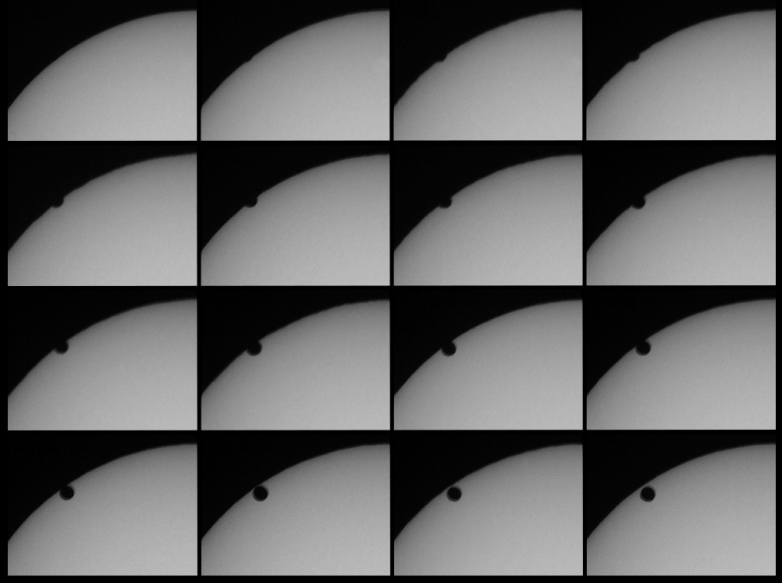
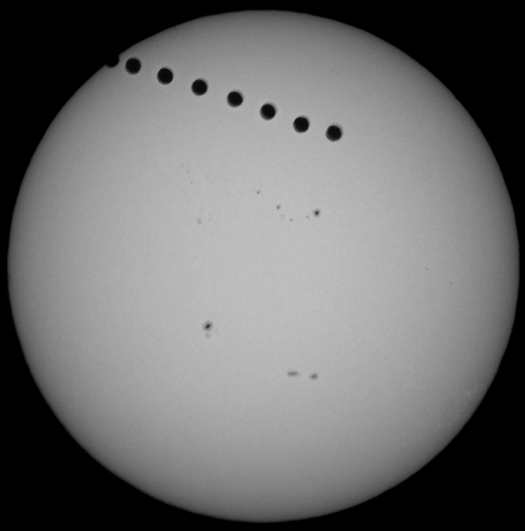
Transits of Venus

June 8, 2004
June 5, 2012





An Astrophoto Album

by

David B. Viscio

December 2014

Introduction

A transit of Venus across the Sun takes place when the planet Venus passes directly between the Sun and Earth, becoming visible against the solar disk by obscuring a small portion of it. During a transit, Venus can be seen from Earth as a small black disk moving across the face of the Sun. The duration of such transits is usually measured in hours (the transit of 2012 lasted 6 hours and 40 minutes). A transit is similar to a solar eclipse by the Moon. While the diameter of Venus is more than 3 times that of the Moon, Venus appears smaller and travels more slowly across the face of the Sun because it is much farther away from Earth.

Transits of Venus are among the rarest of predictable astronomical phenomena. They occur in a pattern that generally repeats every 243 years, with pairs of transits eight years apart separated by long gaps of 121.5 years and 105.5 years. The periodicity is a reflection of the fact that the orbital periods of Earth and Venus are close to 8:13 and 243:395 commensurabilities.

The last transit of Venus was on June 5 and 6, 2012, and was the last Venus transit of the 21st century; the prior transit took place on June 8, 2004. The previous pair of transits was in December 1874 and December 1882. The next transits of Venus will be December 10 and 11, 2117, and December 8, 2125.

I was fortunate to be able to observe and photograph both transits of this rare event.

June 8, 2004

I was attending a business course at Northwestern University north of Chicago along the western shore of Lake Michigan. When the sun rose in the morning the transit was almost finished. Heavy fog over the lake provided all the ‘filtering’ I needed to safely obtain a few photographs out the window of my room. However, the fog presented difficulties for focusing the sun’s image and achieving proper exposure as the sun slowly rose out of the fog. In the time I had available I was able to obtain 14 raw images.

Equipment: Nikon Coolpix 5700 digital camera with TC-E15ED 1.5x teleconverter lens on a stationary tripod

Exposure Criteria: ISO 100
Image 1: 1/45 second
Images 2 - 6: 1/500 to 1/2000 second as the sun slowly rose out of the fog

Images were taken manually and saved in highest-quality 8-bit JPEG format.

June 5, 2012

The second transit was photographed at my location in Prescott Valley, Arizona (Lat: north 34° 39' 8.0", Long: west 112° 19' 31.6"). Transit first contact occurred at about 3:00 PM and fourth contact at about 8:50 PM. I was able to photograph the transit until about 6:50 PM when the sun sank behind my house to the west, obscuring the final 2 hours of the event.

Equipment: Celestron C5+ Schmidt-Cassegrain OTA (1250mm f/10)
Canon 20Da DSLR at prime focus
Paramount MX German equatorial mount

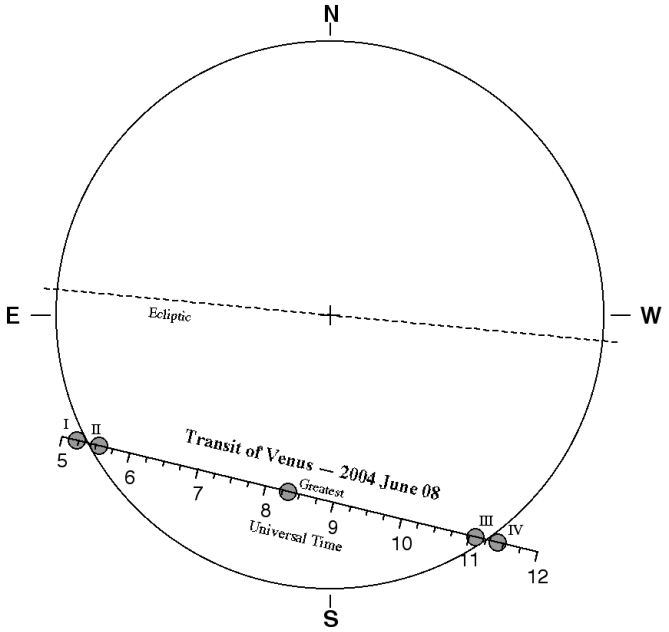
Exposure Criteria: ISO 100
1/200 second

The camera was controlled using Canon EOS Utility software. Raw images were saved as highest-quality 8-bit JPEG.

During ingress (period from just before first contact until just after second contact), images were taken every 20 seconds. During the rest of the transit, images were taken at a 1-minute interval. A total of 282 raw images were acquired.

All images from both transits were processed and optimized in Adobe Photoshop CS2, using minimal adjustments in Levels and Curves in obtain final images I liked. Final images were saved in 8-bit color TIFF format. For this album, images from the June 5, 2012 transit were converted to 8-bit Grayscale.

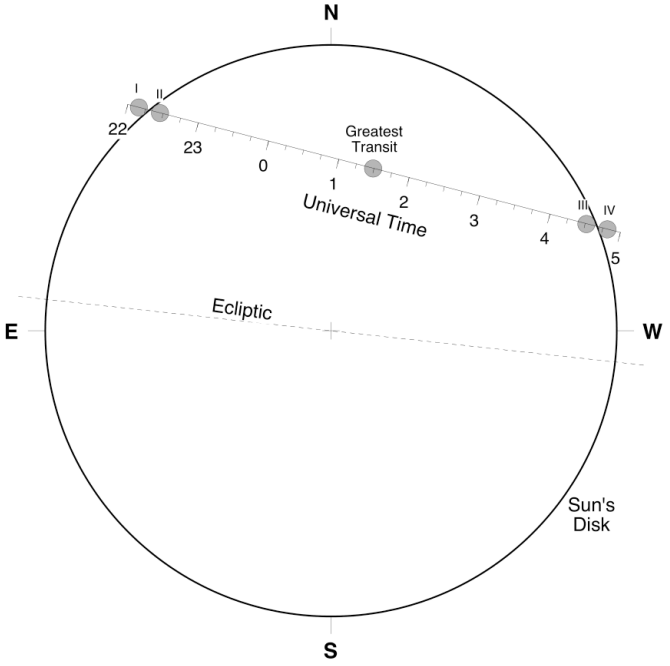
Transit of Venus - 2004 Jun 08



2004 Venus Transit Contact Times

I	= 05:13:29 UT
II	= 05:32:55 UT
Greatest	= 08:19:44 UT
III	= 11:06:33 UT
IV	= 11:25:59 UT

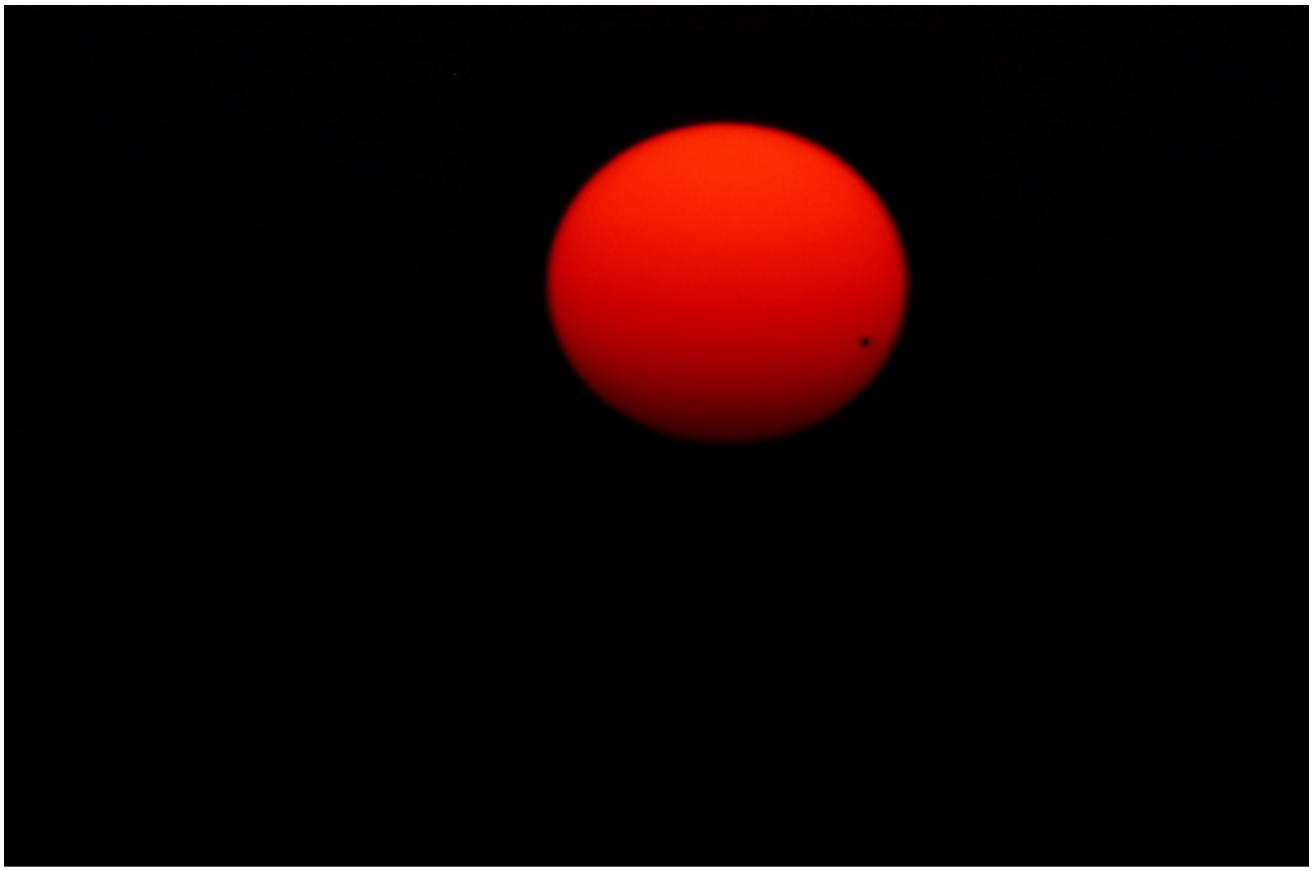
Transit of Venus of 2012 June 05/06



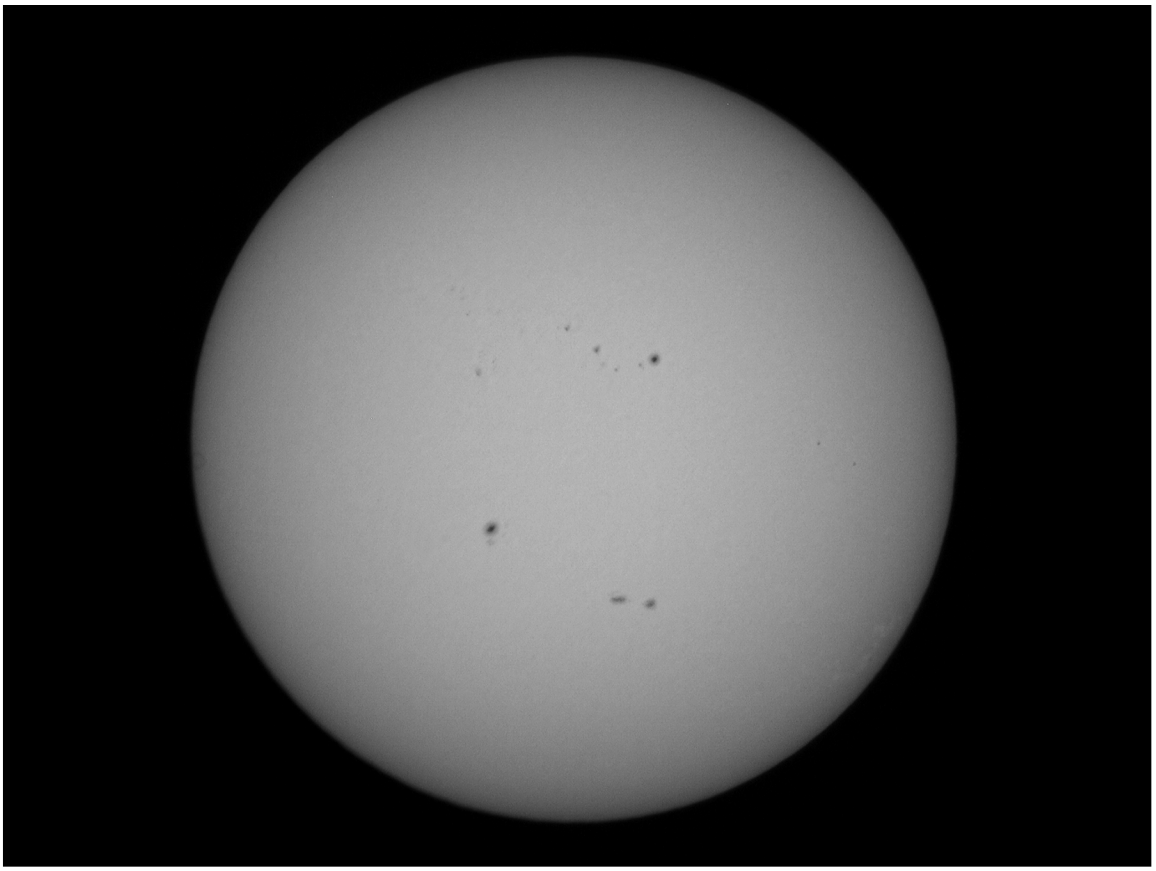
Venus Transit Contacts

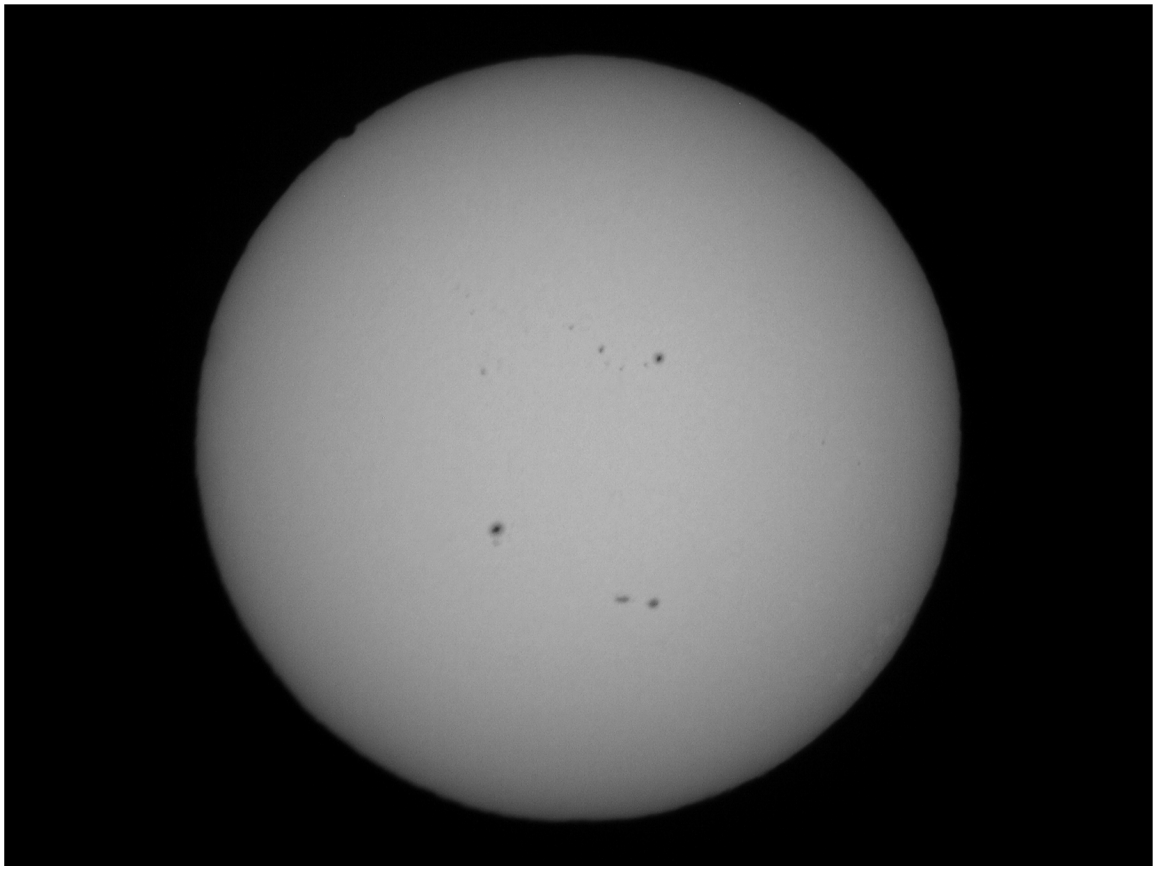
I	= 22:09:38 UT
II	= 22:27:34 UT
Greatest	= 01:29:36 UT
III	= 04:31:39 UT
IV	= 04:49:35 UT

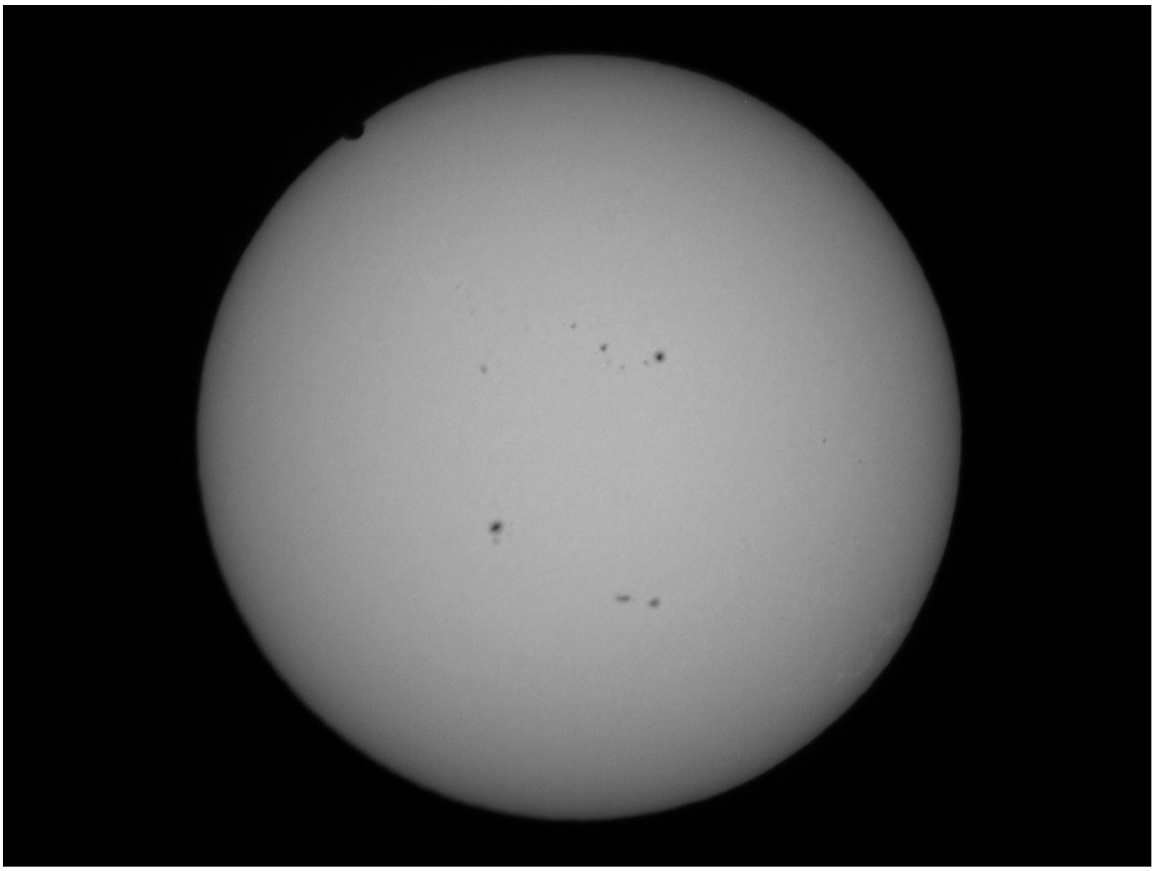
June 8, 2004

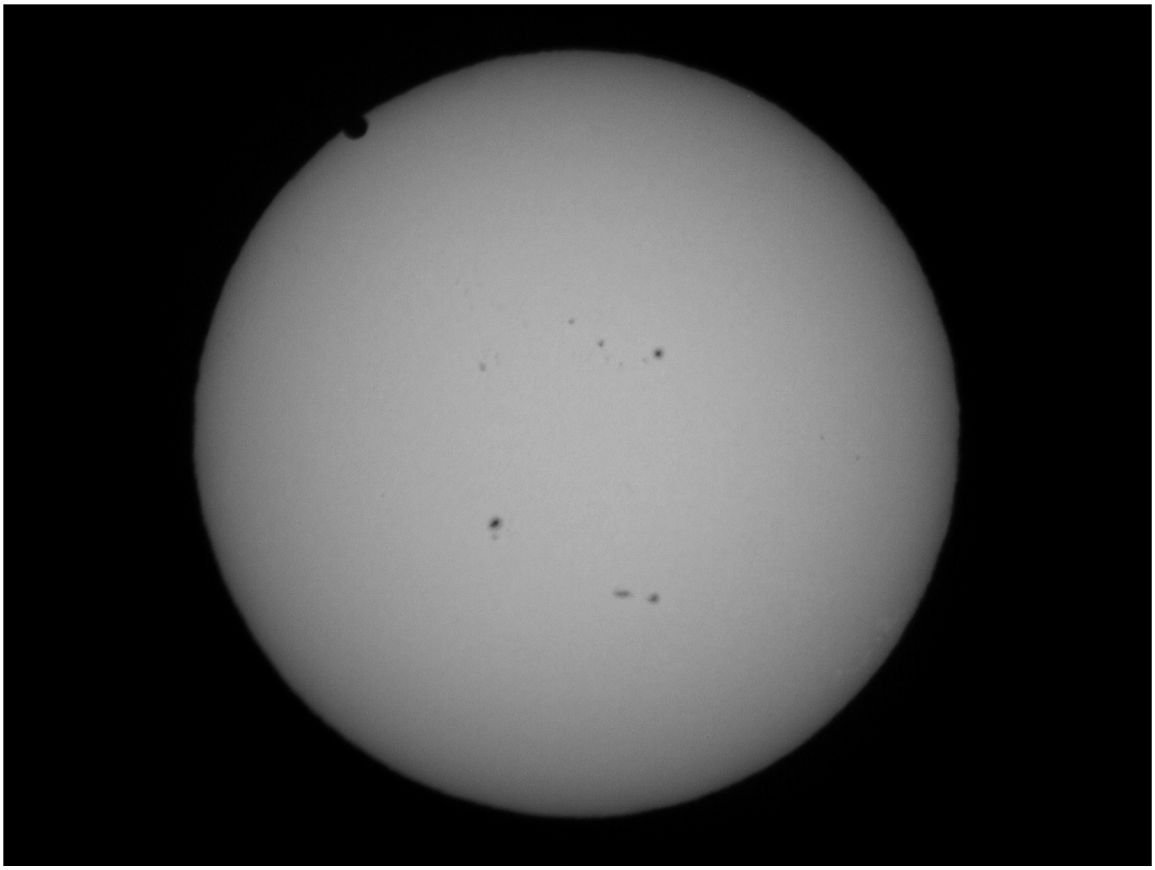


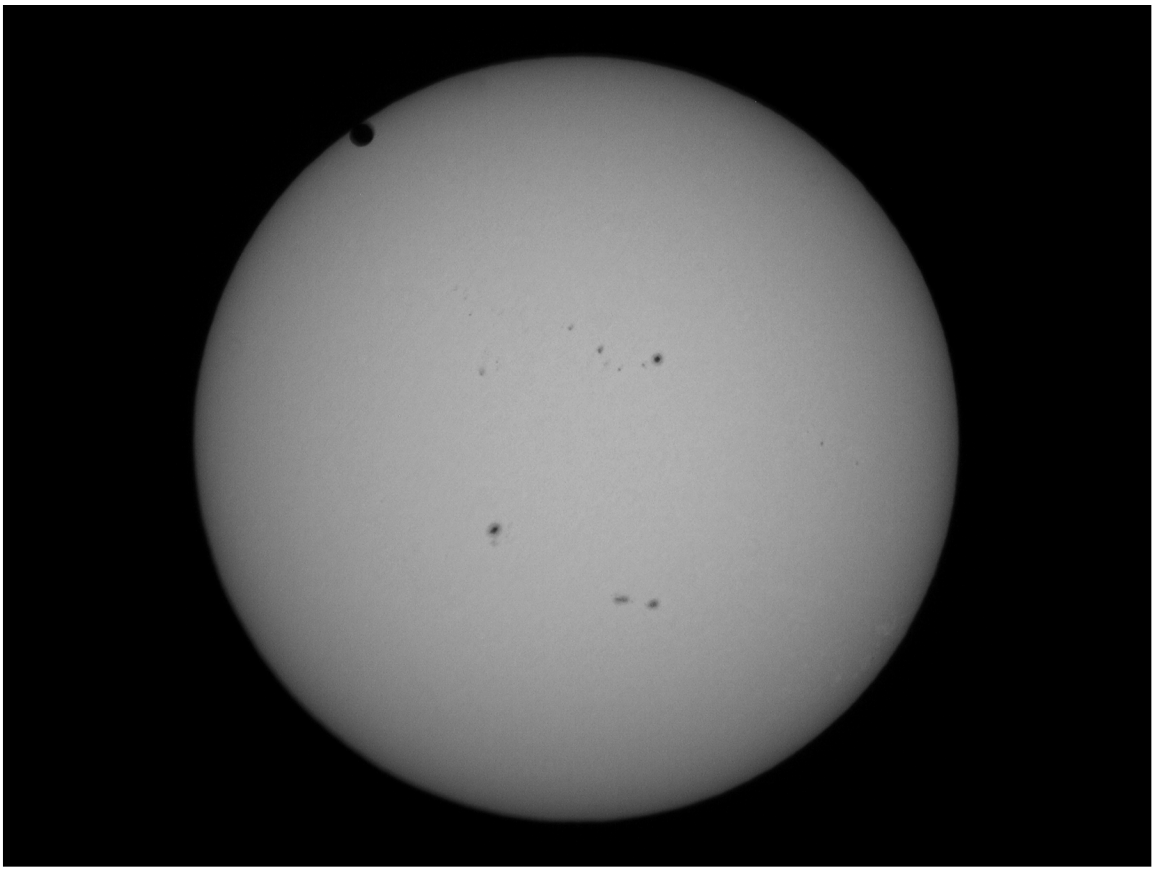
June 5, 2012

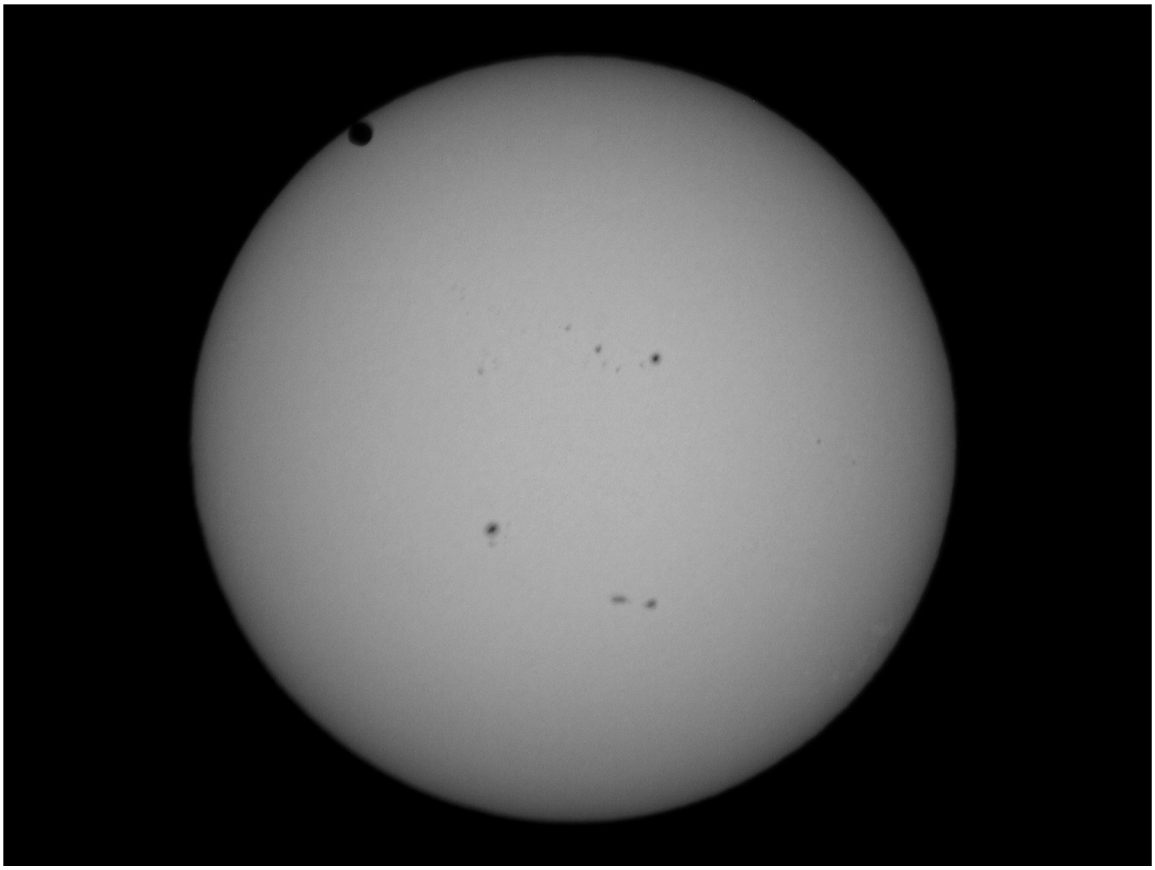


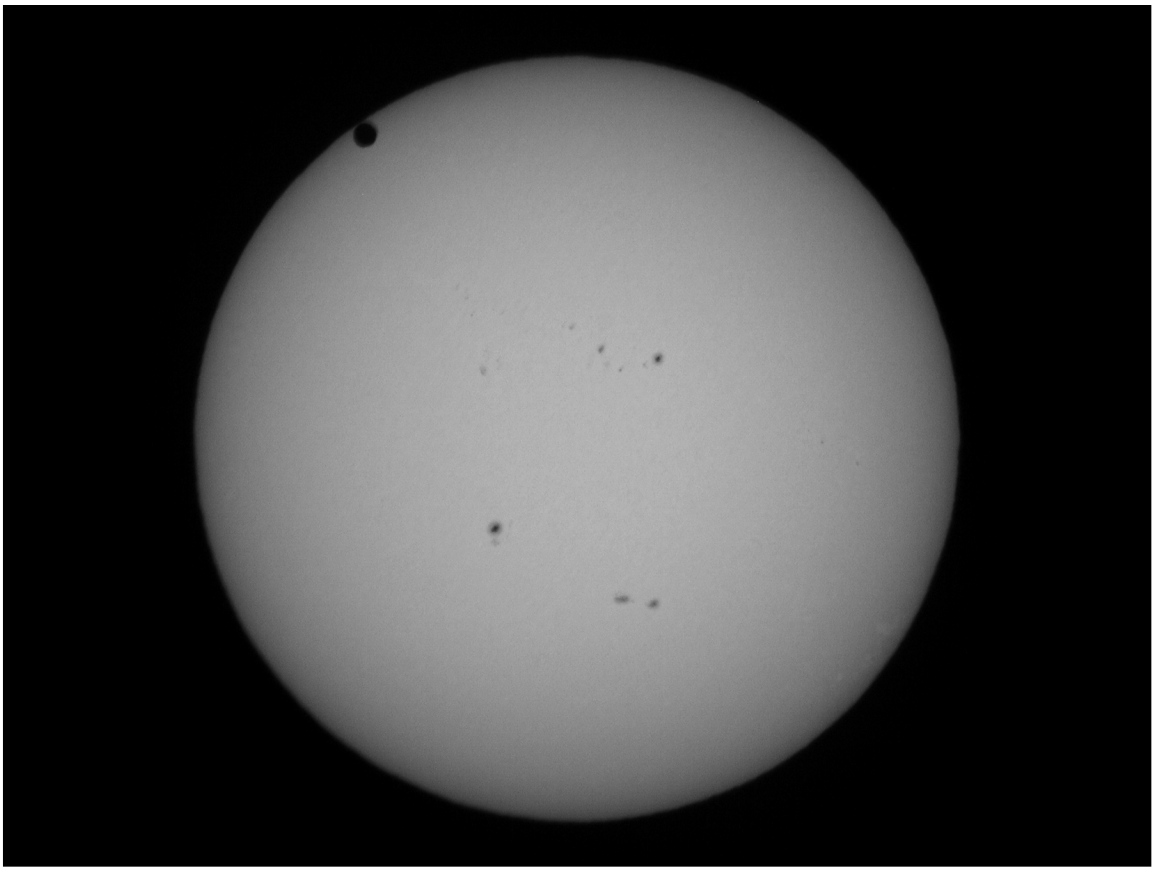


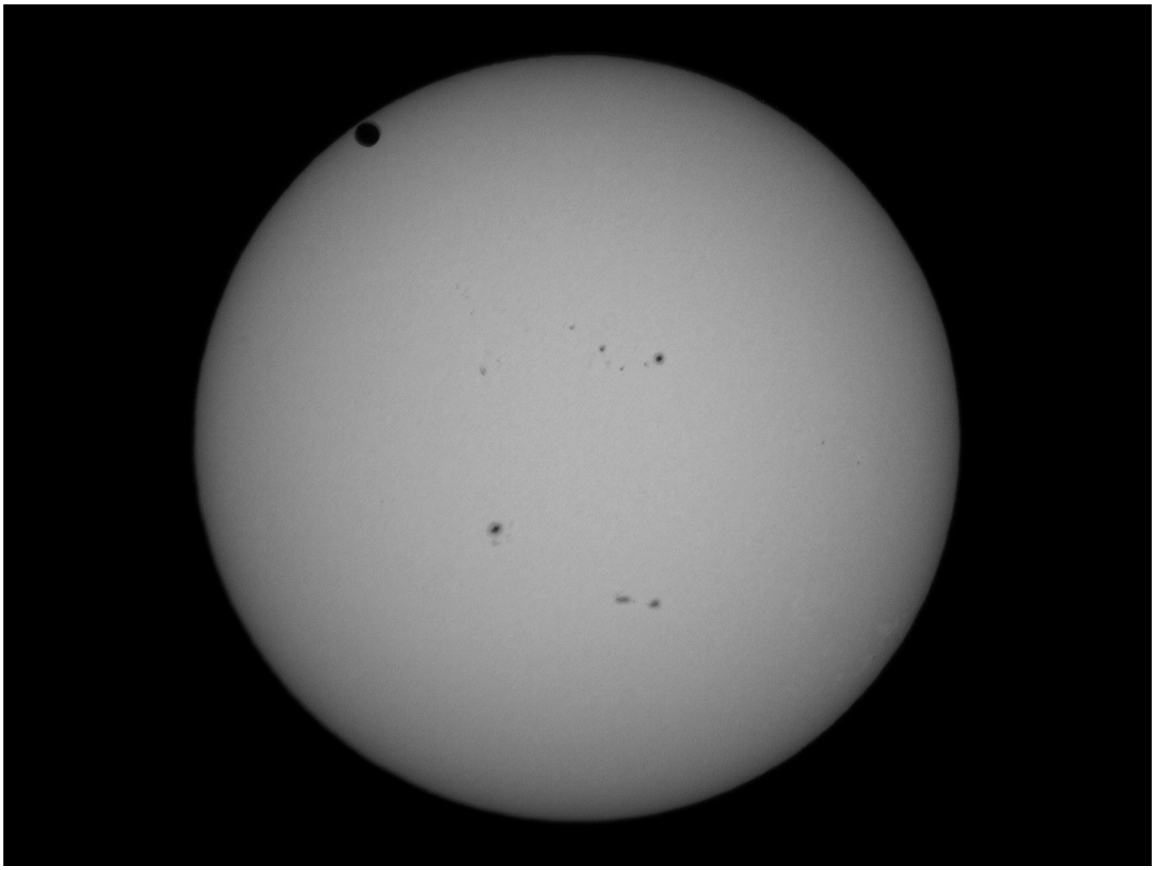


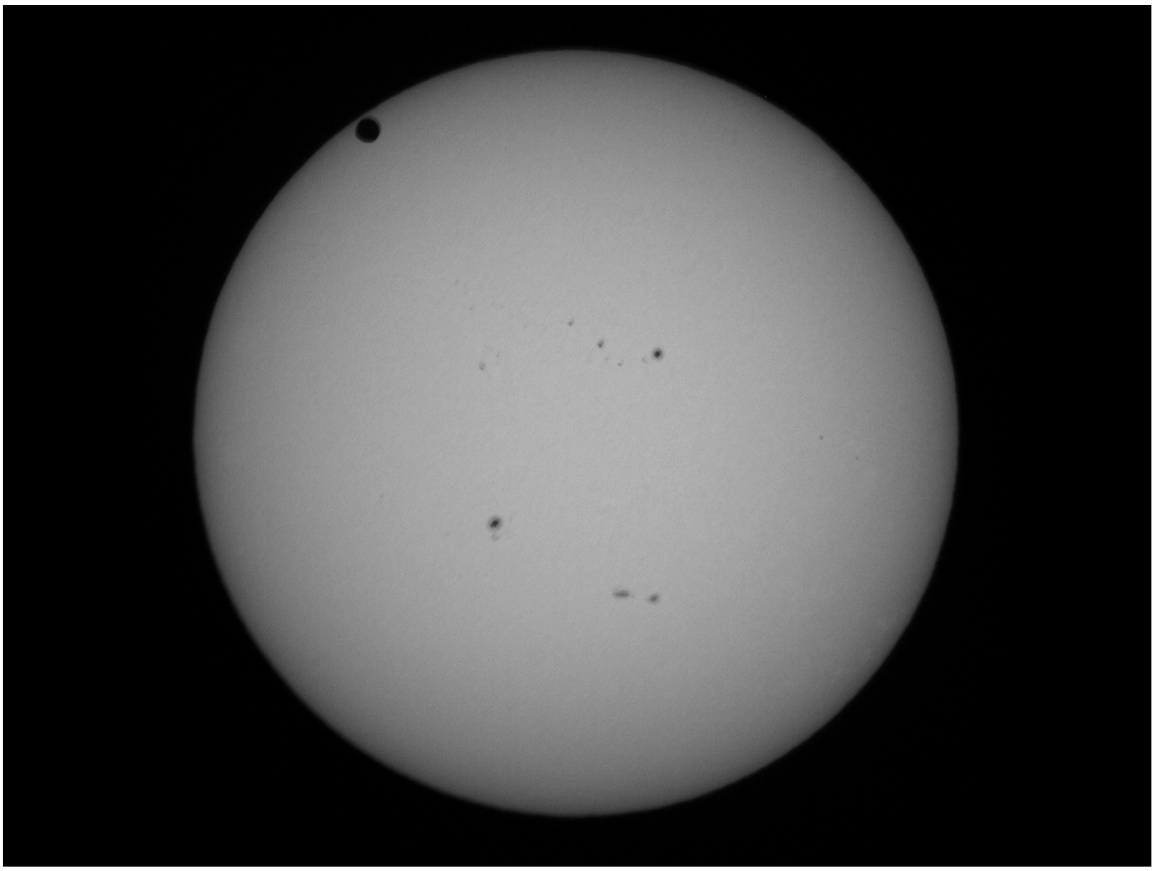


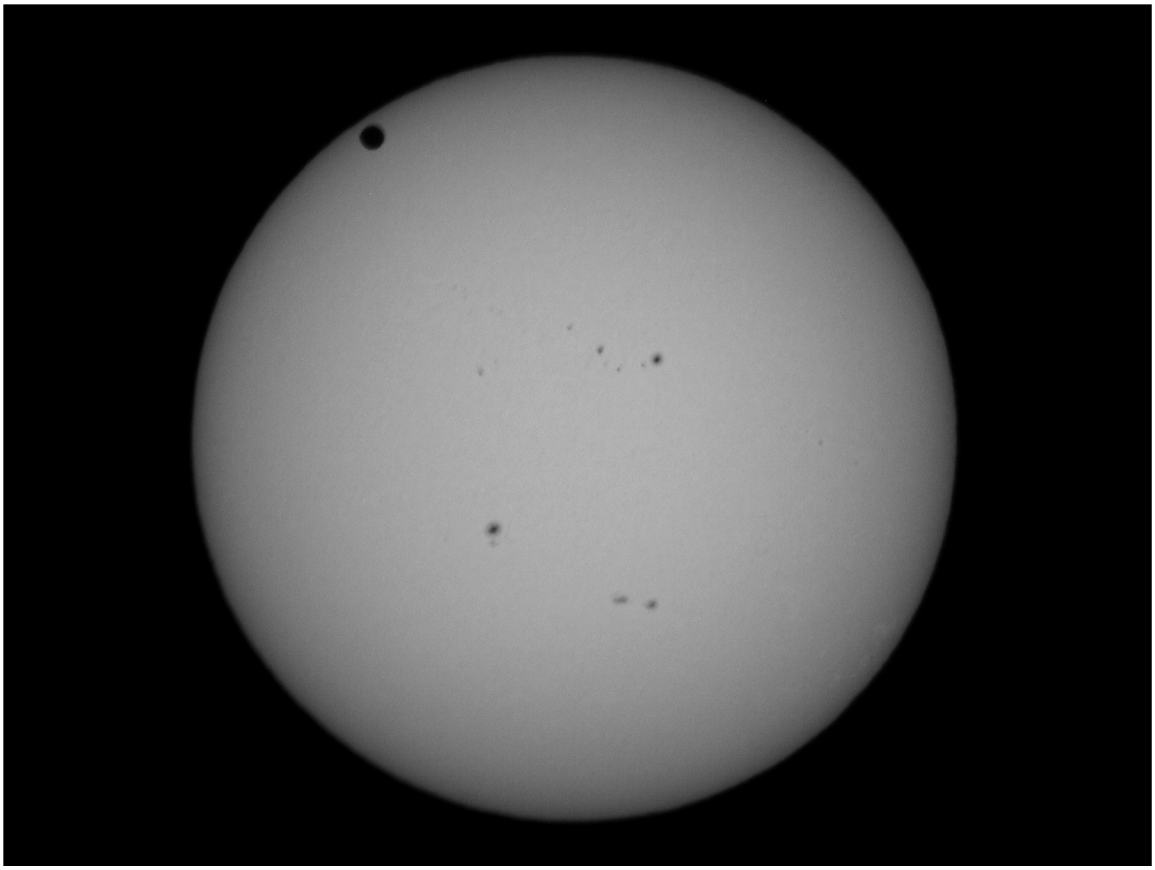


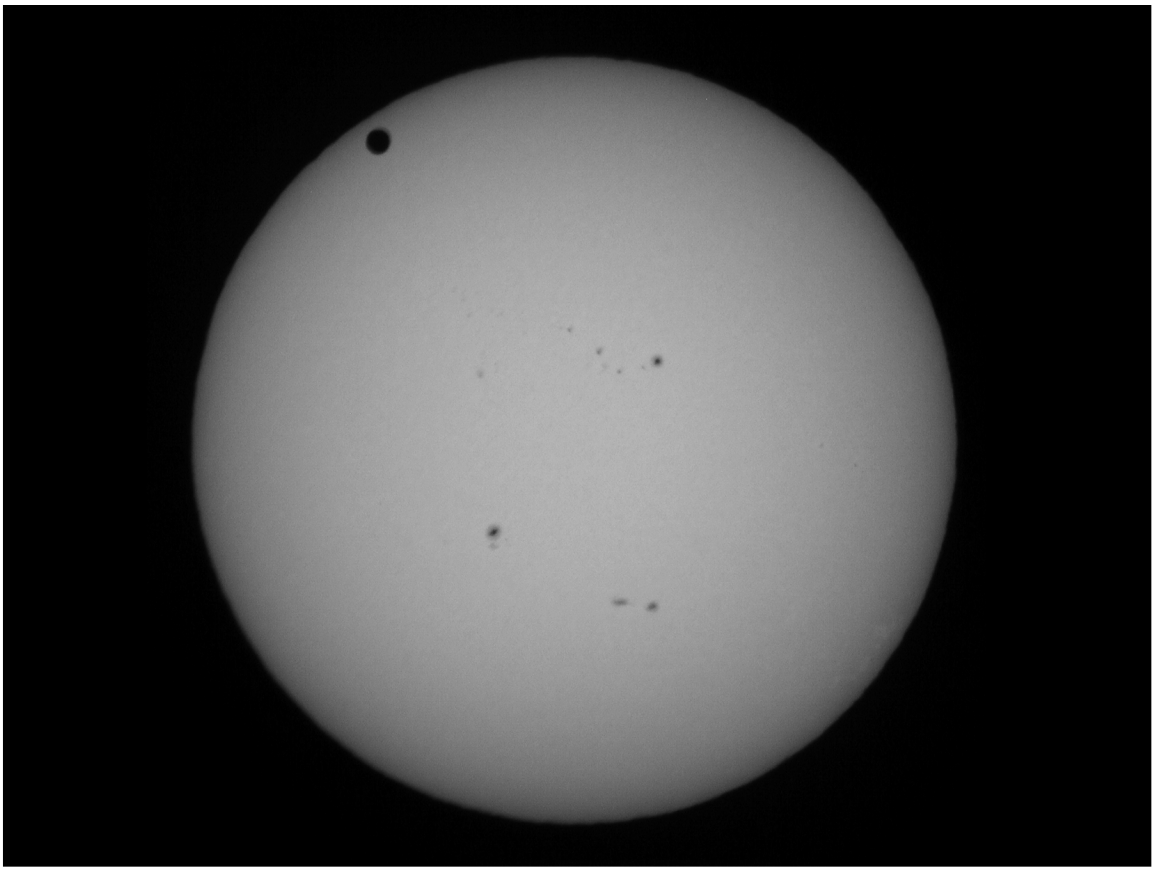


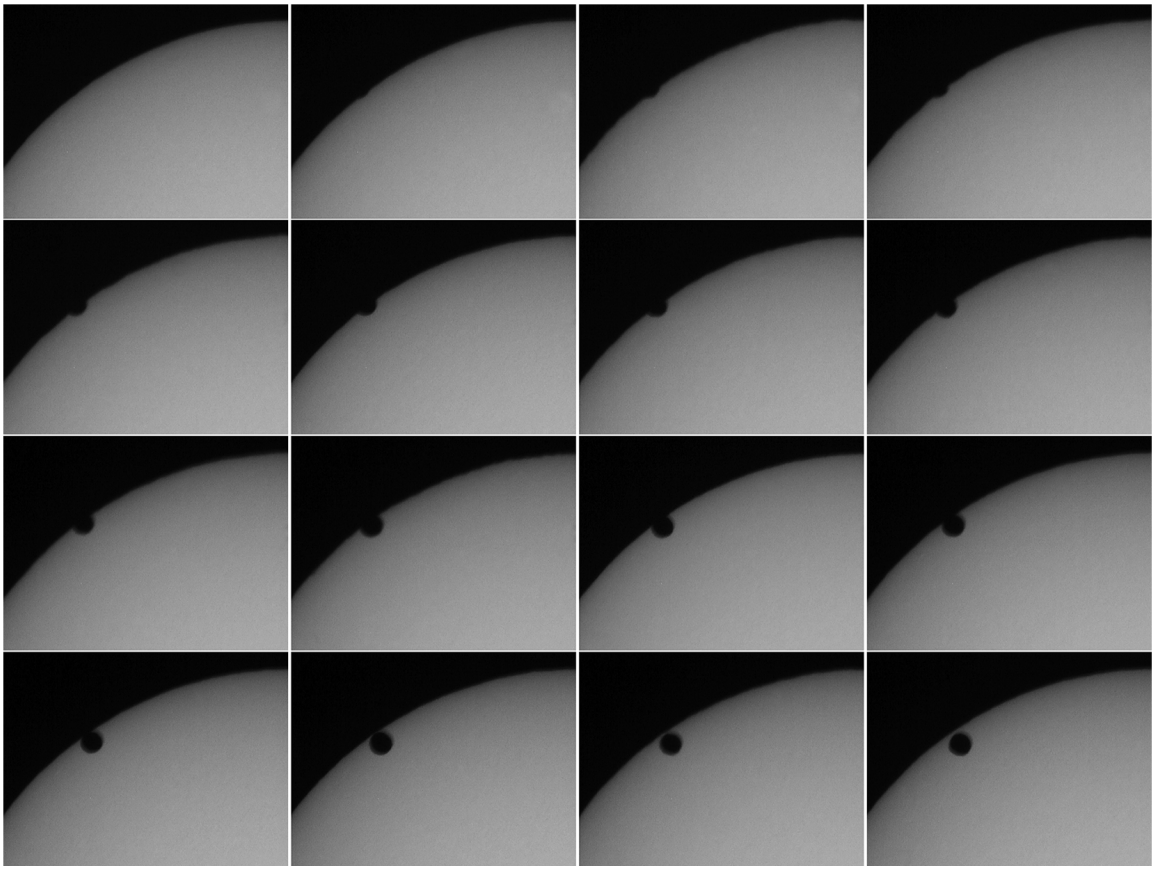


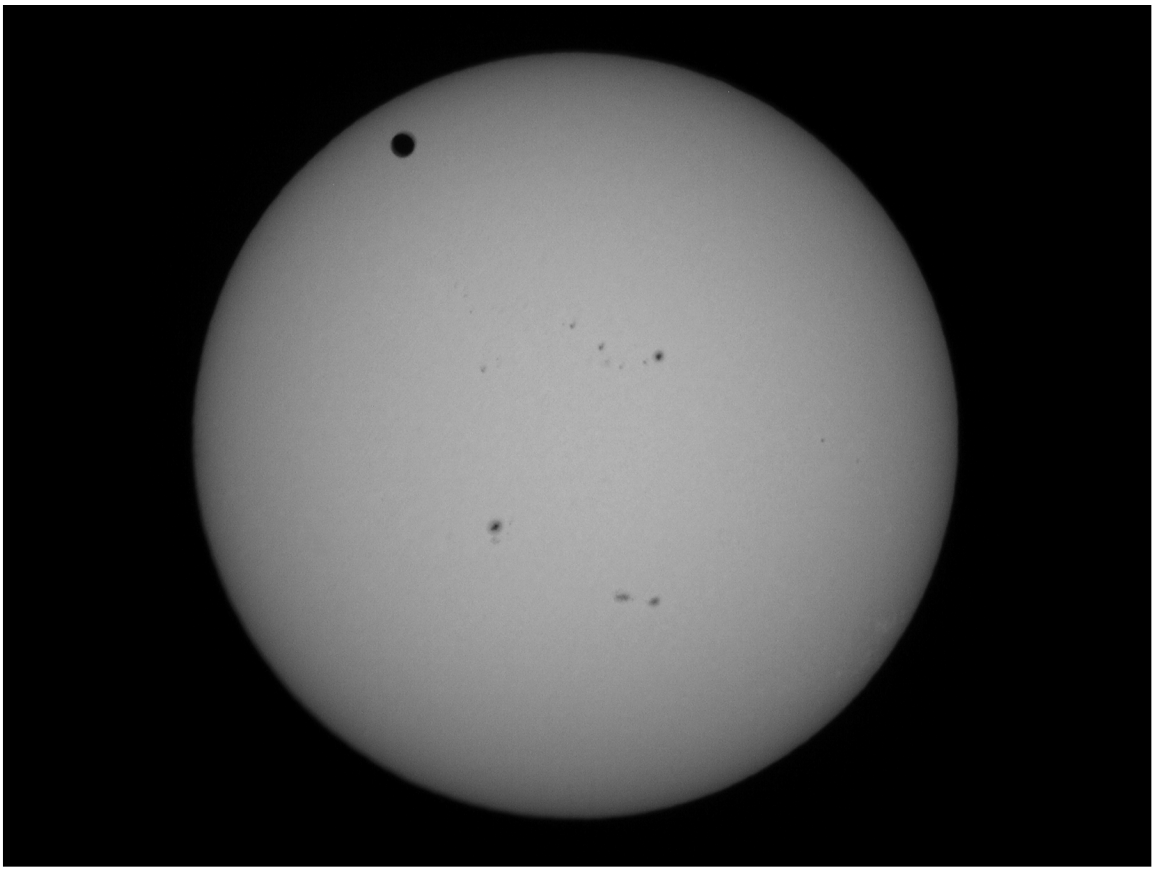


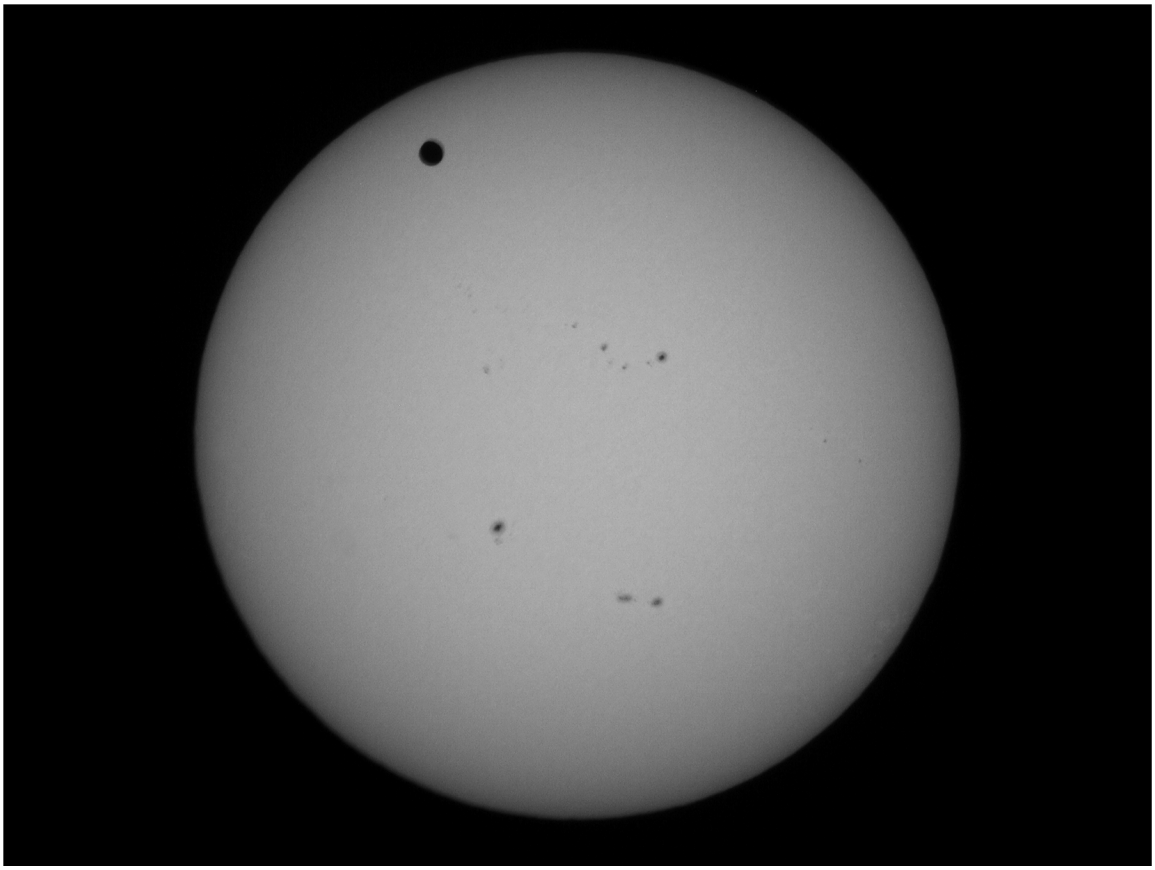


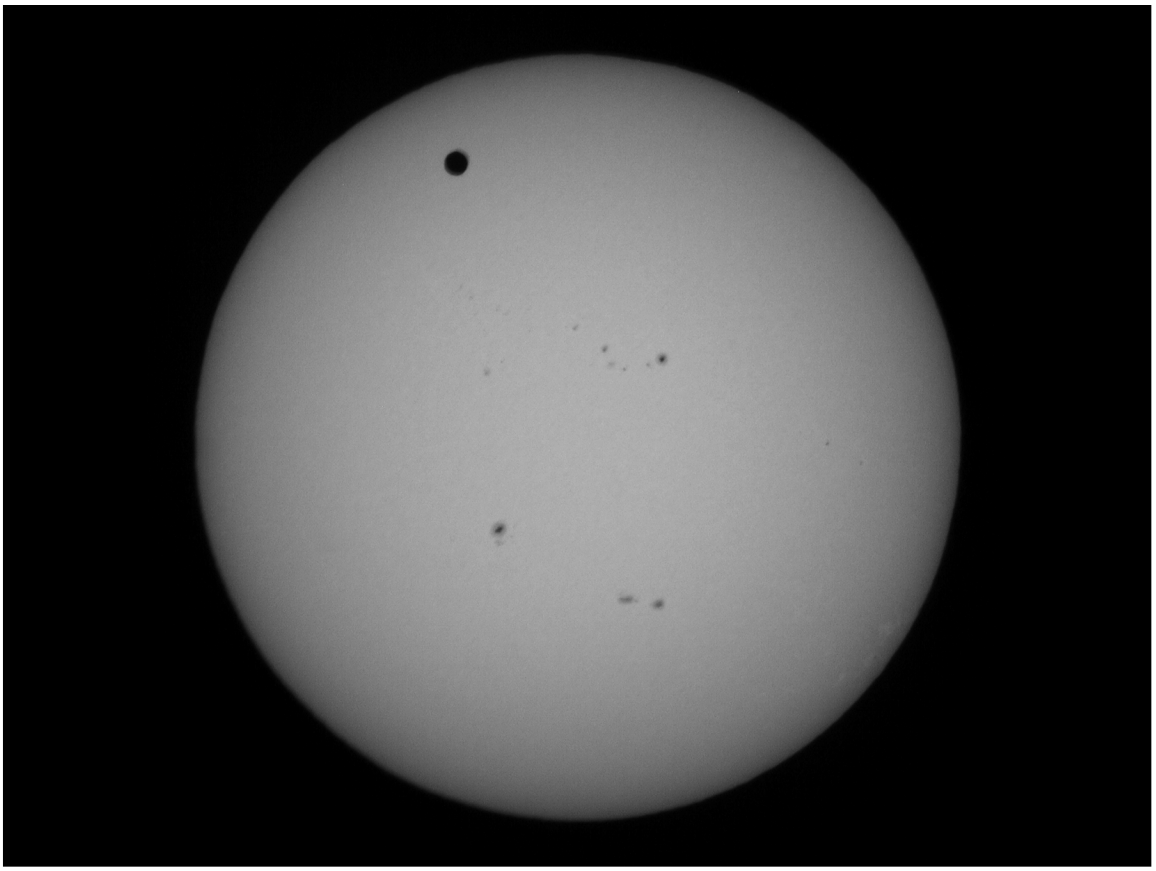


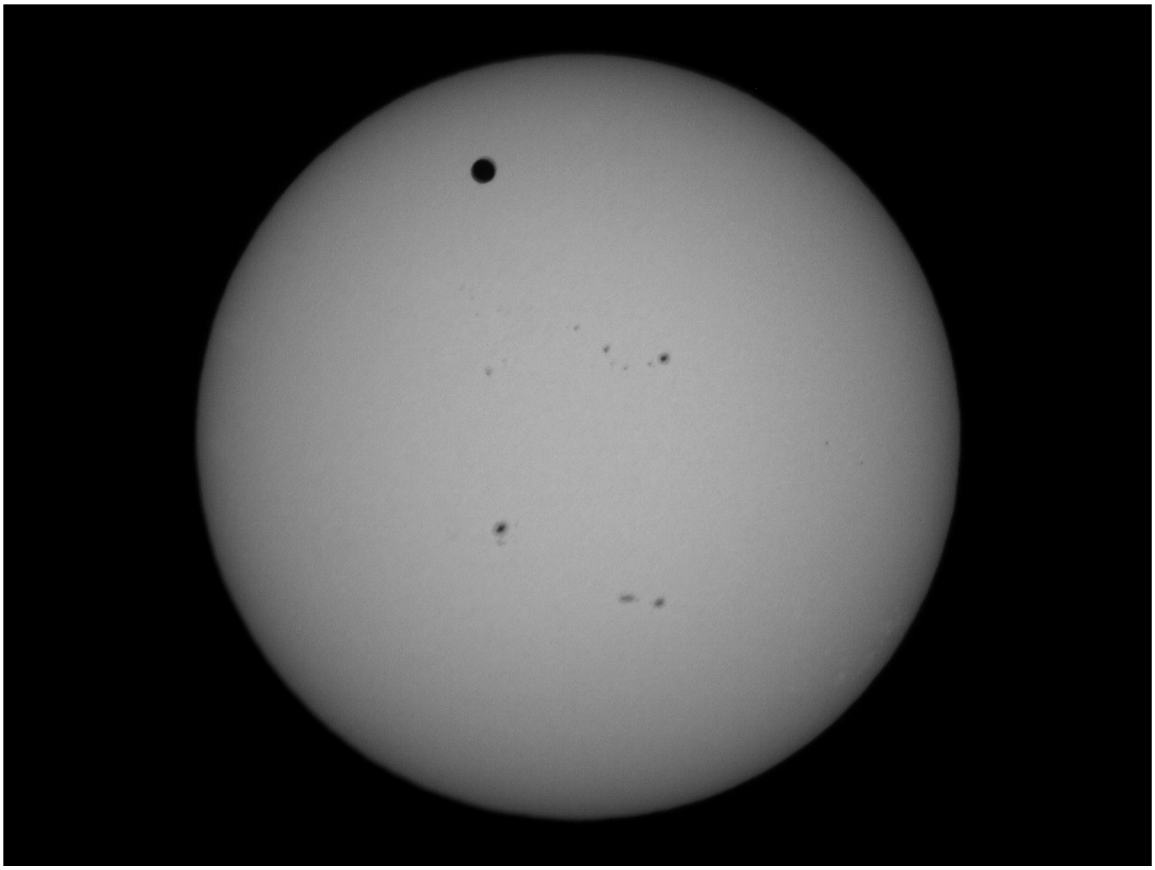


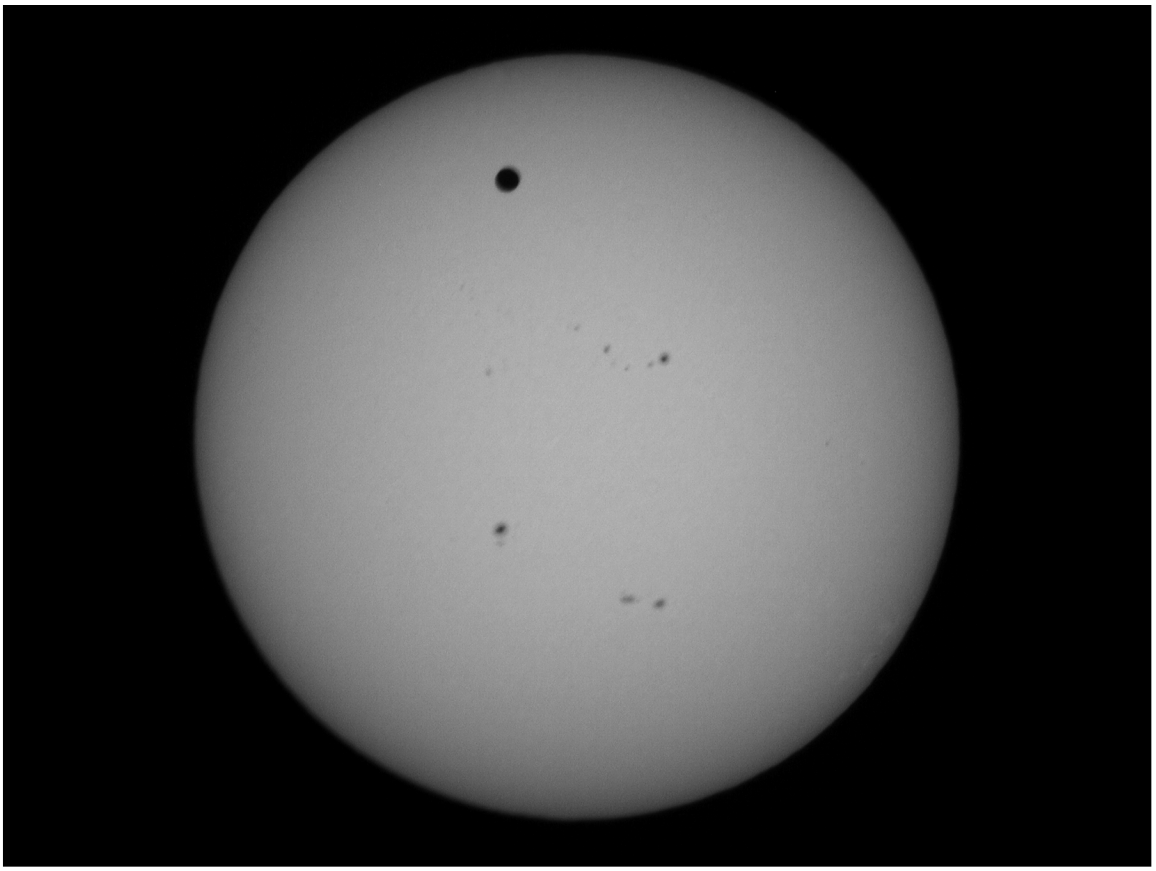


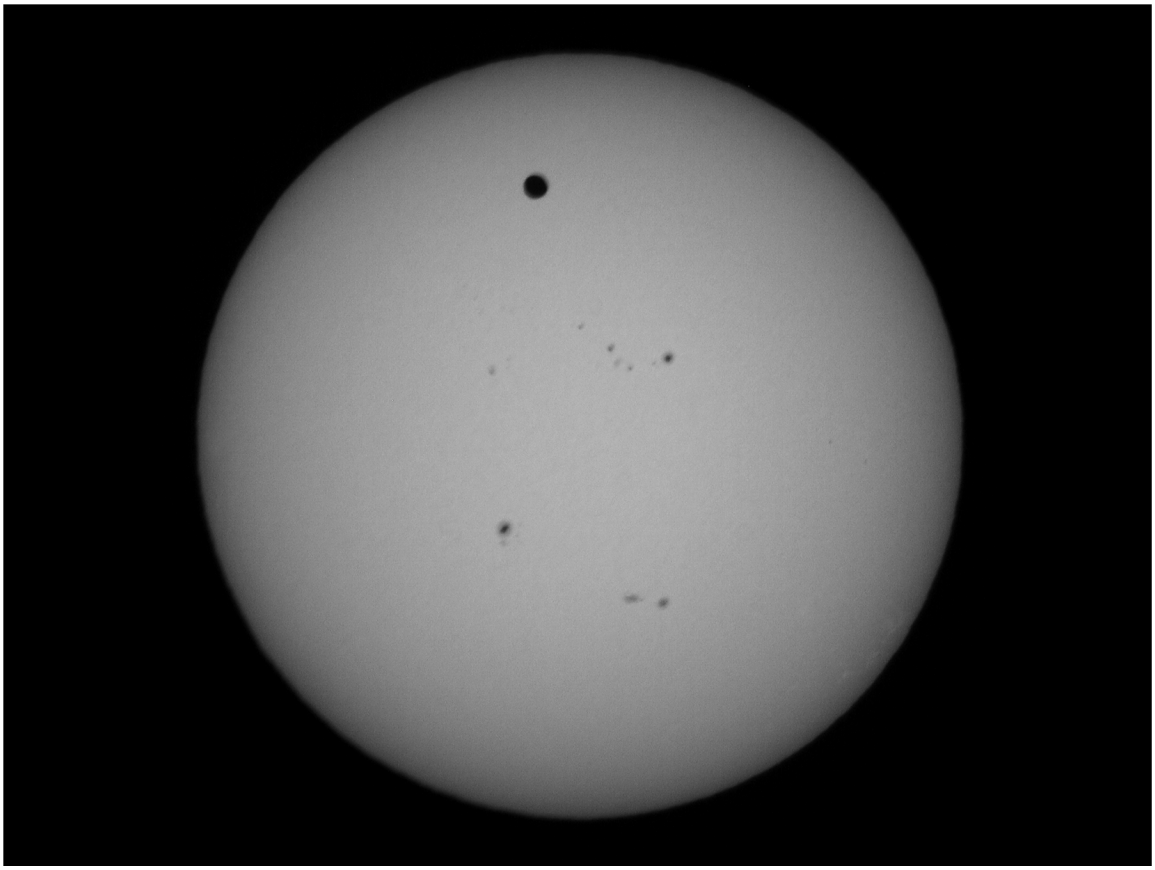


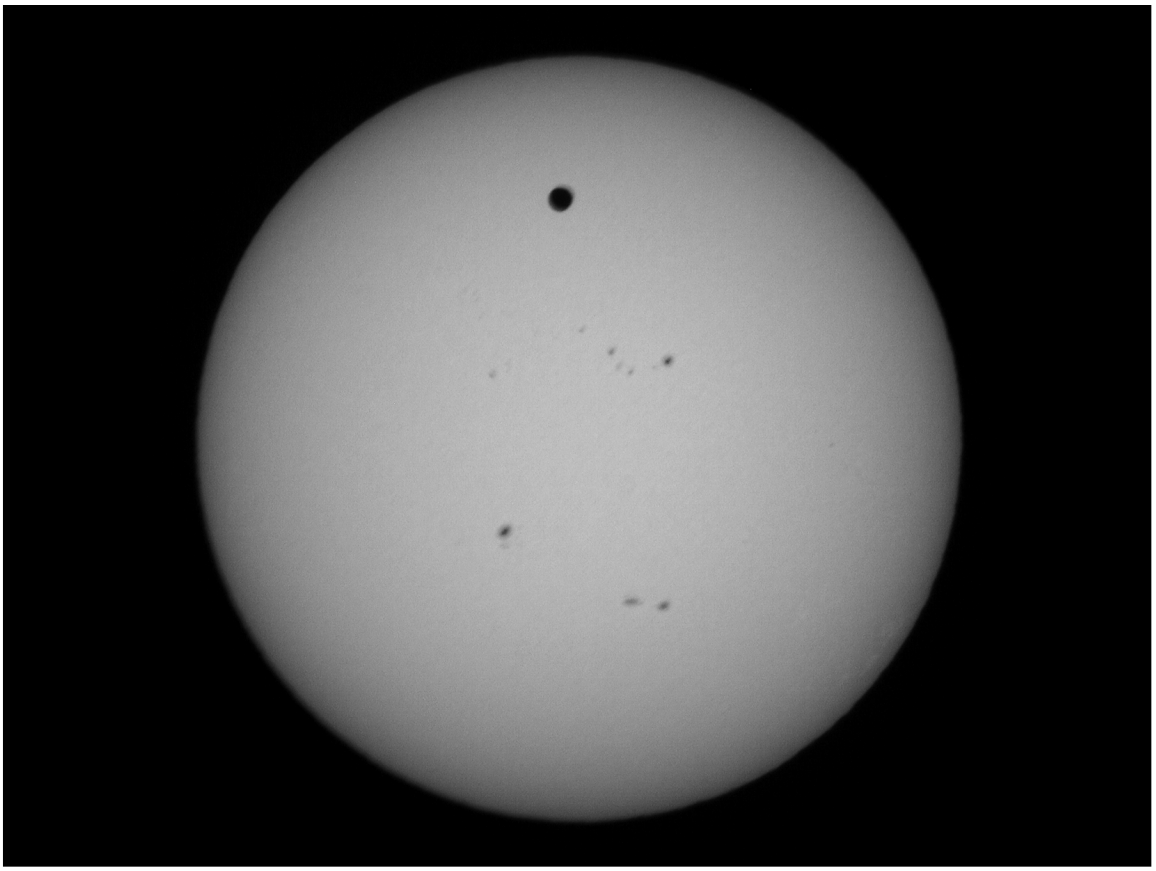


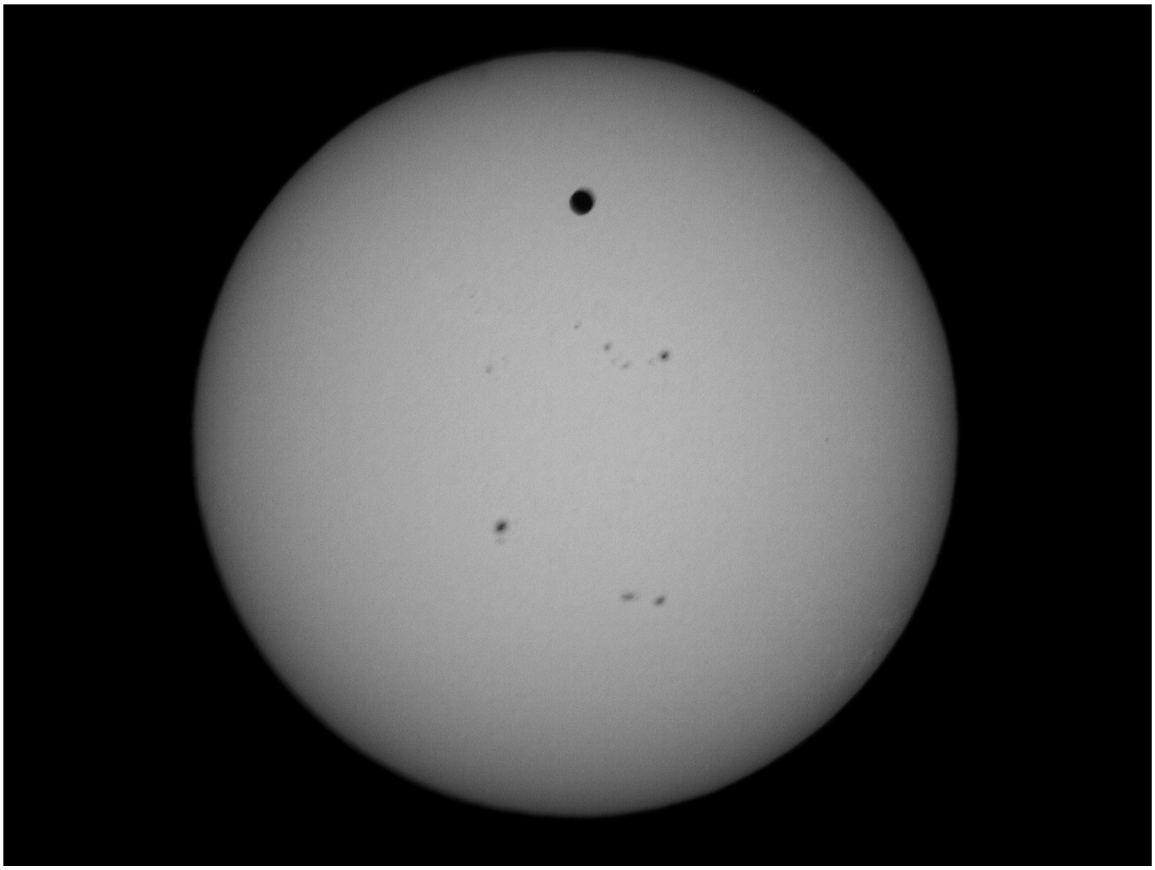


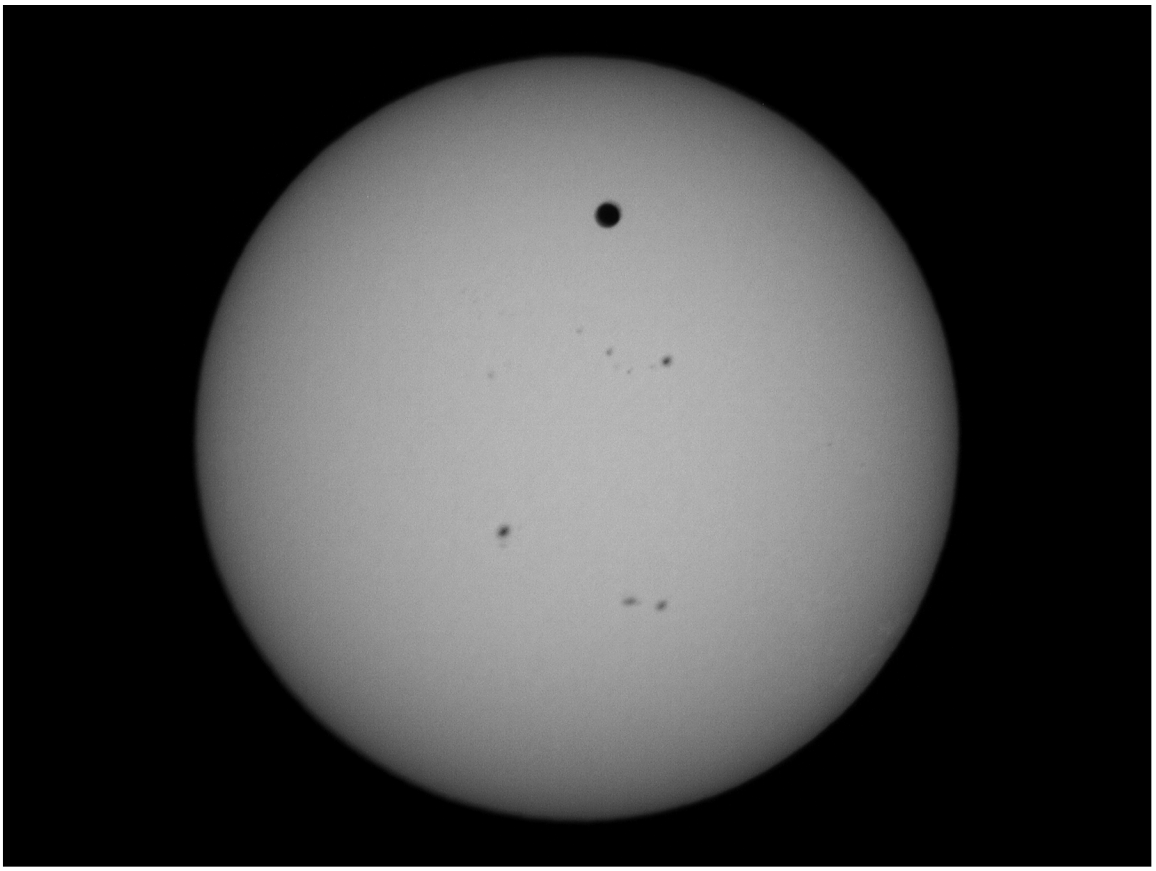


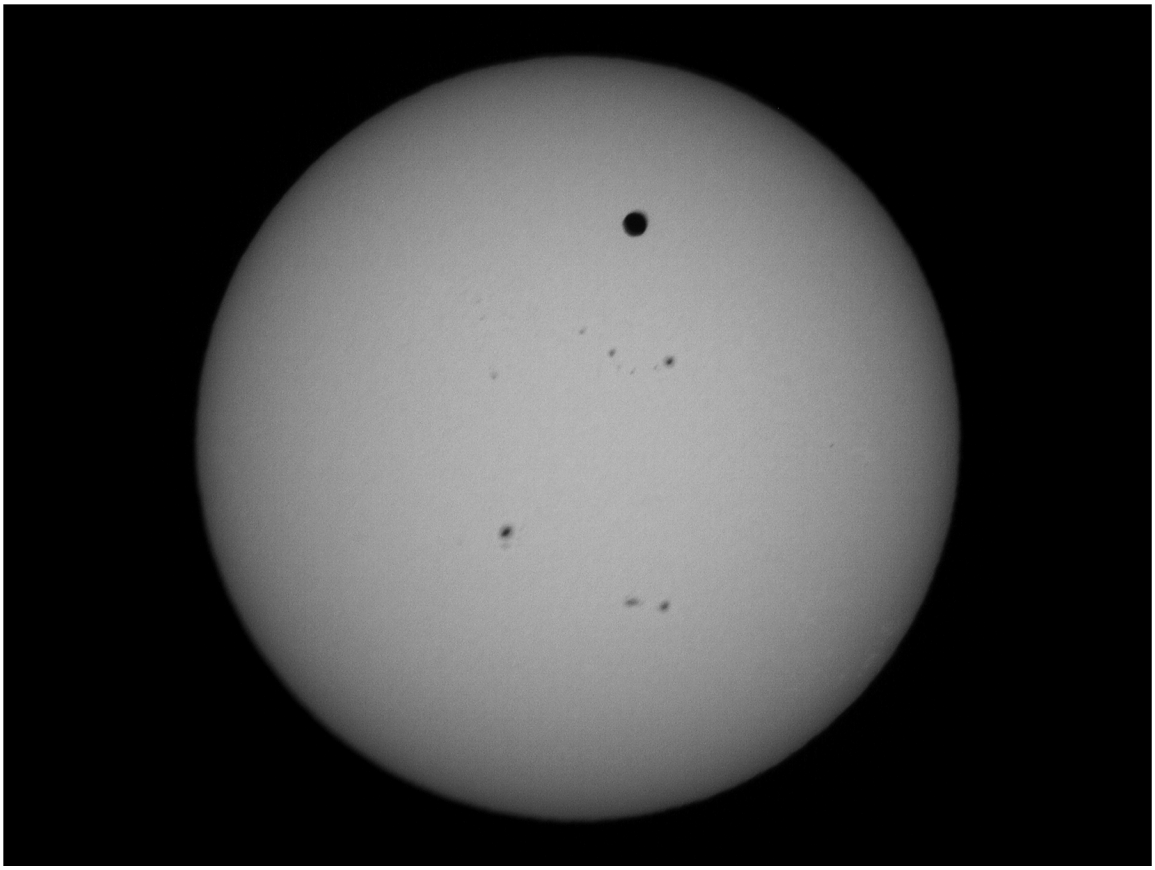


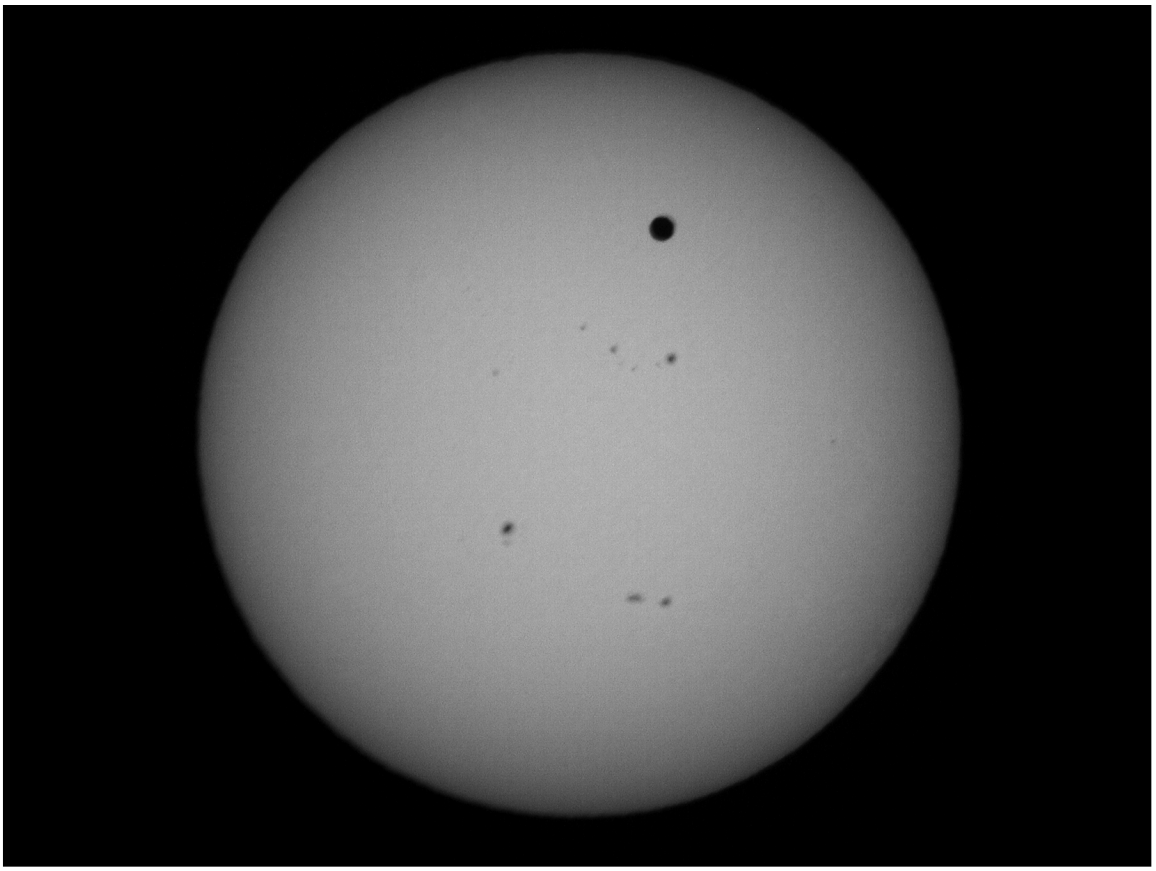


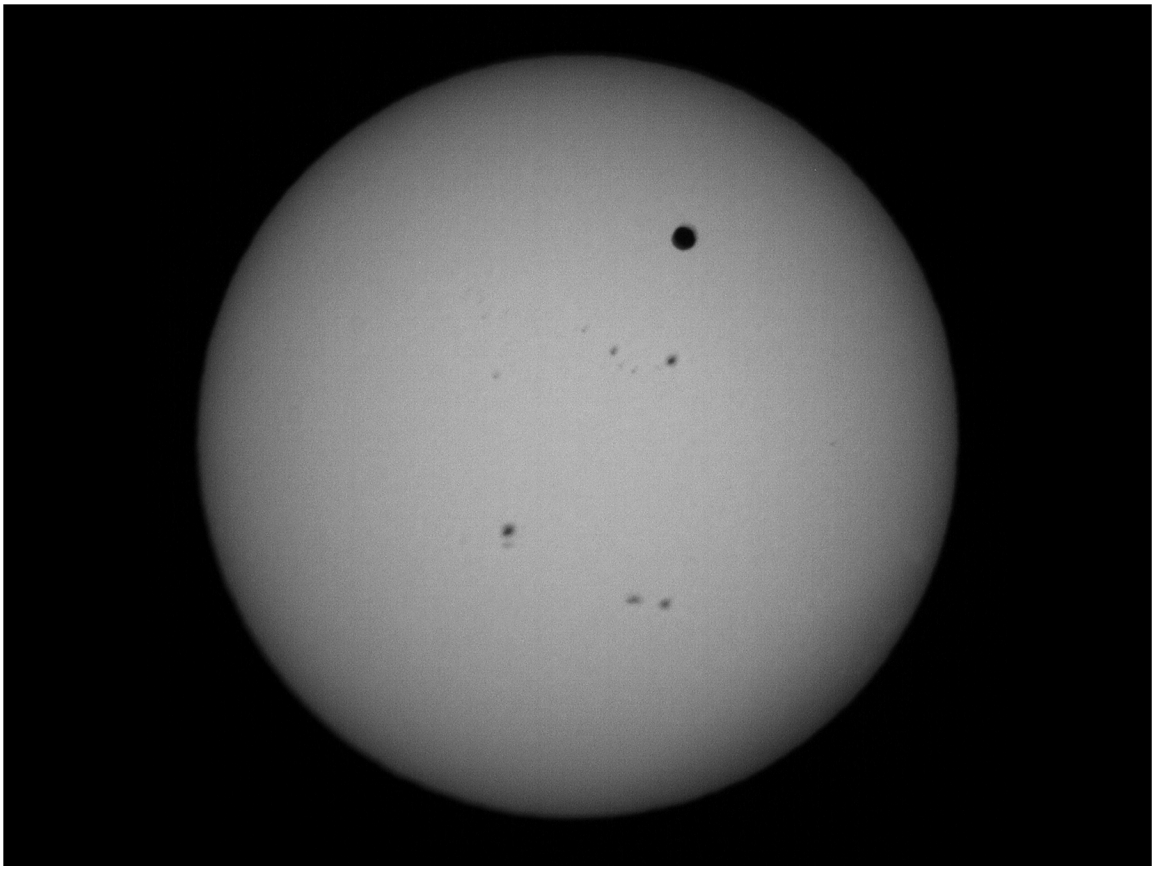


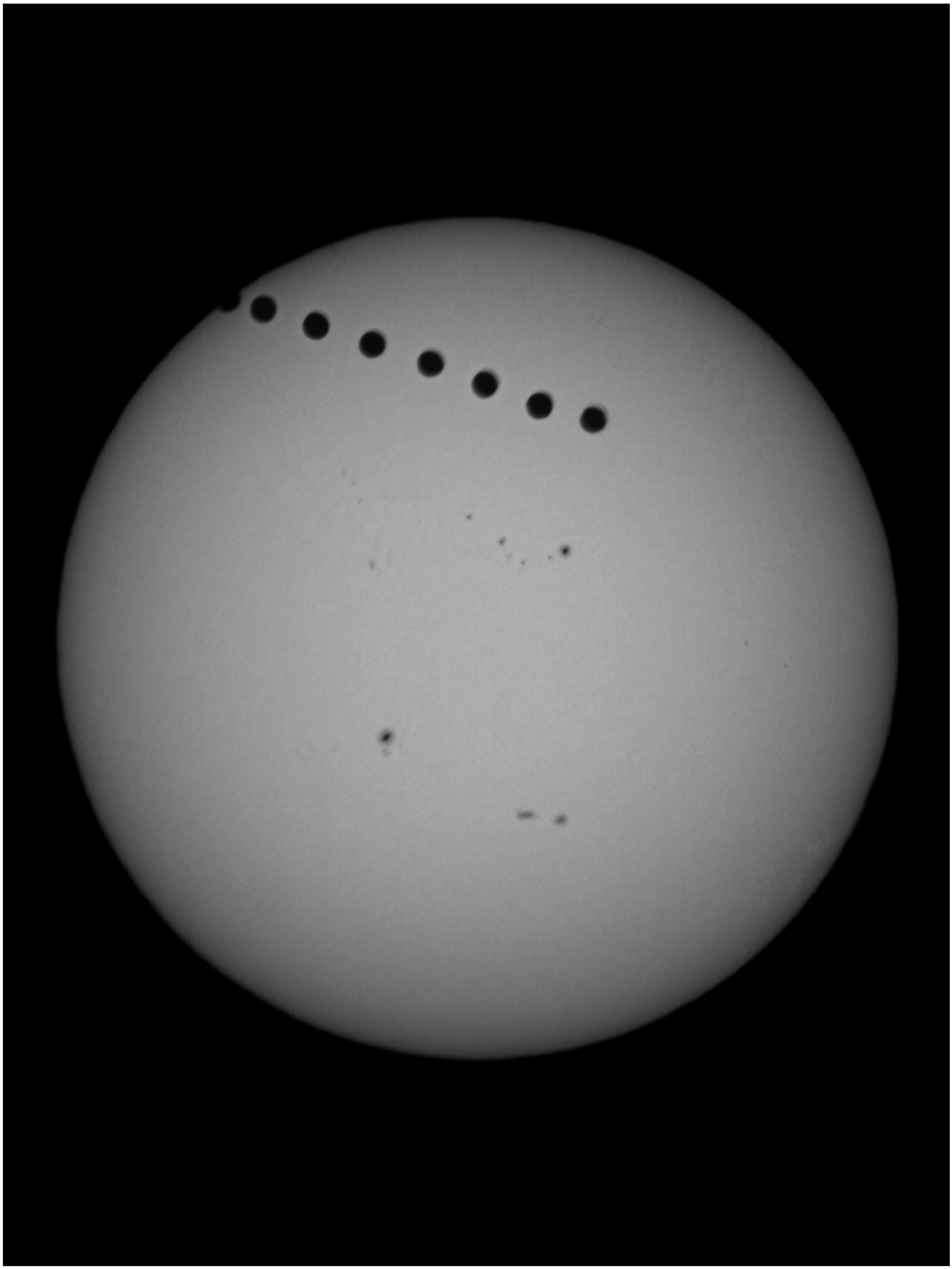












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December 1, 2014