been in excess of 1000K. Spectra were obtained at two minute intervals and the variation in the strength of the various lines with time is very evident with the sodium line becoming strongest at 22.34 UT and all the lines having faded almost to the level of the noise by 22.42 UT.

On the following night of July 20 spectroscopy of the Q2 plume was obtained with the same telescope/spectrograph combination, but at a higher resolution with $\Delta\lambda$ of 0.1 nm. Again neutral sodium was detected in emission, but in addition, with the higher resolution, the sodium D-lines were well resolved and their time evolution was again recorded. When these datasets are combined, they will prove of immeasurable value in disentangling the structure of the plumes according to the various theoretical models that are already calculated.

## OBSERVATIONS FROM THE IMPACT OF COMET P/SHOEMAKER-LEVY 9 IN JUPITER FROM THE PIC–DU–MIDI OBSERVATORY, FRANCE

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The impact of comet P/Shoemaker–Levy 9 has been observed from the Pic–du–Midi Observatory, France. Observations with the 1 meter telescope were performed starting several months before the impacts, to several months after. During the event, a Nicmos infrared camera with several filters (J (1.25 $\mu$m), H (1.65 $\mu$m), K (2.0–2.3 $\mu$m)) has been adapted to one of the Nasmith focus. The spatial resolution was 0.4 arcsec per pixel. The other focus contained a Thomson CCD with various filters between 0.4 and 1.05 $\mu$m and a resolution of 0."28 per pixel.

At the 2 meter Bernard Lyot telescope, high resolution spectroscopy has been performed with the MUSICOS (MUlti SIde COntinuous Spectroscopy) spectrograph. The instrument has a spectral resolution of about 36,000 in the spectral range between 564 and 875 nm. A total of 35 spectra of almost all impact sites and of the flash and plume of impacts L and $Q_1$ were obtained. These last ones do show at least seven metallic emission lines: Na (doublet at $\sim$ 589 nm), Fe (636 nm and 805 nm), Ca (657 nm), Li (671 nm), and K (767 nm). H$\alpha$ emission is also seen. These emissions appear about 15 minutes after

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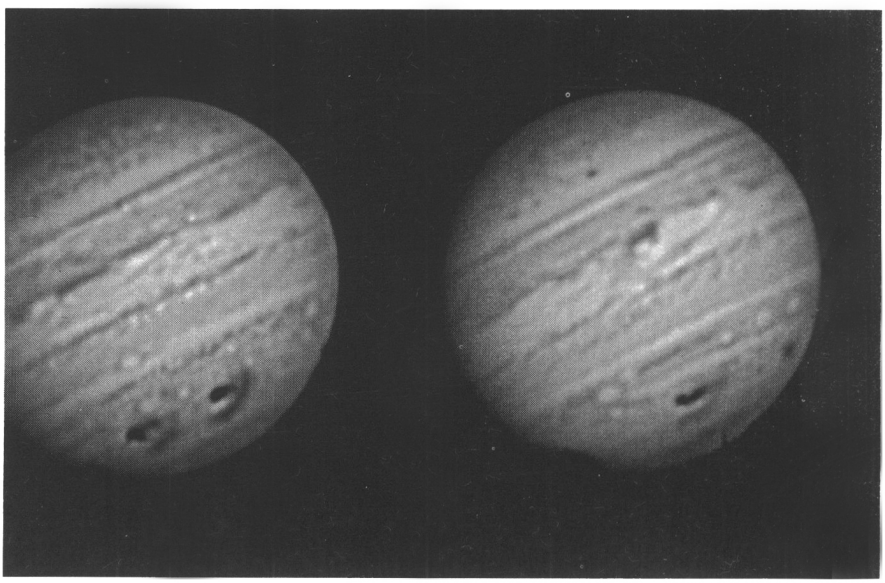
the actual impact, which seems to correspond to the limb crossing of the fresh impact site. Several excitation mechanims are proposed (thermal, fluorescence, recombination), but a firm discrimination between all these remains to be made, and comparisons with other observations reported by different groups will be useful for this task.

The spectra of the impact sites at a later stage do not show direct evidence for emission lines, but will be examined closer in the future for continuum variation or absorption lines.

**Figure: Images of Jupiter from Pic-du-Midi Observatory (1 meter telescope, red filter) taken on July 20, 1994. Left image (19:56 UT): impacts L (right) and G (left); the dark half-ring, extending more than 10,000 km from the central spot, corresponds to the ejecta. Impact Q can be seen at the left limb. Right image (21:11 UT): impact K (central meridian) and L (at the right limb).**



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