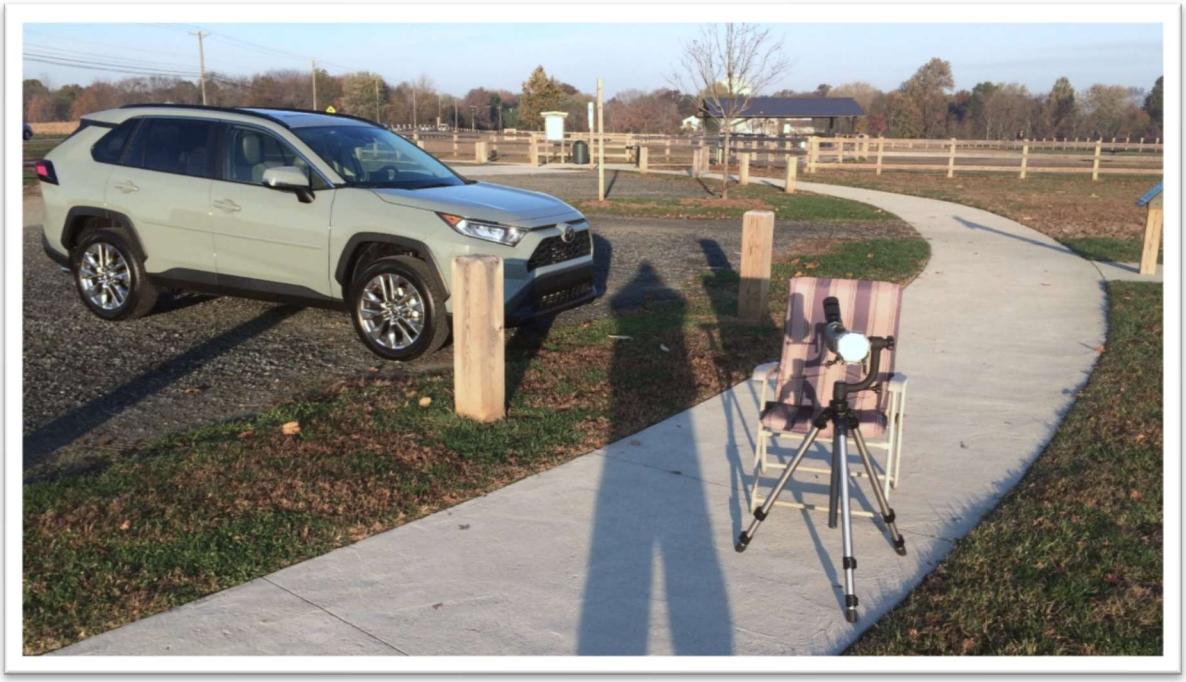
Observing Report for November 11, 2019 – Transit of Mercury

by Joe Stieber

Initially, I went to Swede Run in Moorestown, NJ, to watch first and second contacts, which would occur about 7:36 am EST. Predicted contact times were generated by the United States Naval Observatory's MICA 2.2.2 software for a location of 40°N-75°W, a few miles each from Swede Run and Merchantville, NJ, where I watched the later part of the transit. Interestingly, a synthetic solar image generated by WinJUPOS software indicated the same contact times (to the nearest tenth minute) as MICA.

I arrived at 7:09 am and set up my Kowa 88 mm, f/5.7 apo fluorite triplet spotting scope, which is really a fine astronomical-quality refractor. The standard zoom eyepiece provides 25 to 60x magnification, but I used the 1.6x extender at Swede Run to provide 40 to 96x. A DayStar SolarLite metallized mylar filter was fitted over the front of the scope (and secured with gaffer's tape), yielding an orange-colored solar disc. The scope was mounted on a Magnus gimbal head atop a Slik tripod as shown in the photo below…



Taken at Swede Run with an Apple iPhone 5s at 7:28 am EST when the sun was at 7.6° altitude.

The long shadow of me taking the picture reflects the low altitude of the sun, which rose at 6:40 am. My observing chair sits behind the scope, and my new Toyota RAV4 is at the upper left. The old RAV4 was retired last week after 14½ years of service. In the background, the wooden fence encloses a pair of dog runs at this Green Acres site. Crops are still grown here, surrounding the parking area and the dog runs, as well as the other side of adjoining Westfield Rd. In the past, soybeans were planted, but this year it was corn, which reached 6 ft high. To some extent, the corn blocked the horizon (the soybeans only got to 2 or 3 ft high, so they hadn't been a factor). However, the corn stalks were harvested last week.

The weather was uncharacteristically favorable for a November transit (this is the first November transit I would see). It was generally cloud free, but towards the rising sun in the southeast, there were some streaky thin clouds. The sky itself was a bit milky-blue, so transparency wasn't ideal. Throughout the 5½ hours of the transit, the sky remained milky-blue with some wispy thin clouds and many contrails, such that it always looked hazy around the sun. The temperature ultimately exceeded 60°F, so it was quite pleasant to sit outside in the warmth of the sunlight.

Anyway, I sat down and started watching the sun continuously at 7:30 am in anticipation of first contact at 7:36:04 am EST. Seeing was poor at the sun's low altitude (8.9° at first contact) and the entire circumference of the limb rippled considerably. It was therefore difficult to pick out the ingressing silhouette of Mercury in the welter of ripples, especially since the point of entry was a virtual location, estimated to be about the 7 o'clock position on the solar disc.

Observing with the scope at 96x, I thought I saw a couple of blips of Mercury in the ripples beforehand, but I didn't see an unambiguous disc segment until 7:36:27 am, 23 seconds after the predicted time. For my timings, I used a reliable and accurately-set quartz wristwatch, which I checked it against the NIST/USNO web clock at https://time.gov/ shortly before heading out (the differential was zero).

The disc of Mercury continued to emerge from the limb, and at 7:37:40 am, I saw a "black drop" effect (more like the diffraction lines seen when slowly bringing a thumb and forefinger together in front of one's eyes). This was 5 seconds before the predicted second contact at 7:37:45 am.

For the following half-hour, I continued to watch the black silhouette of Mercury's tiny, 10 arc second diameter disc trudge across the sun's nominal 32 arc minute disc (more precisely, 1,939 arc seconds per MICA, or 194x the diameter of Mercury). I left Swede Run for home with the intention of taking some snapshots when the sun was high enough to clear obstructions as seen from my back yard. However, I decided to call a friend in Merchantville on the way. He was imaging the sun from a football field local to him. It wasn't that far, so I decided to stop by.

I didn't set up the spotting scope on arrival, instead I was helping him with battery and sunlight shielding issues with his imaging rig, plus I spent some time just sitting in the pleasant weather. As they say, time flies, and when it reached 11 am, just two hours until last contact, I decided I wasn't going to rush home and set up a camera. There would be innumerable pictures taken of what was, frankly, a relatively boring event. Even though I'm a devoted Mercury spotter at each of its elongations (now 56 in a row since January 2011), watching Mercury's silhouette cross the solar disc is a bit like watching cement harden. The beginning and the ending contacts would be the most interesting aspects to me.

So, I set up the scope, this time without the 1.6x extender, and watched intermittently at different magnifications until Mercury approached the solar limb around 1 pm, when I started watching continuously at 60x. By then, seeing was much better than it was for the morning contacts, but there was still some shimmering at the limb. I saw the "back drop" effect again at 1:02:40 pm EST, the same as the predicted third contact time. Then at 1:04:15 pm, I saw my last recognizable glimpse of a segment of Mercury's disc, 6 seconds before the prediction for fourth (and final) contact.

To try and minimize any influence by the predictions, I did not check them before leaving the house or after I got to either of the fields. I just remembered that the transit began about 7:36 am and ended about 1:04 pm. Remember, these are topocentric times for 40°N-75°W and are 37 seconds later at the start and 7 seconds later at the end compared to the more commonly published geocentric times.

Here's a table of the contact times (hr:min:sec, Eastern Standard Time in each case)…

Contact: Mercury Altitude**:**	**First** 8.7°	**Second** 8.9°	**Third** 29.9°	**Fourth** 29.7°
Predicted by MICA: Observed by Joe:	7:36:04 7:36:27	7:37:45 7:37:40	13:02:40 13:02:40	13:04:21 13:04:15
Delta Time, Joe vs. MICA:	0:00:23 after	0:00:05 before	00:00:00 --	00:00:06 before

I was somewhat surprised by how close my observed times were to the predicted times, and indeed there may be a fair amount of dumb luck involved. However, I would note that the one timing that was most different from the predictions was first contact. That's also the only one that was a "blind" contact, i.e., unilluminated Mercury was invisible against the black sky around the sun (because of the dense solar filter) and couldn't be seen until it was actually a bit onto the disc. And as noted before, the limb of the sun was wriggling from poor seeing, which tended to obfuscate the ingressing silhouette.

All in all, I was satisfied with my observations of the transit as well as the experience of watching it. I was also unconcerned about not capturing an image of it. Had I done so, it would have been just another picture of a blank solar disc with a tiny black spot, just like virtually all of the blizzard of images already posted online and on message boards.

One notable exception is Thierry Legault. During the Mercury transit of 2016, he captured an ISS transit simultaneously – from a nearby Philadelphia location of all places! This time, he was in Chile and he captured the Hubble Space Telescope transiting during the Mercury transit. The image was posted at Spaceweather.com: https://spaceweathergallery.com/indiv_upload.php?upload_id=157419

I hope to spot Mercury and capture a wide-field image of it the week of November 17, 2019, after the Winged Messenger has swooped far enough west of the sun into the morning twilight. By November 20, Mercury reaches 6° altitude at 6 am and will be 27% illuminated, magnitude +0.5. Weather permitting, I may try a day or two earlier or later, as I want to get the spotting scope on it to see the crescent visually.

Joe

P.S. – Here's a close-up crop of the initial image, which shows the scope, filter and mount a little better.

Last edit: 17-November-2019