TO CHASE A VERY SMALL DOT

By Ernie Piini

Finding and photographing the planet Mercury as it passes in front of the Sun was a challenge that I could not ignore. The weather forecasts for the week of November 5 thru 11, 2006, were for mostly clear skies, with the exception of November 8, the day of the Mercury transit, when all the weather men predicted rain. Sure enough, the day dawned overcast and gloomy; however, at 10:35 a.m. The Sun came out from behind the clouds and the rest of the day was perfect! This would be my second attempt, having photographed the Mercury transit from Canberra, Australia, in 1993.

It takes fairly high-powered equipment to photograph a small dot in front of the Sun (see Photo #1). I set mine up in my driveway in San Jose (see Photo #2). First there was my home-built 8-inch Newtonian telescope (f/5.6), with a Baader density -5 solar filter (reduces sunlight intensity by 100,000 times), with a Canon "Rebel" digital camera attached. Another system, alongside, consisted of my Canon GL-1 camcorder on top of a Takahashi mount—the same system I used for the 2004 Transit of Venus.

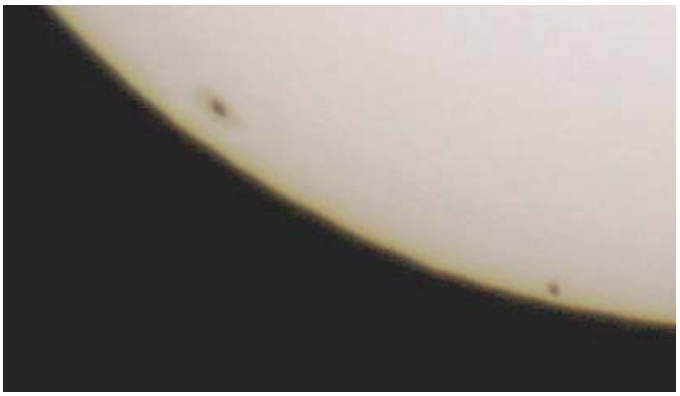

Photo #1. First appearance as Mercury passed 2nd contact at 11:15:30 a.m. Mercury is the small dot to the right just inside the Sun's limb. A sunspot is on the left. First contact is when Mercury just touches the limb of the Sun (on ingress); second contact is when all of Mercury appears inside the limb.

I was joined by my neighbor, Billy Mac, who brought his Berkut 70 mm x 25 power binoculars, which provided us with a clear view of a sunspot and the tiny image of the planet Mercury. Billy, much younger than I and with much keener eyesight, helped me find the itty-bitty spot in both my viewers. Throughout the event, we used the location of the sunspot to locate Mercury. Other amateurs joined our party, including Dick Nelson, who brought his camcorder setup, a homemade azimuth-elevation mount that tracked the movement of the Sun during the 4 hour, 56 minute transit.

I took 45 exposures with the digital camera and about the same number of video exposures with the camcorder. I downloaded the digital exposures into my eMac computer using the iPhoto software application. This gave me the capability to enhance each photo and to magnify the area where the image appeared. Much to my enjoyment, every exposure clearly revealed Mercury in front of the Sun (see Photos #3 and #4). I then used Adobe Photoshop 7 to crop and position the photos for printing. Unfortunately, my Canon GL-1 results were not as good as I liked. I have set them aside for later evaluation. To mark our initial success everyone present enjoyed a tailgate party during the noon break.

Three photos appear in this report. All exposures were taken using 1/1000- or 1/2000-second exposures, ISO = 100, camera set for maximum resolution of 6.3 Megapixels.

It is interesting to compare the size of the home-made equipment for this year's transit to the equipment Joe Shrock and I built for the November 6, 1993 Australian transit of Mercury. That system consisted of four major parts: 1.) a simple heliostat; 2.) a 5-inch

double folded refractor with 72-inch focal length, and an eyepiece used to project the image onto a large screen; 3.) a projection screen; and 4.) two camcorders on tripods to record the images (see Photo #5). I designed the heliostat and refractor, and Joe designed the projection screen housing.

The heliostat tracked the Sun across the sky. A telescope magnified its image and projected it onto the screen up to 12 inches in diameter. The image size of Mercury is only 10 arc-seconds wide—1/194th the apparent diameter of the Sun.

In the afternoon, a very strong wind came up just as the transit began. The image jittered excessively, a dilemma overcome when we managed to record Mercury with our camcorders during those few still moments.

The writer wishes to thank my editors, May Coon and Joe Heim, for their always gracious work.

Photo #2. The author with his home-built, 8-inch Newtonian reflector (f/5.6) used for the 2006 transit.

Photo #3. Mid-transit at 1:41:00 p.m.—the moment of deepest penetration when Mercury lies closest to the Sun's center.

Photo #4. My last exposure was taken as the Sun set above my neighbor's two-story house at 3:55:08 p.m. Mercury was captured near the Sun's right-hand limb. The transit ended at 4:08 p.m. The 4 hour, 56 minute transit began at 11:12 a.m.

Photo #5. The author and Joe Shrock behind the projection system used in Australia.