On May 9th 2016 about 120 people took advantage of the opportunity and the fantastic weather to view the Transit of Mercury. During this event, the solar system’s smallest planet crossed the face of the Sun from our point view here on Earth. Mercury made a crisp, perfectly round, and completely black image against the bright surface of the Sun, in marked contrast to the irregular and fuzzy sunspots also visible on the surface of the Sun at the same time. The site was open for the event from 7 AM to 3 PM. We had 3 astronomers available with 6 scopes set up viewing of the event. About 32 guests and 60 3rd graders along with 30 Teachers/Chaperones from Buffalo Public School # 81 were on hand to witness the event.

Did I mention the weather was fantastic? We couldn’t have asked for a better day, hardly a cloud in the sky. Clearly as an astronomer, I am better suited for observing at night. Yes, I spent the whole day outside observing the Sun without putting on any sunscreen, Ouch!

All in all it was a spectacular day. Thanks to my fellow astronomers Rich Switzer and Jim Maroney for sharing their time and expertise and thanks to the volunteers and staff that helped organize and run the event.

Clear Skies!

What exactly is a Transit? An astronomical transit is when one celestial body like a planet or a moon appears to move across the face of another celestial body, like a star for example, as seen from observer on a particular vantage point (in our case, on Earth). So from our perspective here on Earth, only the planets Mercury & Venus and the Moon can transit the Sun. When the moon passes across the face of Sun we call that a Solar Eclipse. In this case, Mercury, the solar system’s smallest planet and the closest planet to the Sun, passed in front of the Sun from 7:12 AM to 2:42 PM EST and was visible. Mercury appeared as tiny black dot 10 arc-seconds wide moving across the face of the Sun (about 1/200th the width of the Sun). If Mercury was the same size as the Earth, the tiny dot would only appear 2.6 times larger as it traveled across the face of the Sun.

How rare are Transits of Mercury? Transits of Mercury occur about 13 or 14 times per century, so they are rare, but nearly as rare as Transits of Venus. The last transit of Mercury was in 2006 and the next one will occur on November 11, 2019. By contrast the next

continued on page 2
Educator’s Note

This has proven to be an incredible spring for the Education department! Since the end of April, Penn Dixie hosted nearly 40 schools on site and reached over 2,850 people during our on-site school programs. Not only did we see high attendance, but also received positive feedback from many of the teachers and parent chaperons. I would also like to thank all of the volunteers and staff who made these field trips such a great success! Without all of your hard work and dedication our programs would not have received the positive responses and all the smiles on the kid’s faces as they left the site.

As our school field trip season comes to a close, I can now look forward to all of the summer recreation and summer camps that will be happening this summer. Our Penn Dixie camps offer a week of science exploration, hands-on experience and friendship building that will last a lifetime. Our camps are filling up quickly, but we still have some opening in each of our sessions. Be sure to check out our website: www.penndixie.org or call (716)627-4560 for more summer camp information.

Happy fossil hunting!

Sarah
Director of Education

2016 Transit of Mercury continued from front cover

Transit of Venus, which last occurred in 2012, won’t happen until 2117. The 2019 Transit of Mercury will again be visible in the Americas and Europe.

Were any pictures taken? In addition to viewing the event visual thru telescopes with special solar filters (Never look at the Sun without following the proper precautions!!!) images of the event were captured. Photos and videos were captured via smartphones thru the eyepiece of one of the telescopes and Jim Maroney (Penn Dixie’s resident astrophotographer) had multiple telescopes setup to capture the event. We even managed to broadcast the transit live on our Facebook page for a few minutes until the battery in my iPhone was completely drained.

Ernie Jacobs captured this image of the event using an iPhone, 8” Dobsonian Telescope, and a 25 mm Plossl eyepiece. A short video was captured on the iPhone. Software broke the video up into individual images, aligned the images, sorted them for quality, and then stacked the highest quality images to create the final image above. AR2542 is a sunspot.
Director’s Note

Summer has arrived! After spending eight years – and eight grueling summers – in the scorching heat of southern Arizona, I’m very pleased to be living where the temperature has never reached 100 degrees.

Things are heating up at Penn Dixie, though! This year’s Dig with the Experts program hosted 165 fossil collectors – the most ever and more than double our 2015 attendance! We thank Dan Cooper, Don Bissett, and Jeff Aubrey for their help excavating the new part of the quarry and for providing expert guidance on the dig. Zoladz Construction leased to us a brand new excavator which was more than up to the task.

Our guests – who came from a dozen states plus Ontario – were in excellent spirits all day as they found trilobite after trilobite.

The heat was on for our inaugural Scouting Rocks! Program – literally – as the temperature reached 92 degrees in the afternoon. The program drew over 100 scouts and their families to dig for fossils and learn about science and technology. Congressman Chris Collins and Hamburg Town Supervisor Steven Walters provided introductory remarks while our friends from Moog led rocket-making activities. We thank our distinguished guests for their support and for making the program a tremendous success.

Our Children’s Day program was another hit, though cloudy skies kept things a bit cooler at Penn Dixie. We hosted goats, sheep, rabbits, prairie dogs, a tortoise, and other animals from Sun-Dance-Kids-Farm while Mr. NO the Balloon Guy made dinosaur balloons for our attendees. Other special guests included the Town of Hamburg Police Department – and their SWAT vehicle, Big Tree Volunteer Fireman’s Company, Blasdell Volunteer Fire Company, Woodlawn Volunteer Fire Company, Hamburg YES, and Past & Present Fossil and Rock Shop.

Traveling through Lake Erie, the Niagara River, and the Outer Harbor, the annual Miss Buffalo Nature Cruise provided refreshing relief from the weather. Special guests Jerry Bastedo, Will Elliott, Tom Johnston, and Mike Morgante gave excellent commentary along the way.

Penn Dixie welcomed nearly 3,000 K-12 students and chaperones to the site this spring! We relied heavily on our dedicated volunteers to accommodate the large groups and cannot thank them enough for their help. Our staff grew as well: we added educators Phillip Queiroz and Tasha Mumbure, marketing assistant Alex Krycia, and development associate Patrick Miller. Not to be outdone, our board of directors gained Hanna Burkett, David Hanewinckel, and Frank Scarpinato. If you haven’t noticed, we changed the format of our newsletter. Editor Bry Gwirt has accepted a position as development assistant at Hunter’s Hope and we salute her for this achievement. Bry gave us some very useful guidelines for developing our own social media and marketing and we cannot thank her enough for her feedback.

Looking forward, I call attention to some of our upcoming programs:

• A free cookout for our members on Saturday, July 30 – you deserve it!!
• The Classical Planets of Antiquity also on Saturday, July 30 – five planets, one night! Galileo himself would attend if he wasn’t fossilized.
• Mid-Summer Night’s Adventure on Saturday, August 13 – is there anything cooler than astronomy plus late-night fossil collecting?
• Bricks & Digs on Saturday, September 10 – building LEGO dinosaurs and digging for fossils together in the same program! We can’t wait!!

Finally, I’m pleased to announce a new partnership with the Aquarium of Niagara! As part of the deal, Penn Dixie members will receive 50% off daily admission at the Aquarium. And, our first joint program will take place at the Aquarium on Saturday, June 25. Additional details will soon be posted at penndixie.org.

That’s all for me – I’ll see you at the site!

Phil
Constellation: Sagittarius “The Archer”
by Rich Switzer

Myth: Sagittarius is a centaur, or half-man, half-horse. The archer represents the upper body of a man growing out of the body of a horse. The man’s body replaces the neck and head of the horse. Sagittarius is associated with Crotus, the son of the god Pan and the nymph Eupheme. Crotus begged Zeus to be placed into the heavens upon his death.

What to view: The shape of this constellation looks just like a tea pot with handle, lid, and spout. The stars that form the handle and lid are known as the “Milk Dipper.” Sagittarius lies directly in the plane of the Milky Way. The star Al Nasl marks the spout’s tip, which lies near our galactic center – the hub of our galaxy. Many star clusters and nebulae are in this constellation. Look for the M22 and M24 star clusters and the two great nebulae Trifid and Lagoon.

Above: Our Dig with the Experts program gave professional collectors and fossil enthusiasts alike the opportunity to dig in a freshly excavated part of our quarry.

Left: Charlie the Tortoise – part of the petting zoo from Sun-Dance-Kids-Farms – is just a bit too short to use the telescope at Children’s Day.

This May, Girl Scout Troop 31319 installed a new rain barrel at our education pavilion. Collected rainwater will be used for fossil cleaning and preparation.

Jake Clancy completed his Eagle Scout requirements by constructing a new nature trail at Penn Dixie in June. Read more about Jake’s project on our blog at penndixie.org.
Hidden Treasures

by Amanda Martin, M.S. Biological Sciences

It was just another nature tour, the group of students chattered under the trees as they looked back and forth trying to find any kind of animal nearby. The birds sang, squirrels climbed the trees and then the group reached the special spot. To many people, it looks like a junky wooden board, what could it possibly hide underneath? The tour guides paused at the board to explain and waved for the students to stop and gather around. “Hello everyone, what you see here in front of you is a cover board. This summer, we are conducting a herpetofauna survey where we are examining the different types of reptiles and amphibians that live here at Penn Dixie. This is a demonstration board that anyone can look under to see what types of critters are hiding underneath. So far, we’ve only found invertebrates underneath (earthworms, slugs, and bugs). I wonder what we will find today.” The guides lifted up the board and underneath they could see a small black tail. Quickly, but carefully the guide caught the small creature to reveal the first salamander found underneath the board and for the study!

They found a red-backed salamander, the red-backed morph (Plethodon cinereus). Unlike the lead-back morph, which is completely black, the red-backed morph has a long red stripe running down the middle of its back with black sides on their long and slender bodies. Of the 11 salamander species living in Erie County New York (Mudpuppy, Jefferson, Blue-spotted, Spotted, Red-spotted newt, Northern Dusky, Allegheny Dusky, Northern Slimy, Four-toed, Northern Spring, Northern Two-lined), the red-backed is the most likely candidate to be found underneath the cover board since it is an abundant, terrestrial species. This species is found in wooded or forested areas and hides under a variety of objects such as logs, bark, stones, etc. They prefer moist environments because they do not have lungs and breathe through their skin. They will hunt at night looking for small insects, slugs, and worms to eat. Unlike aquatic salamanders, females will lay their eggs (6-12 eggs) inside rotten logs, where she protects them by curling her body around the eggs until they hatch.

Cover boards are a great tool to find salamanders, but they are even more effective for finding snakes, which some people confuse with salamanders. There are some similarities, but also several differences between these two. Both are ectothermic, they move in and out of areas with heat to regulate their body temperature and they both have long slender bodies. However, salamanders are amphibians and snakes are reptiles. When identifying an amphibian vs. a reptile, look at these major characteristics: skin type, feet, and body shape. Amphibians have smooth, moist skin whereas reptiles have scales (they are not slimy). If you look at the individual’s foot, amphibians have webbing, whereas reptiles have claws (except for snakes). Finally, color patterns will vary quite a bit, even within each group, but once you learn the basic shapes (frogs and toads do not have tails, turtles and tortoises have shells, etc.) it is easier to differentiate between amphibians and reptiles. Each organism plays an important role in its environment and conducting surveys are an important part of understanding the natural world around you. This amazing sighting is hopefully the first of many in the future of our herpetological survey.
Across

3. I am a smart medium sized black bird that can be seen all over; I make “cawing” sounds
5. I go from flower to flower looking for pollen while making buzzing sounds
7. I hop into ponds when predators get too close and I eat bugs with my long tongue
8. I find and store nuts; I have a bushy tail and can be gray, red, black or white in color
11. I sleep during the day and fly around at night using echolocation to find bugs to eat
12. At birth, I swim with a tail, which slowly disappears as I start living on land
16. I am an insect that has a name like a large mythical creature combined with an annoying buzzing insect
18. I am a quick bird that has sharp talons
20. I am a small insect that can jump really high and some people will eat me
22. I spend most of my time in the water and I am well protected by my hard shell
23. I like to prance around and eat vegetation in the forest
24. I am quick and I dash around on the ground with my fluffy cotton-tail
26. I like to fly around at night and I can turn my head around 270 degrees
27. I am really slimy mollusk that does not like salt
29. I spend most of my time flying by the lake, but I also like to yell “mine” a lot

Down

1. I like to travel in flocks, leaving a triangular shaped footprint, and I like to gobble
2. I am a small mammal that squeaks, I have pointed ears and a long tail
4. I am an amphibian, but I have multiple warts on my body
6. I am an insect that flies around at night, but I am not as brightly colored as the insect that flies around during the day
9. I am a bird that likes to sing in early spring and has a visible red chest and belly
10. I have a red furry coat and a large bushy tail
11. I like to flutter around in gardens and have many different patterns on my wings
13. I am an invertebrate that spends all day digging tunnels in the dirt
14. I am a large mammal that howls at night
15. I am a worm-like insect that changes shape when metamorphosing in a cocoon
17. I am a large bird that eats dead carcasses
19. I am a large bird that makes honking sounds and I visit from another nearby country
21. I spend a lot of time in trees, but many recognize the black mask I wear on my face
25. I am a really tiny mollusk with a shell that is slower than a turtle
27. I like to build silky webs in the forest and can be found hiding under rocks
28. I like to slither in the grass and sun my body on rocks

Answers on Page 7
Penn Dixie Summer 2016 Programs

Saturday, July 30th • 4-9 pm
Member Appreciation
COOKOUT

Join us for an evening of celebration in honor of our members! Featuring food, games, fossil collecting, astronomy, and awards, this program will have a little something for everyone. Co-sponsored by the Buffalo Association of Professional Geologists. RSVP at penndixie.org or 627-4560 by July 22. FREE for Penn Dixie members and their immediate families; guests welcome at $5/person.

Saturday, July 30 • 7:30 pm
THE CLASSICAL PLANETS OF ANTIQUITY

Telescopes will focus on all five naked eye visible planets (Mercury, Venus, Mars, Jupiter and Saturn). Penn Dixie astronomers will trace out The Summer Triangle (Vega, Deneb, & Altair) in the east. M57 the Ring Nebula in Lyra and the Star Albireo in Cygnus and the summer constellations will also be visible. A few leftover meteors from the Delta Aquarid Meteor shower may be visible in the moonless sky. FREE for members, $4 for non-members.

Saturday, August 13 • 5-11 pm
MID-SUMMER NIGHT’S ADVENTURE

Join us as we venture out to our collecting site to search for fossils at night, but don’t forget your lantern or flashlight to help you find your fossils. Sunspot viewing will be available until dusk. After dark, telescopes will focus on the waxing gibbous Moon and all five naked eye visible planets (Mercury, Venus, Mars, Jupiter and Saturn). The Summer Triangle will be high in the east for good viewing of M57 the Ring Nebula in Lyra and the Star Albireo in Cygnus. Meteors from the recently peaked Perseid Meteor Shower may also be visible. A few leftover meteors from the Delta Aquarid Meteor Shower may be visible in the moonless sky. FREE for members, $4 for non-members. Adults $9, Children $7, FREE for members.

Saturday, September 10 • 12-4 pm
BRICKS AND DIG

A new Penn Dixie program in partnership with Bricks 4 Kidz! In a guided workshop, children will learn, build, and play with LEGO Bricks to make dinosaur models. Fossil collecting expeditions and nature tours will also take place during the program and our experts will be on site to identify geological treasures. Our telescopes will be available for viewing sunspots as well. In recognition of National Grandparents Day, all grandparents are admitted free for this program. Non-grandparent adults: $9, Children 3-12: $10, Member adults: FREE, Member children: $5. Pre-register at penndixie.org to save $1 per ticket.

Crossword Puzzle Answers

<table>
<thead>
<tr>
<th>Across</th>
<th>Down</th>
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</thead>
<tbody>
<tr>
<td>3. Crow</td>
<td>1. Turkey</td>
</tr>
<tr>
<td>5. Bumblebee</td>
<td>2. Mouse</td>
</tr>
<tr>
<td>7. Frog</td>
<td>4. Toad</td>
</tr>
<tr>
<td>8. Squirrel</td>
<td>6. Moth</td>
</tr>
<tr>
<td>12. Tadpole</td>
<td>10. Fox</td>
</tr>
<tr>
<td>22. Turtle</td>
<td>15. Caterpillar</td>
</tr>
<tr>
<td>23. Deer</td>
<td>17. Vulture</td>
</tr>
<tr>
<td>27. Slug</td>
<td>25. Snail</td>
</tr>
<tr>
<td>28. Snake</td>
<td>27. Spider</td>
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</tbody>
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The programs of Penn Dixie are supported by public funds from the County of Erie, the Town of Hamburg and Hamburg Gaming and by our members and friends.
Dig for Fossils at Penn Dixie

THE #1 FOSSIL PARK IN THE U.S.

SAVE $7.00

Use this COUPON for ONE FREE child admission on public collecting days.

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Penn Dixie Today

380 million years ago

Penn Dixie’s Bricks & Dig

Saturday September 10
12 - 4 pm

BUILD A DINOSAUR, DIG FOR FOSSILS, AND MORE!

More info: penndixie.org

Mid-Summer Night’s Adventure

Saturday August 13
5 - 11 pm

Gaze at the night sky
Search for fossils by lantern light

4 Kidz.com
We Learn, We Build, We Play with... LEGO® Bricks