Satellites

&

Telescopes

Delivering Space for the new Science GCSEs

Dr. Carly Howett
Satellites & Telescopes

Specialist Schools and Academies Trust
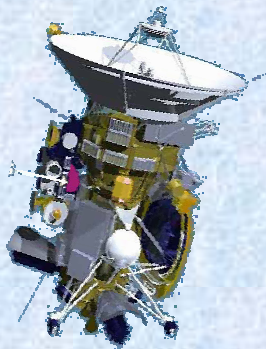EXCELLENCE AND DIVERSITY

Why bother using telescopes & satellites?

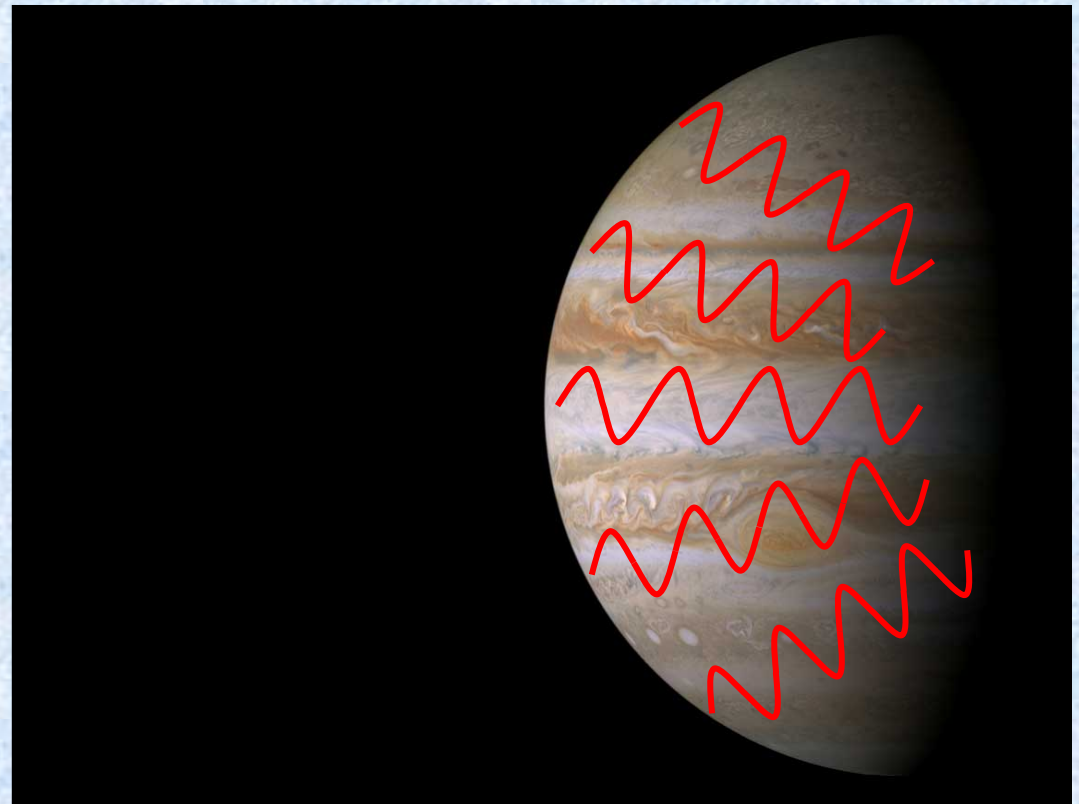# What can we learn using telescopes & satellites ?

Many things!!!

- Atmospheric composition
- Temperature
- Cloud structure
- Cloud composition
- Topography
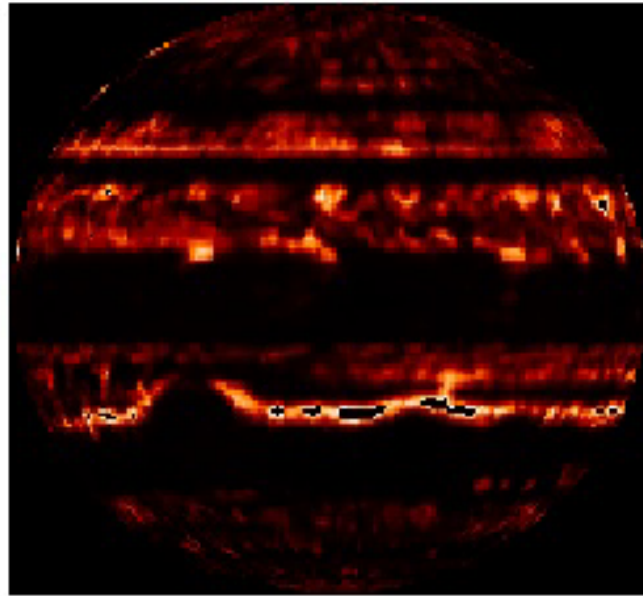- Surface conditions

How?

A technique called Remote Sounding

Galileo NIMS image at 4.99 microns

This is a region of **minimum gas opacity** and between breaks in the clouds we see **thermal emission** from deep in the Jovian atmosphere, down to pressure levels of 4-6 bars.

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Why bother?

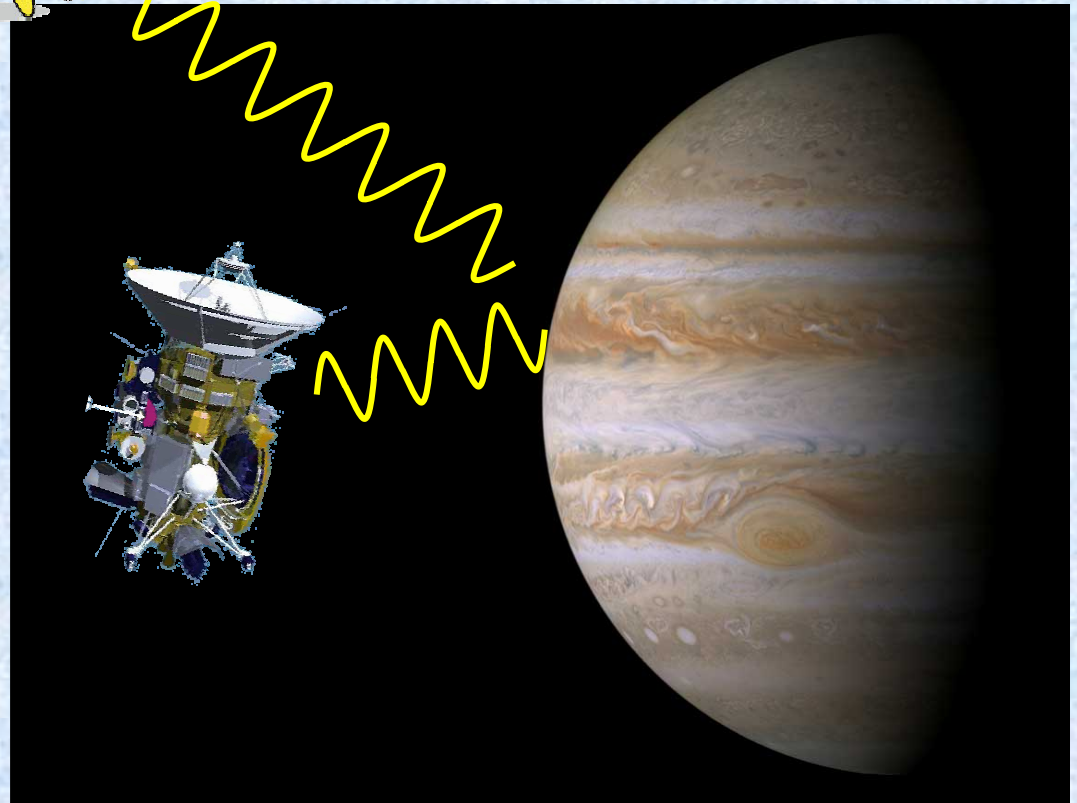What can we learn with telescopes & satellites

Many things!!!

- Atmospheric composition
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- Cloud structure
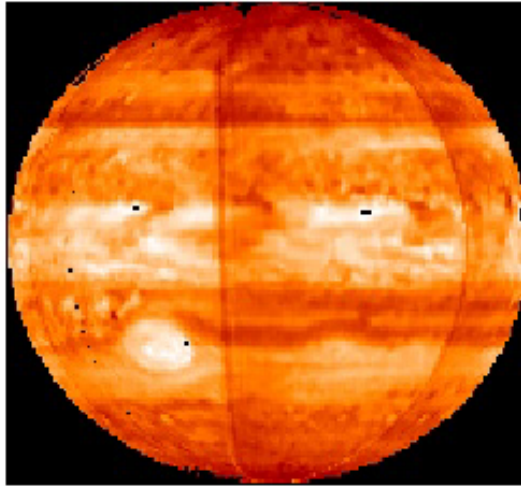- Cloud composition
- Topography
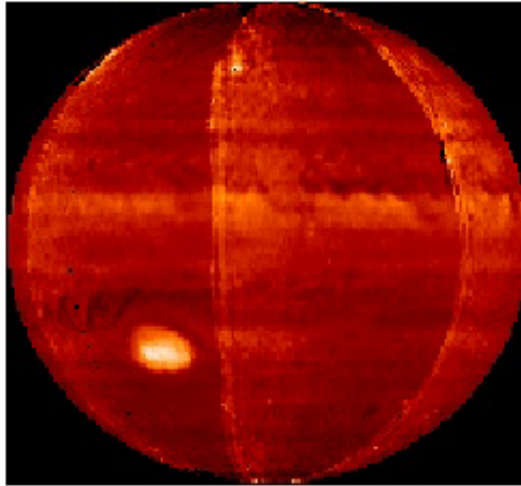- Surface conditions

How?

A technique called Remote Sounding

1.61 microns

This is a region of **minimum gas opacity** and so we see reflected sunlight **from all cloud levels**. The Great Red Spot on the bottom left is clearly visible.
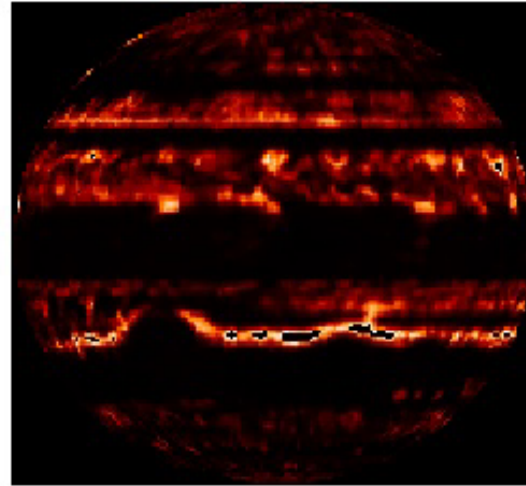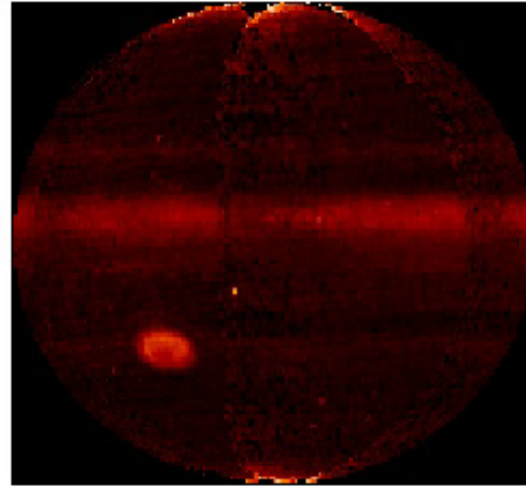
3.01 microns
Another strong gaseous absoprtion region but less so than 2.17 microns. Hence we some sunlight reflected from lower cloud decks.
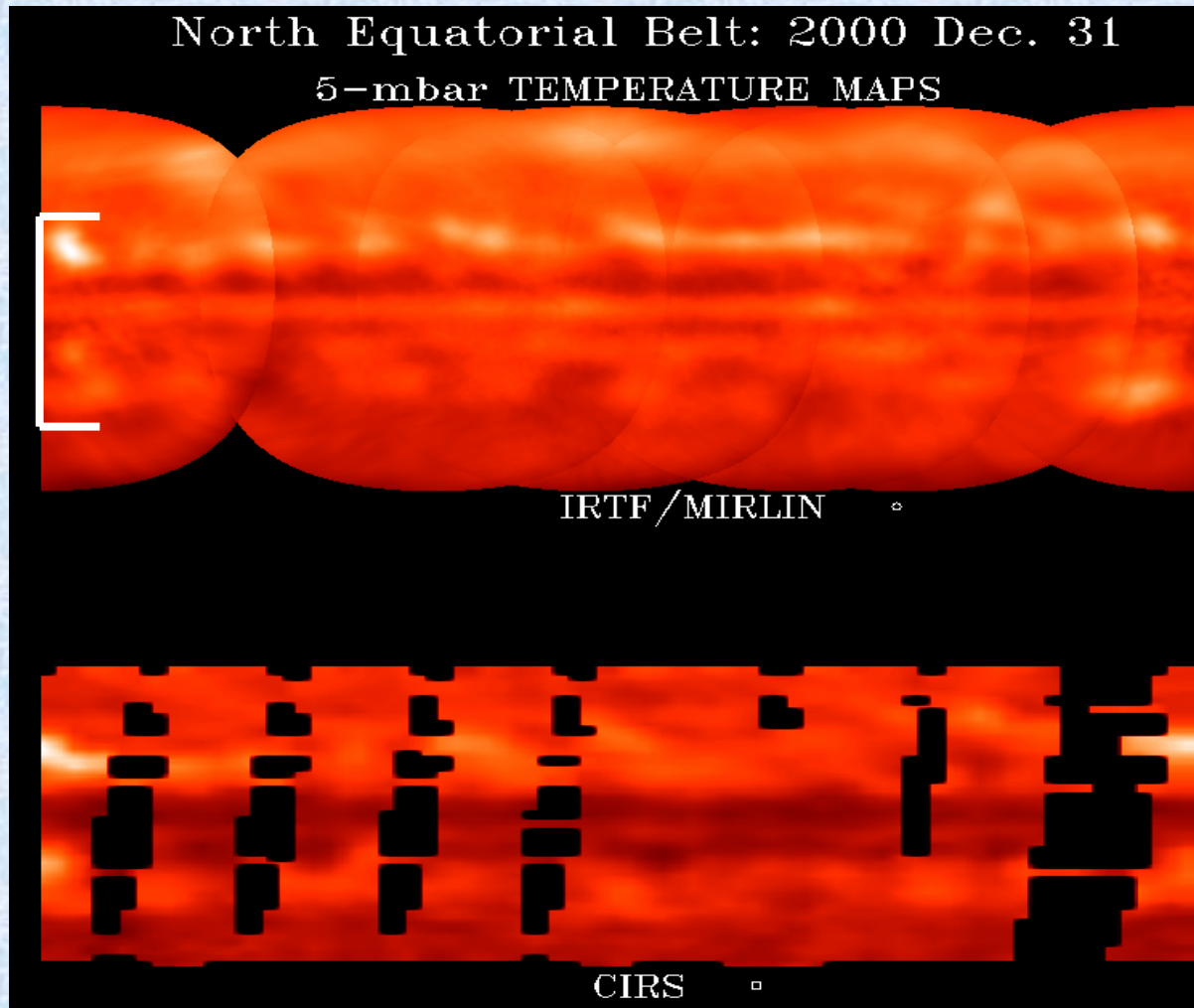
2.17 microns
This is a region of strong gaseous absorption and thus we see mainly reflected sunlight from **stratospheric haze**. This is clearly **most abundance above the Great Red Spot and the North Equatorial Belt**.
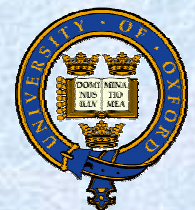
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Telescope vs. Satellite Observation

North Equatorial Belt: 2000 Dec. 31
5-mbar TEMPERATURE MAPS

IRTF/MIRLIN

CIRS

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Thank you for you attention!!

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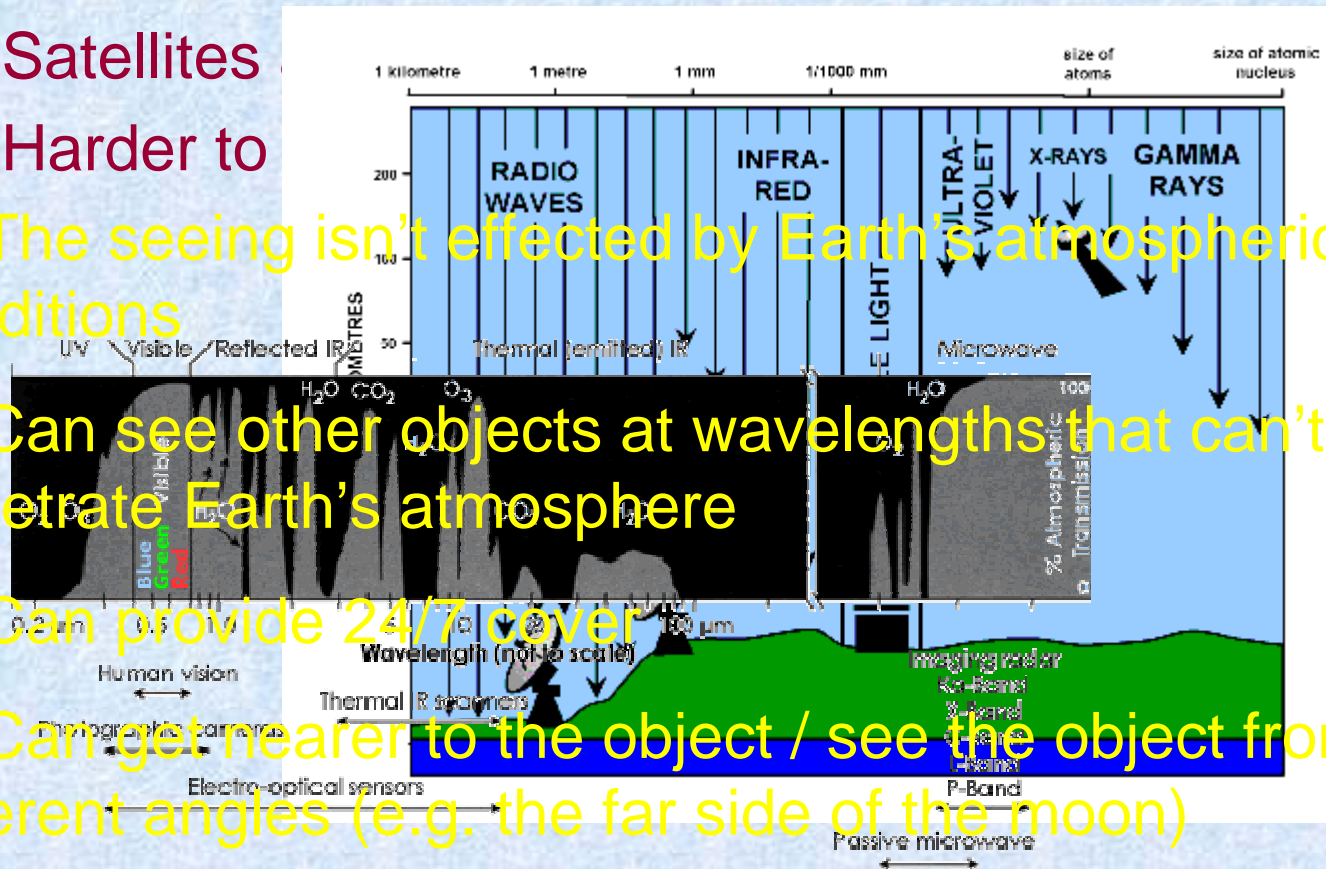# Additional Information I
Why use satellites?

✖ Satellites

✖ Harder to

✓ The seeing isn't effected by Earth's atmospheric conditions

✓ Can see other objects at wavelengths that can't penetrate Earth's atmosphere
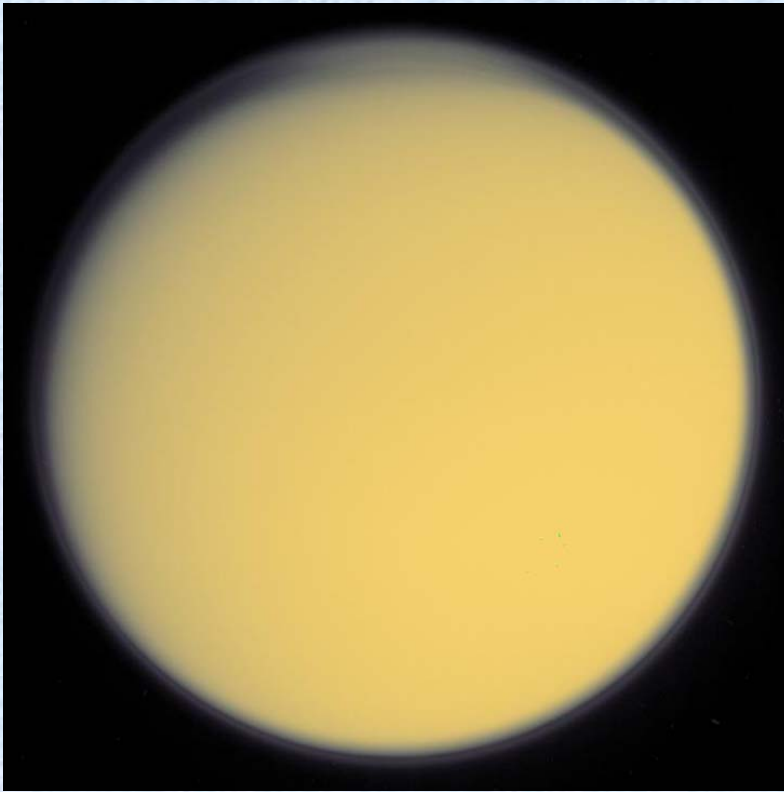
✓ Can provide 24/7 cover

✓ Can get nearer to the object / see the object from different angles (e.g. the far side of the moon)
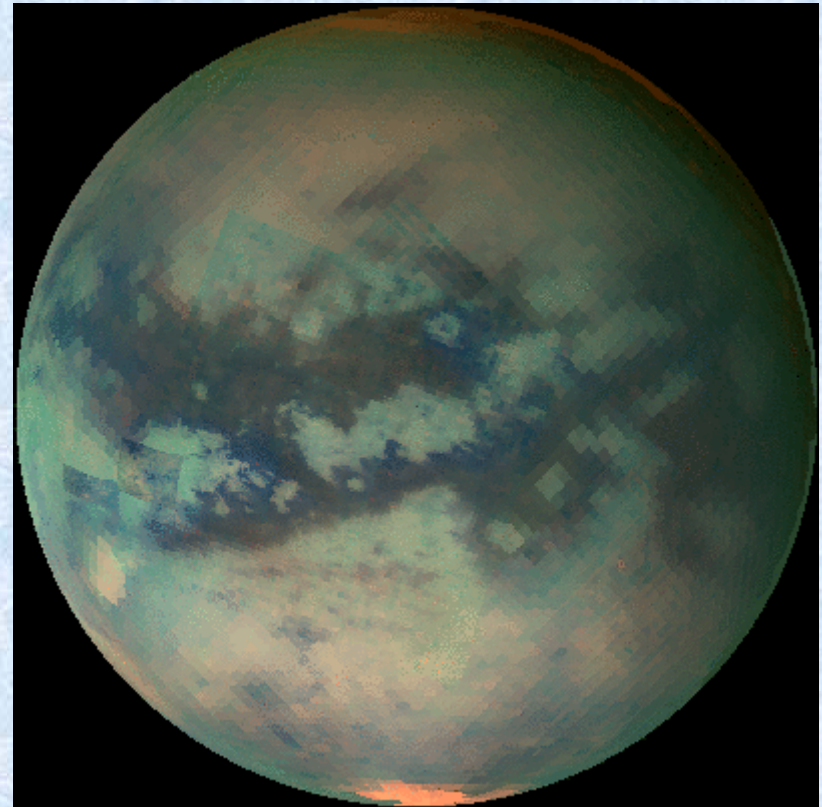

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Additional Information II
Why look in the infra-red?

Surface Image from Cassini VIMS of Titan (Saturn's largest moon)

Visible

IR

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