the Indian Ocean.

To illustrate the effect geologic processes have on life, one only needs to look at Antarctica. Antarctica was once full of life, but then the volcanic ring created the southern oceans and changed climate patterns leading to the endless march of cold and ice that brutally drove all but the most basic life forms to extinction. As all native mammals, birds, reptiles, and fish went extinct, only the ancestors of the tenacious Emperor Penguin survived, completely alone throughout the dark winter months.

References:
End of the Year Fundraising Drive!

We have $10,000 in matching funds through the end of the year, help us reach our goal and meet this match!

Increase your membership level or make and additional donation, and your contribution will be matched!

To all who have already sent in your support, we offer a sincere thank you.

Send in an additional donation of $100 or more and receive a copy of BRMC's 22-year retrospective!
(Continued from pg. 1) However, if the weather becomes too dry for too long the buds could be drastically reduced and potentially the plants could die. Analyzing this region in a study that links climate, tea quality, and farmer livelihoods is the goal of a U.S. National Science Foundation 4-year project. This study could also have implications for coffee and cocoa, two other holiday treats. For example, coffee is a highland loving plant that, as temperatures rise, can only move upslope, limiting or eliminating suitable territory worldwide.

As you drink a hot beverage curled up on the couch reading or sitting with family and friends, remember how these plants are connected to the landscape, environment, and people’s livelihood. It is fascinating how life is linked together and inspiring to learn more about the myriad of connections.

References:

According to the Tea Association of the USA, during the course of 2015 over 80 billion cups of tea were drunk by Americans alone—that’s over one half of the US population drinking tea each day.
Yes, I would like to become a member of Bull Run Mountains Conservancy.

Name _______________________________________________________
Organization _________________________________________________
Address ____________________________________________________
________________________________________________________________
Phone _________________________ E-mail _______________________
Referred by _________________________________________________

☐ $15 Student  ☐ $20 Senior  ☐ $25 Individual
☐ $35 Family  ☐ $75 Group  ☐ $100 Sustainer
☐ $300+ Leadership ☐ $1,000+ Benefactor  ☐ $1,000+ Corporate
☐ $5,000+ Conservation Patron  ☐ Other ________

Please make your tax-deductible contribution to:

Bull Run Mountains Conservancy is a membership driven organization.

Become a member today and support our programs and support the public preserve. Your membership provides BRMC necessary funds to operate and shows our foundation and corporate supporters that the public values and appreciates the resource.

Membership Benefits:
• Support environmental and historical programs for all ages
• Support research and management of the natural area
• Discounts on all public programs and camps
• Quarterly newsletter including our program calendar

Bull Run Mountains Conservancy 2016/7 Calendar of Events

December 22 & 23: Winter Nature Camp
December 27: Volunteer Holiday Party
January 14: History of Broad Run
January 22: Geological Evolution of Thoroughfare Gap
January 28: Orienteering Workshop
February 4: Winter Birding Workshop
February 18: Old Home Exploration Hike
February 21: Annual Fundraising Event
February 25: Bat Survey Post Discussion

Directions:
Unless otherwise noted, all programs and events will meet at the Mountain House at 17405 Beverley Mill Dr. Drive in Broad Run, VA across from the Bull Run Natural Area Preserve. Visit us online for more information: www.brmconservancy.org

Take I-66 to Haymarket exit. Go south on Rt. 15. Go west on Rt. 55 for 2.7 miles. Turn right on Turner Rd., then left on Beverly Mill Rd. The Mountain House is on the right at the stop sign. Call (703) 753-2631 for more information.