

# Mars Exploration Rover Mission

**Spirit  
and  
Opportunity**



**Week in Review  
July 17 - July 23**

**Spirit continues driving backwards on five wheels to preserve the right front wheel, which is sticking due to old age.**



*Front hazard-avoidance camera, July 17, 2004. Now, it looks backwards.*

**The rover has already traveled 2.2 miles (3.5 kilometers), which is six times its designed capacity.**

**On July 16, Spirit spotted an unusual looking rock that the scientists named “Loofah.”**



*Front hazard-avoidance camera, July 16, 2004*

**With the microscopic imager, scientists got a closer look at the holes and pits in “Loofah.”**



*Microscopic imager,  
July 17, 2004.  
Image credit:  
NASA/JPL/Cornell/USGS*

**The rock is probably volcanic, and the holes were probably formed by the release of volcanic gases, but scientists are testing other possibilities too.**

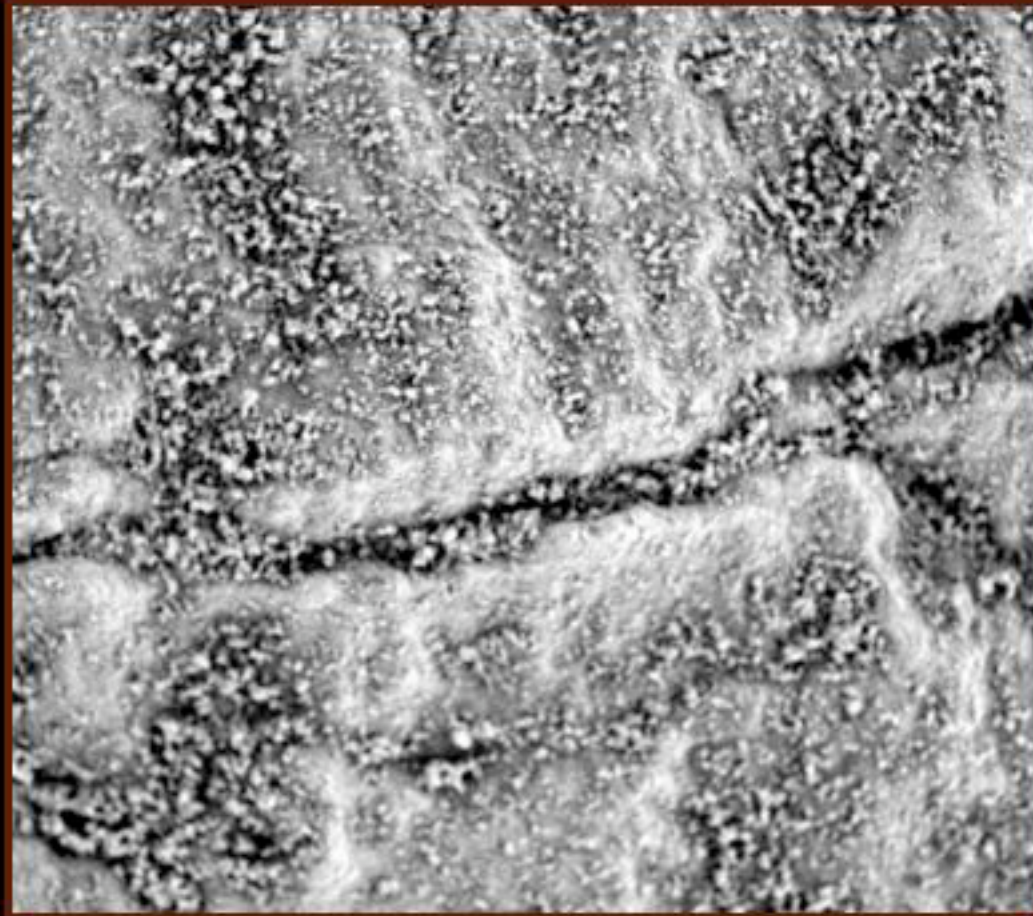


**The microscopic imager captured close-up views of distinct rock layers in the “Woolly Patch” outcrop.**



*Microscopic imager, July 19, 2004. Image credit: NASA/JPL/Cornell/USGS*

**The microscopic imager revealed tiny crevices  
in a target called “Sabre.”**



*Microscopic imager, July 20, 2004. Image credit: NASA/JPL/Cornell/USGS*

**The alpha particle X-ray spectrometer also investigated  
these areas, and scientists are waiting for results.**



Spirit



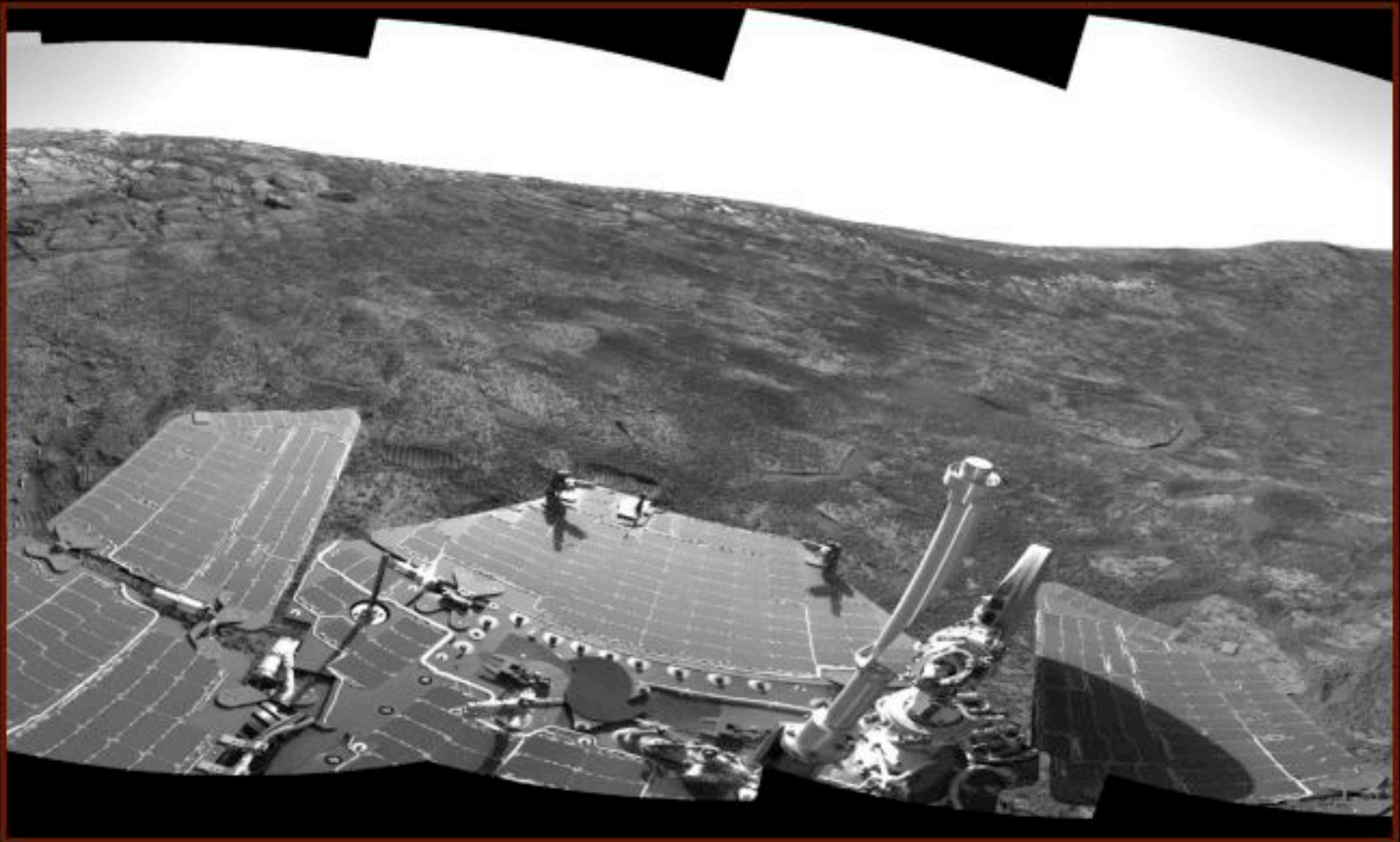
**The rock abrasion tool dug a surprisingly deep hole in only two hours of grinding.**

**The material appears to be softer than what scientists have seen previously in Gusev Crater.**



*Front hazard-avoidance camera, July 21, 2004. Image credit: NASA/JPL*

**Meanwhile, Opportunity is inside Endurance Crater, 36 feet (11 meters) down the slope.**



*Rear view of Opportunity's surroundings, taken July 17, 2004 with the navigation camera.*



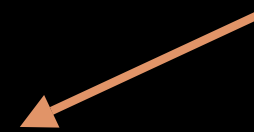
**As Opportunity cruises down the slope of Endurance Crater, the rock abrasion tool (RAT) has been busy grinding holes.**



*Navigation camera image taken on July 15, 2004 inside Endurance Crater.*



**How many RAT holes can you identify in this picture?**



**Peering ever deeper into the past, Opportunity's RAT has nibbled seven holes into the slope of Endurance Crater.**

**From top to bottom,  
the hole targets are:**

**Tennessee**

**Cobblehill**

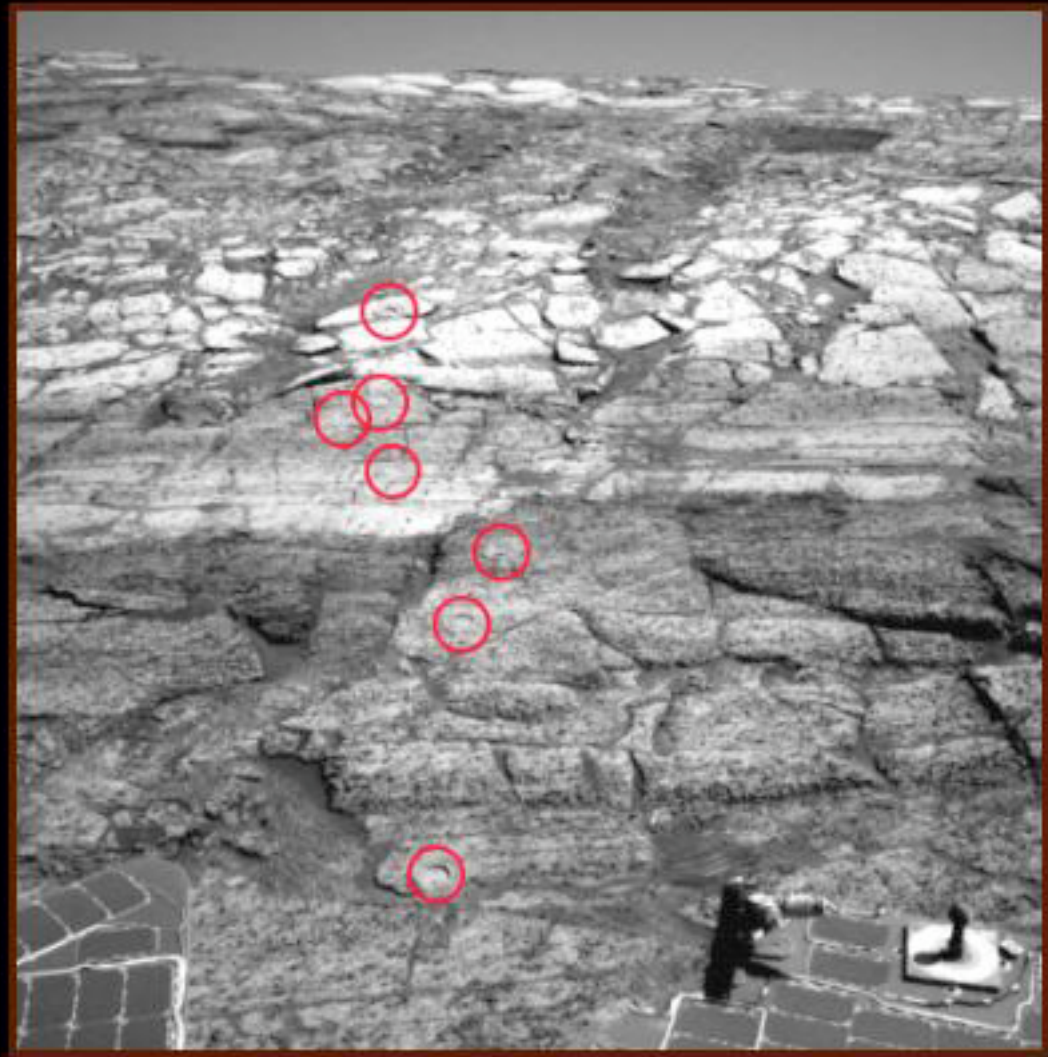
**Virginia**

**London**

**Grindstone**

**Kettlestone**

**Drammensfjorden**



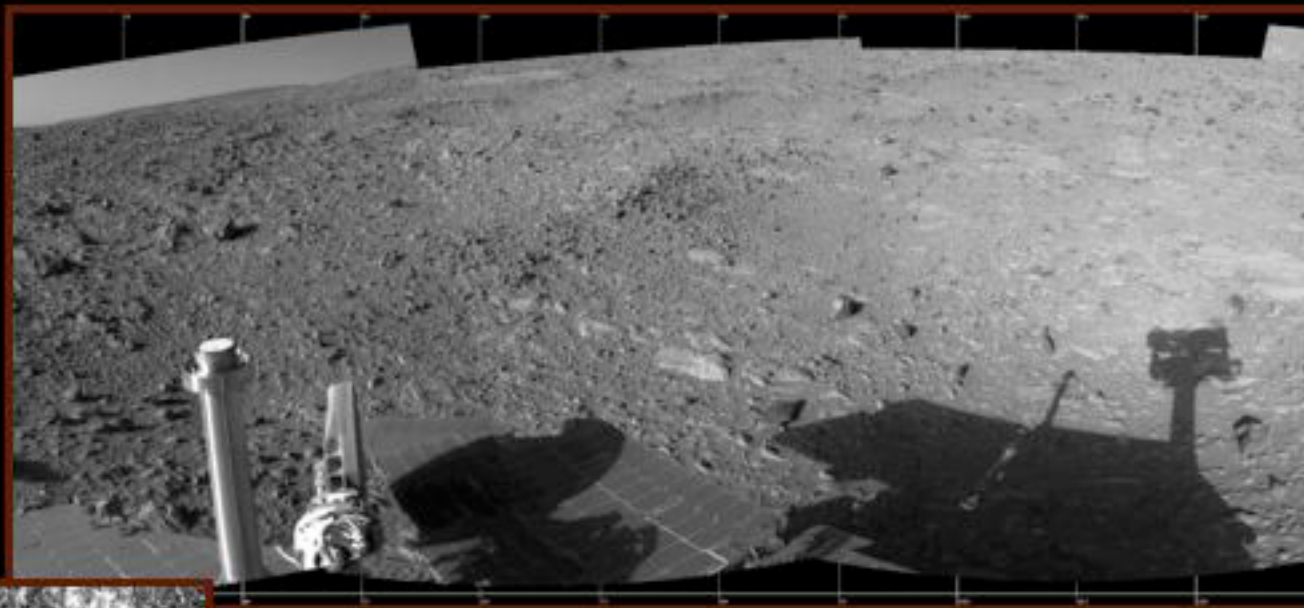
*Navigation camera image with graphics added to show rock abrasion tool holes.*



**COMING UP!**

**Spirit will aim for a target named  
“Mammoth” in the Columbia Hills.**

*Navigation camera,  
July 15, 2004.  
Spirit at the base of the  
“West Spur” portion of  
the Columbia Hills,*



**Opportunity will continue to  
investigate the various layers of  
rock, soil, and “blueberries”  
inside Endurance Crater.**

*Microscopic image of soil inside  
Endurance Crater, July 23, 2004.*