SPECTROSCOPIC OBSERVATIONS OF COMET BENNETT NEAR PERIHELION

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Comet Bennett (1969i) was observed spectroscopically from the 22 to the 28 of March 1970, at Tonantzintla. Several spectrograms were obtained, which cover the spectral range from λλ3100 to 8700 Å. The Cassegrain spectrograph, attached to the 40-inch telescope, was used. The dispersions involved are 61, 123 and 246 Å/mm. Only 6 spectrograms will be discussed here; they were obtained when the heliocentric distance of the comet was close to 0.54 A. U.

Close to perihelion the nucleus was circular and the observations were carried out setting the slit on the nucleus, the slit covered 168 seconds of arc. In Figure 1 two of the six spectrograms analyzed are shown. The guiding was satisfactory, due to good seeing conditions.

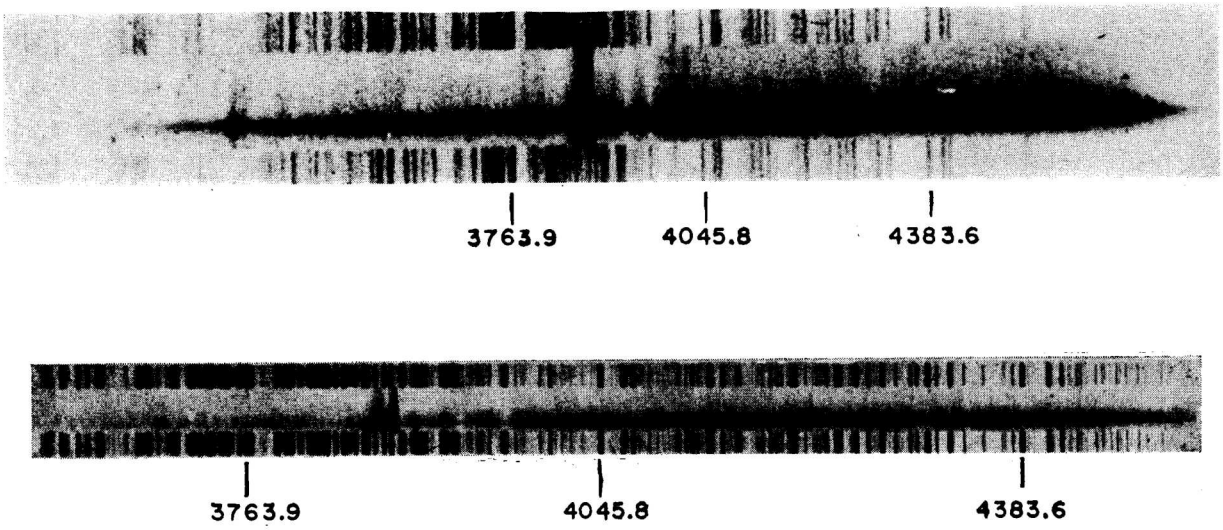

Figure 1.—*Comet Bennett Slit spectrograms. The upper one was taken in March 22 at 11h50m U.T. with a 61 Å/mm dispersion. The lower one was taken in March 25 at 11h54m U.T., with a 123 Å/mm. dispersion.*

The nucleus shows a strong solar continuum, which increases in intensity toward longer wavelengths. At the near infrared it is dominant, masking completely the few emission features around the nucleus.

Molecules of CN, C_2, CH, C_3, CH^+ and OH are present. The relative intensities of their bands have been estimated on uncalibrated plates. The spectral response of the instrument was taken into account by the use of an AO star, 58 Aql, which was always observed before the comet at the same hour angle. The intensities given in Table 1 should be taken as good eye estimates and refer to a region close to the nucleus. Spectral identifications were taken from Swings and Haser (1956).

During March 22, 23 and 24 no significant variations in intensity were detected. The P_2 band of OH, which was very strong in only one plate, does not appear in the others. However, the atmospheric extinction of the Earth might be responsible for the variation. The same band appears in spectrograms obtained several days later, where more emission features than those given in Table 1 are seen. The CO bands, classical tail features, were very weak during the observations close to perihelion, and increased markedly with increasing heliocentric distance.

TABLE 1

Observed Features

Wavelength	*Estimated Intensity*	*Identification*
3090	1	OH $^{Q}R_{12}$ (0,0) + Q_2 (0,0)
3094-96	2	OH $^{P}Q_{12}$ (0,0) + P_2 (0,0)
3100	4	OH $^{P}Q_{12}$ (0,0) + P_2 (0,0)
3354	2	NH $^{R}Q_{21}$ (0,0) + $^{Q}P_{32}$ (0,0)
3358	3	NH R_1 (0,0) + etc.
3564	0.5	OH^+ R_3 (0,0) N_2^+ (2,1)
3626	1.0	————
3828	1.0	————
3866	8	CN R (0,0)
3880-82	20	CN P (0,0)
3921	2	CH P_2 (0.0)
4000	1	CO^+ R_1 (3,0), C_3
4013	< 1	C_3
4020	1	C_3 CO^+ R_2 (3,0)
4024	2	C_3
4027	2	C_3
4039	2	C_3
4044	3	C_3
4052	4	C_3
4214	5	CH^+ P (0,1)
4254	2	CH^+ P (0,0) CO^+ R_1 (2,0)
4380	1	C_2
4676	< 1	C_2
4682	2	C_2
4695	3	C_2
4713	1	C_2
5128	2.5	C_2
5144	2	C_2
5165	5	C_2
5466	1	C_2
5483	> 1	C_2
5499	2	C_2
5518	1	C_2
5538	2	C_2
5582	2	C_2
5634	3	C_2
5890	9	Na
6615?	1	—

REFERENCES

Swings, P. and Haser, L. 1956. *Atlas of Representative Cometary Spectra* (University of Liege, Astrophysical Institute).