

Mars Exploration Rover Mission

**Spirit
and
Opportunity**



**Week in Review
June 26 - July 2**

Spirit spent June 26 & 27, 2004 wrapping up studies of the mysterious and sparkly material in “Hank’s Hollow” near Columbia Hills.



False-color panoramic camera image of Hank's Hollow taken June 20, 2004.

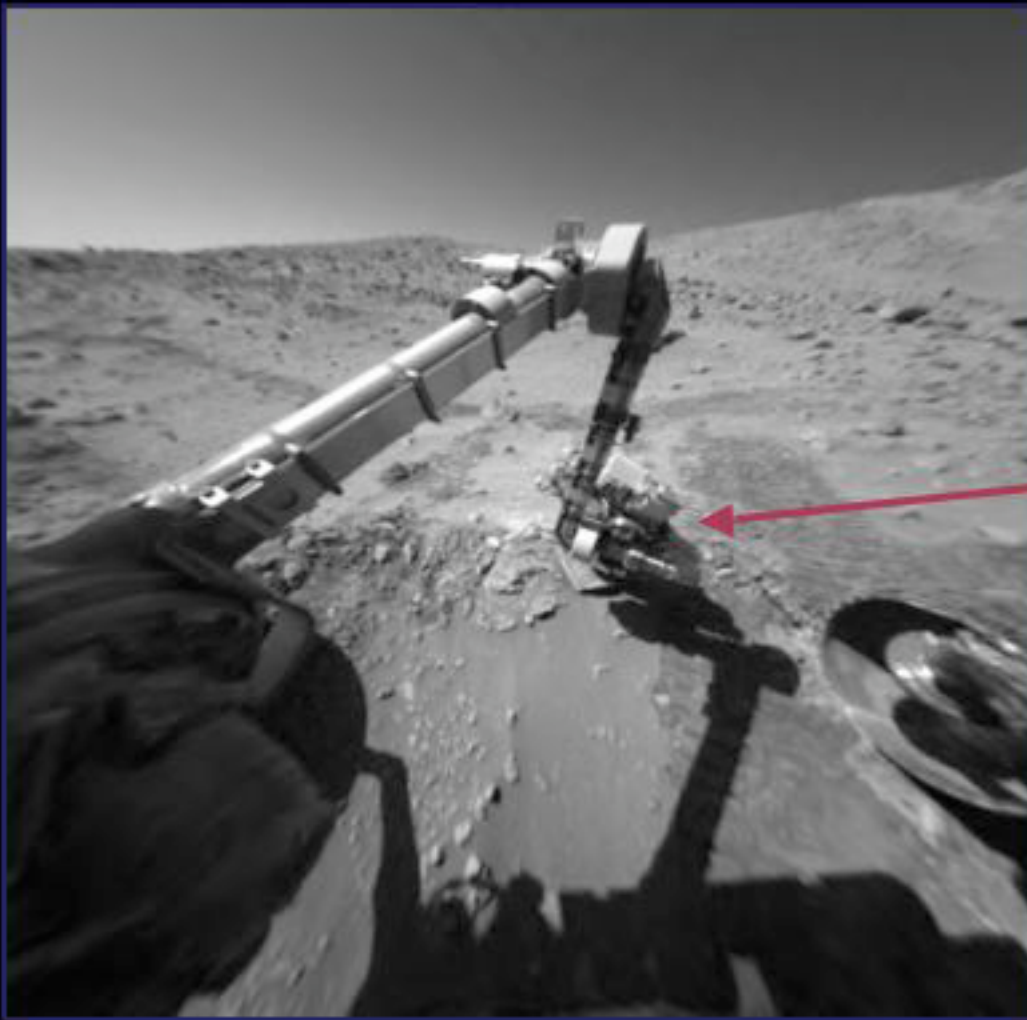
**On June 29,
Spirit turned
toward another area
with bright material,
freshly exposed
by the rover tracks.**

**Scientists are trying
to learn more about
what lies beneath
the surface of the soil
at the Columbia Hills.**



*Left panoramic camera image of "Bright Tracks"
taken at 11:41 Mars Local Solar Time on June 29, 2004.*

**Spirit did a bump backwards to the “Bread Basket” area,
where the microscopic imager got an up-close look.**



Front hazard-avoidance camera image taken on June 30, 2004.



*Microscopic image of Bread Basket
taken at 11:29 Mars Local Solar Time
on June 30, 2004.*

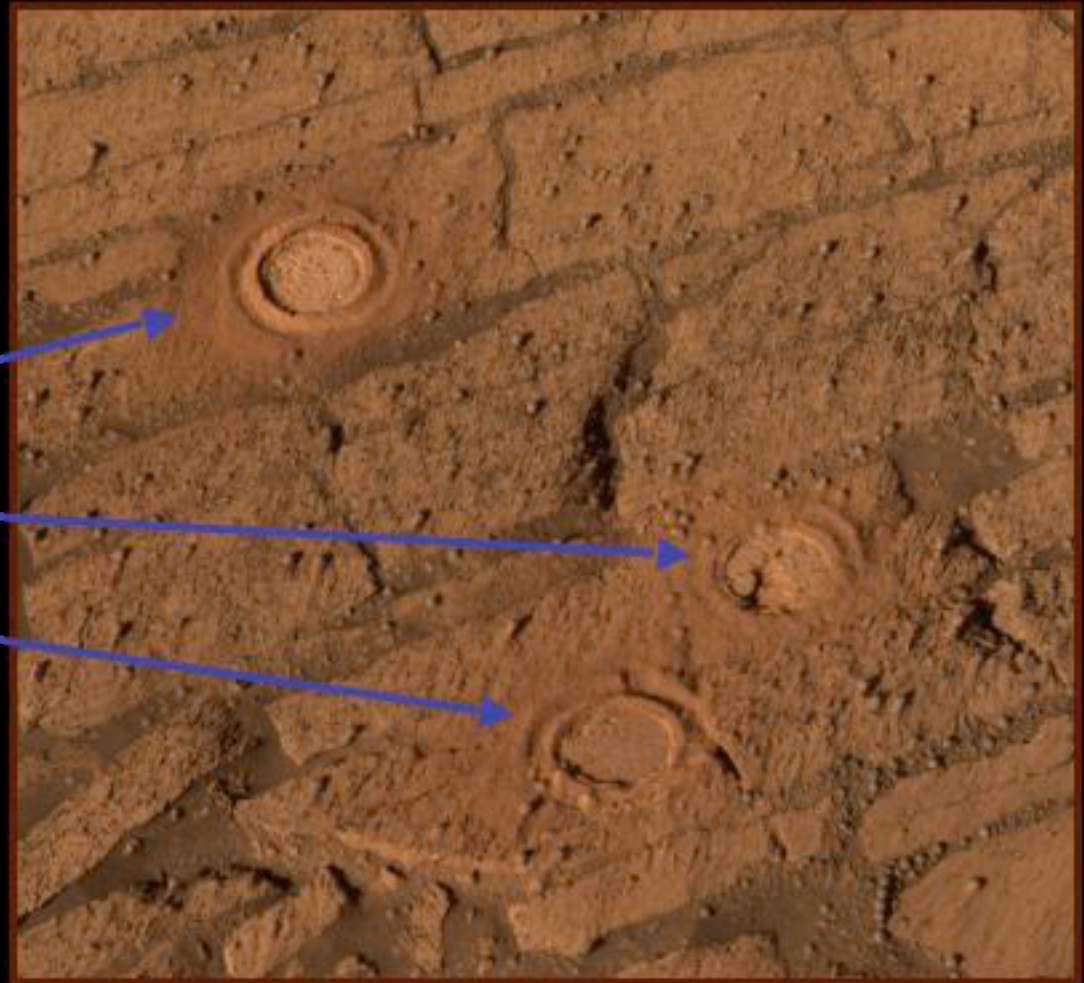
Opportunity



Meanwhile, Opportunity was busy analyzing the chemical make-up of freshly exposed layers inside Endurance Crater.

The rock abrasion tool created holes named:

- “London”
- “Virginia”
- “Cobble Hill”



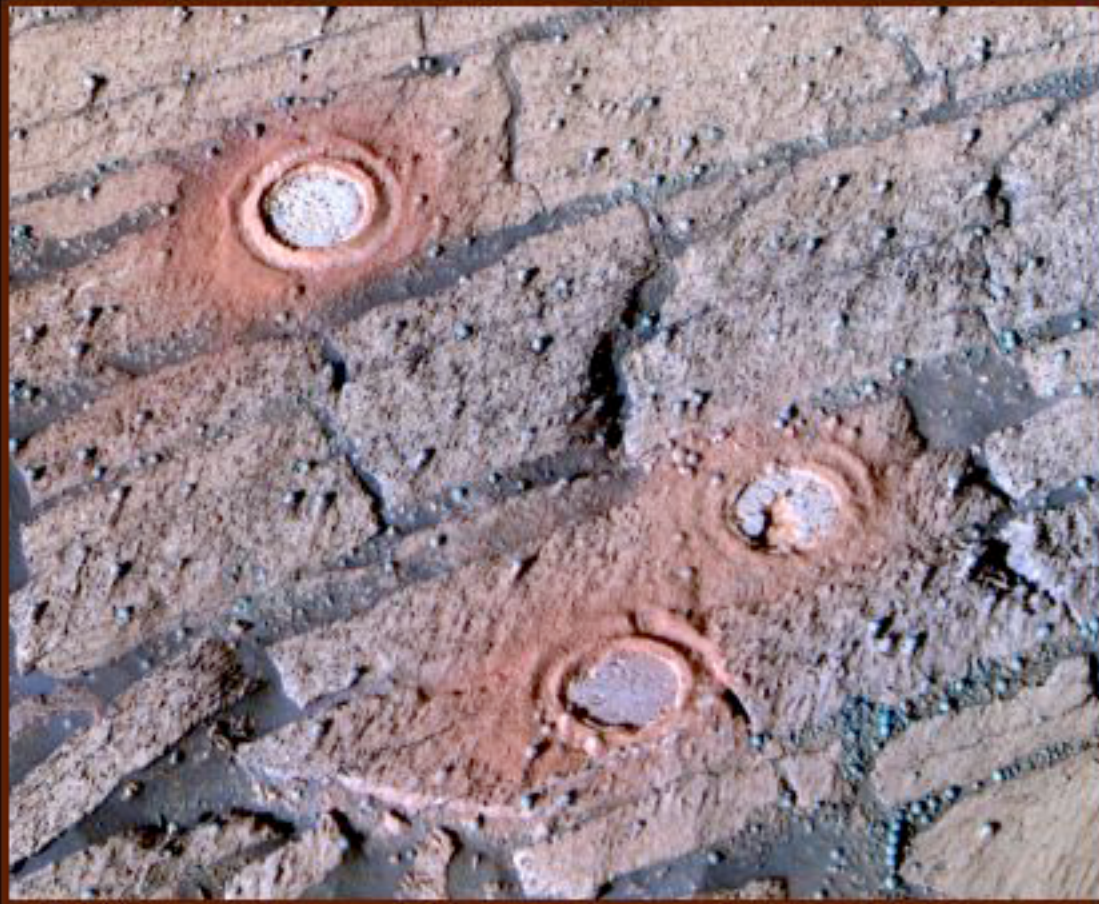
Approximate true color rendering, panoramic camera image after rock abrasion tool grindings between June 18 and 23, 2004.

Opportunity's arm got a good workout this week, safely swinging its spectrometers into these holes to search for chemical clues about the history of water inside Endurance Crater.



Front hazard-avoidance camera image taken by Opportunity on June 30, 2004.

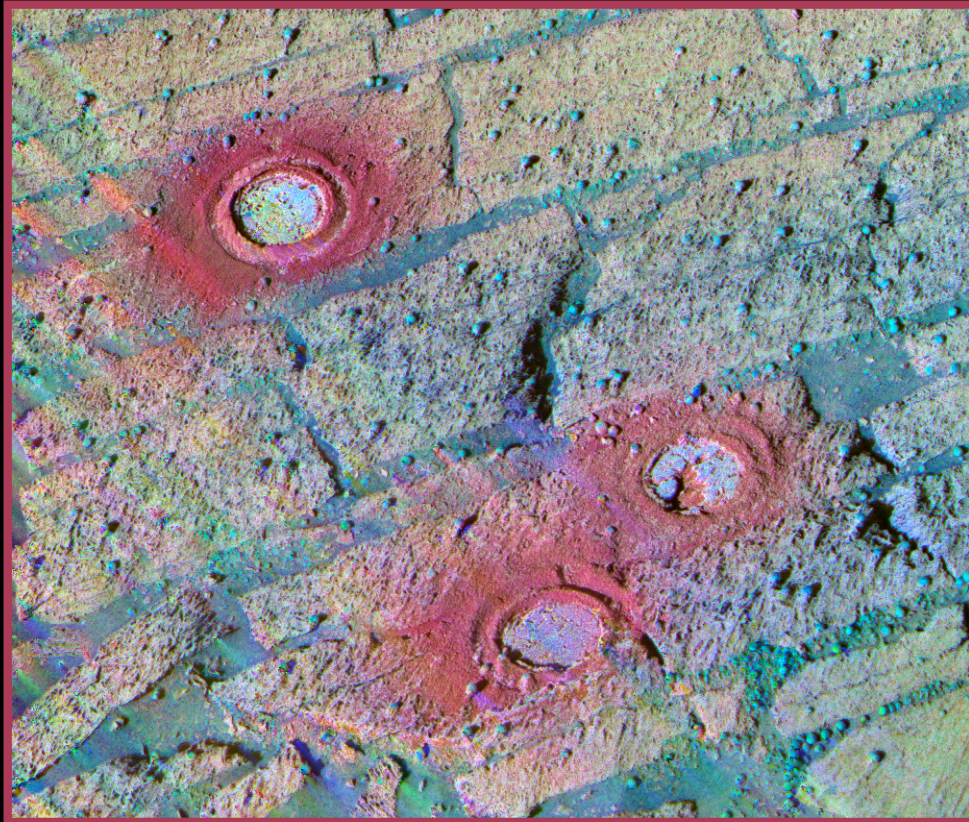
Scientists made color enhancements to this image in order to reveal variations that are too subtle to be seen without this kind of exaggeration.



These variations help them understand differences in the rocks' composition and texture.

Enhanced-color panoramic camera image from Opportunity inside Endurance Crater.

Exaggerating the colors even more, scientists noticed that the “powdery dust” left over from the grinding appears more red around London (top hole).

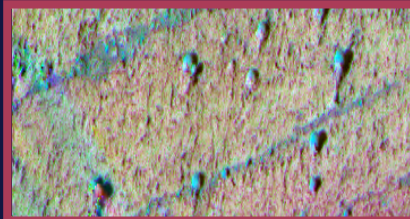


That’s because the rock abrasion tool sliced into two spherules within London containing the mineral hematite, which turns from gray to red when crumbled.

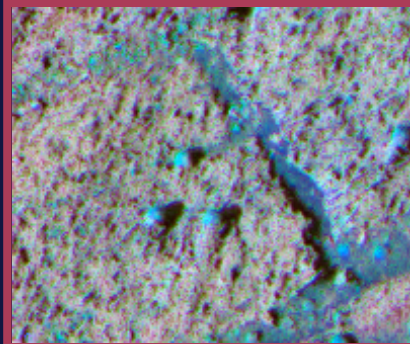
Processed panoramic camera image from Opportunity inside Endurance Crater.

Rock layers with different chemical compositions show color variations as well:

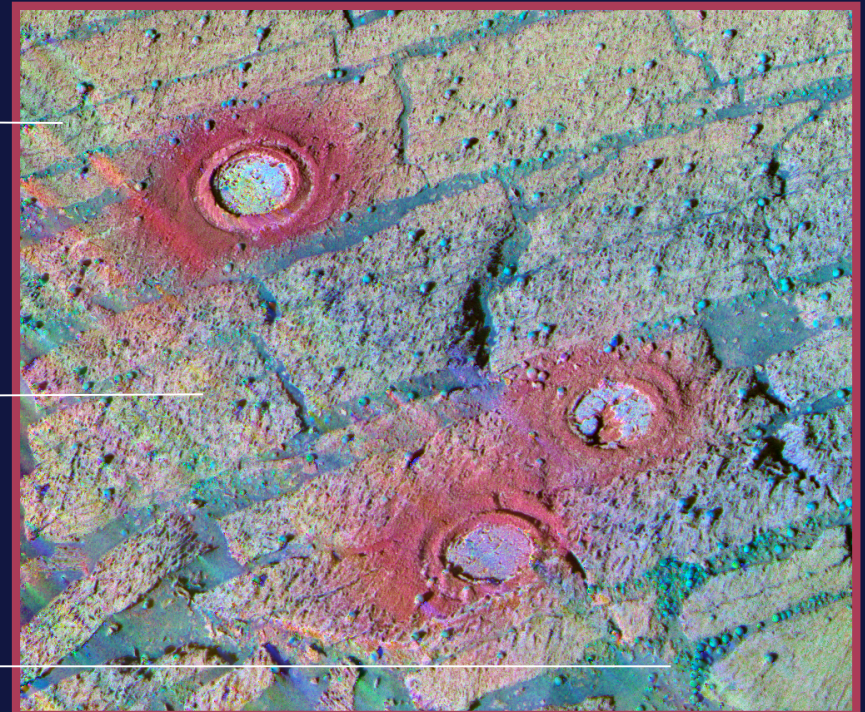
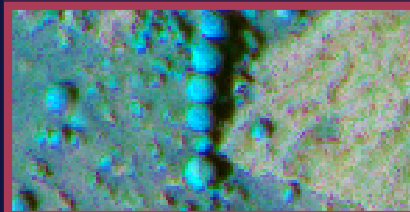
Top layer:
Yellowish-red



Middle layer:
Yellowish-green



Lower layer:
Green



Decorrelation stretch panoramic camera images from Opportunity inside Endurance Crater.

Results on the chemical compositions of the layers are pending.



COMING UP!

Over the next few weeks, Opportunity will continue to analyze the various layers of rock inside Endurance Crater.



Opportunity navigation camera image, June 30, 2004.



Test rover model at Jet Propulsion Laboratory.

Spirit will get a 3,000-meter tune up, including a hazard-avoidance camera adjustment and a right-front-wheel lubrication to prevent sticking and dragging of the wheel.