ING LA PALMA TECHNICAL NOTE NO. 125

Maps of the standard arc-lamps for the WHT ISIS-Blue Arm

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ING La Palma Technical Notes 84 and 98 gave identifications for lines produced by some of the calibration lamps and gratings available to ISIS on the WHT at the Roque de Los Muchachos on the island of La Palma. This note gives identification for each grating available for the blue arm of ISIS with copper-argon lamp, copper-neon lamp and both lamps together.

The calibration lamp exposures were obtained on 2001 April 27th using the ISIS Blue Arm with the EEV12 CCD chip. All the exposures were made with a slit width of 0.93 arcseconds. Several central wavelengths were selected for high resolution gratings.

The reduction was performed inside the IRAF environment. The arc lines were identified using the IRAF task *identify*. All lines were carefully identified with the IRAF line list, the IDS CuAr/CuNe (ING technical Note 70, 1989, by Zuiderwijk & Knapen) and the ISIS Maps (ING technical notes 84 and 98, 1992 and 1995, by Sinclair) as a reference. We used an order 4 Legendre function for fitting the wavelengths. Table 1 lists the laboratory wavelengths of lines.

The following information is given in tables 2 - 13:

Column 1: The wavelength range in Å for each frame.

Column 2: Exposure time in seconds.

Column 3: Order-sorting filter if used; no neutral density filters were used.

Column 4: Dispersion (Å/pixel).

Column 5: Number of lines used in the IRAF fitting routine (identify)

Column 6: RMS values from the fitting of the wavelength.

Table 1: The Copper-Neon and Copper-Argon lines

Line (Å)	**Symbol**	**Line (Å)**	**Symbol**	**Line (Å)**	**Symbol**
3088.19995		3850.57007		4735.90576	
3093.40186		3868.52832		4764.86475	ArI
3169.69995		3925.71875		4806.02051	ArII
3181.10010		3928.62012	AII(10)	4847.80957	
3247.54004		3946.09717	ArII	4865.91016	ArI
3273.96191		3948.97900	ArI	4876.26123	ArII
3279.82007		3979.36011	AII(10)	4879.86328	ArII
3307.22827		3994.79175	ArII	4889.04199	ArII
3323.75000		4013.86011	HeI	4904.75146	ArI
3337.84009	ArII	4042.89380		4933.20898	ArII
3350.92432	ArI	4044.41797		4942.92139	
3369.87012	ArI	4052.92090		4965.07959	ArI
3376.43579		4103.91016		4972.15967	ArII
3378.28003		4131.72998		5009.33447	ArII
3388.53101	HeI	4158.58984	HeI	5017.16260	
3417.90356	ArII	4164.17969	AI(4)	5062.03711	
3447.70288	ArII	4181.88379	ArI	5090.49512	
3454.18994		4198.31689	ArI	5125.76562	
3466.58008	ArII	4200.67432		5141.78271	
3472.57104	NeI	4228.15820	ArI	5162.28467	
3476.74731	ArII	4237.22021	ArI	5165.77295	
3509.77856	NeI	4259.36182		5187.74609	
3520.50000	ArII	4272.16895		5218.20215	
3530.38989		4277.52832		5252.78809	ArII
3535.31958	NeI	4309.23926		5254.46484	ArI
3548.51440	ArII	4331.19971	ArI	5330.77734	ArI
3554.30591	ArII	4333.56104		5341.08984	
3556.90405	AII(70)	4335.33789	ArI	5400.56152	NeI
3559.50806	NeI	4348.06006		5451.65186	ArI
3561.03052	ArII	4362.06982	ArII	5495.87402	ArI
3582.35449		4379.66699	AI(2)	5506.11279	
3588.44067		4385.05664		5558.70215	
3600.16919	ArII	4400.98633		5572.54150	
3622.13745		4426.00098		5606.73291	
3639.83301		4430.18896		5650.70410	
3655.27832	ArII	4433.83789		5689.81641	NeI
3660.43701		4448.87939			

Line (Å)	**Symbol**	**Line (Å)**	**Symbol**	**Line (Å)**	**Symbol**
3678.27002	ArI	4579.34961	ArII	5852.48779	
3680.06079	NeI	4589.89795		5881.89502	
3718.20654		4598.76270	ArII	5912.08545	
3720.42651		4609.56738	ArII	5928.81299	ArI
3724.51660		4651.12402	ArII	5944.83398	
3729.30859	ArII	4657.90137	ArI	5975.53418	ArI
3737.88989		4702.31592		6032.12744	
3763.50537		4721.59082		6043.22314	
3765.27002		4726.86816		6059.37256	
3770.52002		4732.05322		6074.33789	
3780.83984		4628.44092	ArI	6096.16309	
3803.16992	AII	4637.23291	ArII	6114.92334	NeI
4474.75977		5739.51953		6128.44971	
4481.81006		5748.29834		6143.06250	
4510.73340	ArII	5764.41895	NeI	6163.59375	NeI
4545.08008		5820.15576	NeI	6217.28125	NeI

1 R158B Grating

Table 2: Copper-Argon Lamp with R158B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
1216-8016	80	—	1.619	49	0.204

Table 3: Copper-Neon Lamp with R158B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
1216-8016	40	—	1.619	43	0.267

Table 4: Copper-Argon and Copper-Neon Lamps with R158B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
1216-8016	40	—	1.619	53	0.155

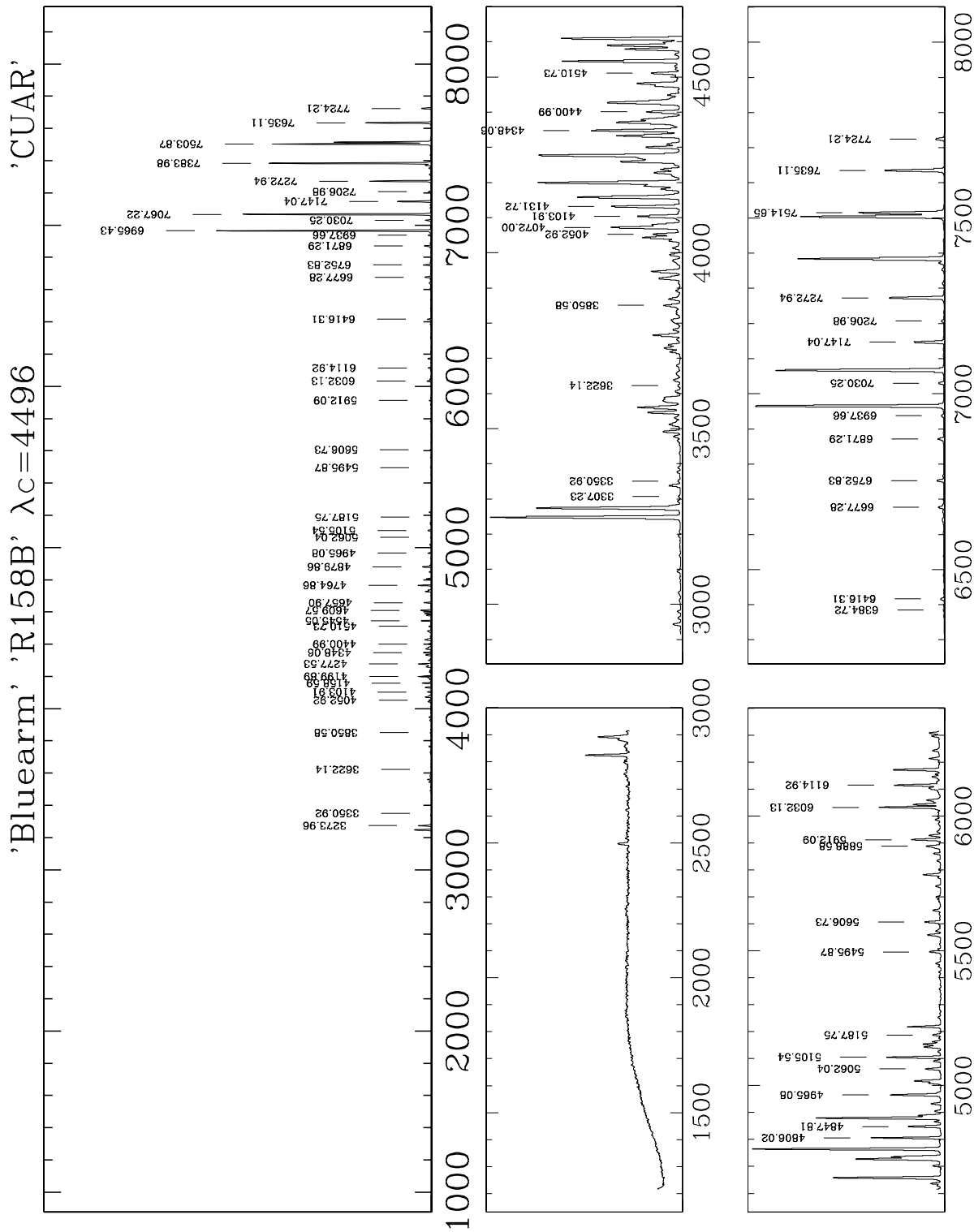

Figure 1: Copper-Argon Lamp with R158B. Central wavelength = 4500 Å.

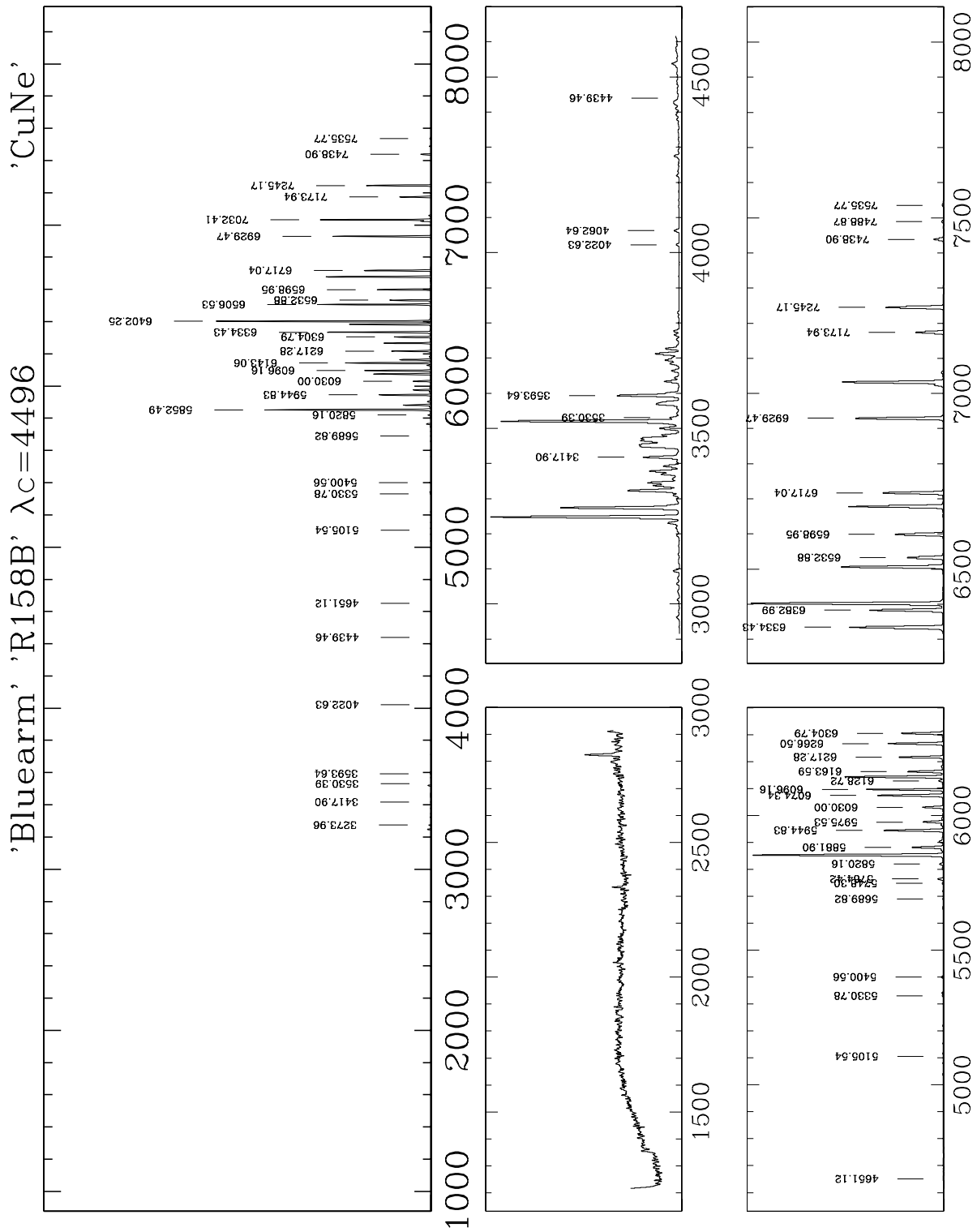

Figure 2: Copper-Argon Lamp with R158B. Central wavelength = 4500 Å.

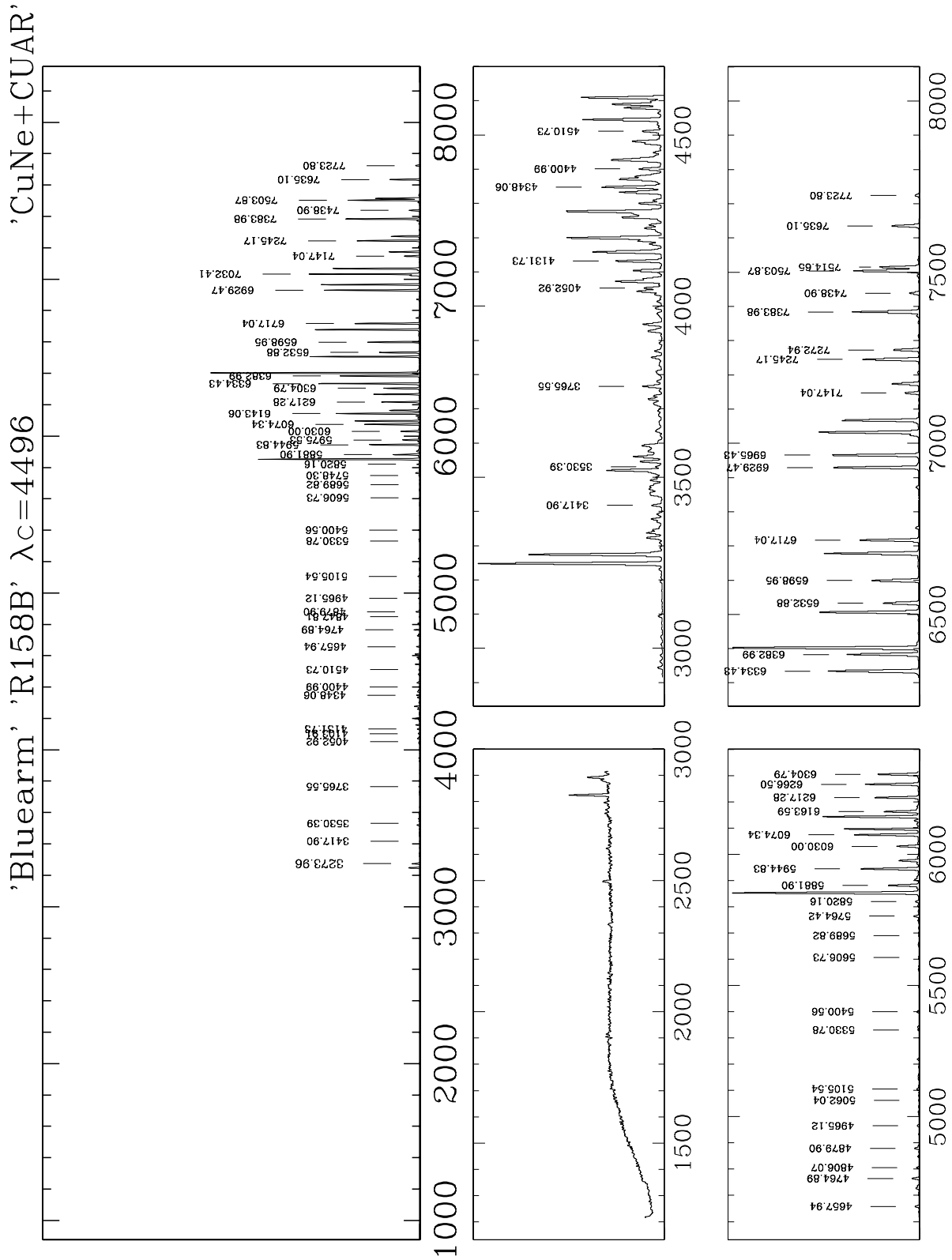

Figure 3: Copper-Neon & Copper-Argon Lamps with R158B. Central wavelength = 4500 Å.

2 R300B Grating

Table 5: Copper-Argon Lamp with R300B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
2748-6362	60	—	0.860	59	0.107

Table 6: Copper-Neon Lamp with R300B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
2748-6362	60	—	0.860	46	0.177

Table 7: Copper-Argon and Copper-Neon Lamps with R300B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
2748-6362	60	—	0.860	62	0.070

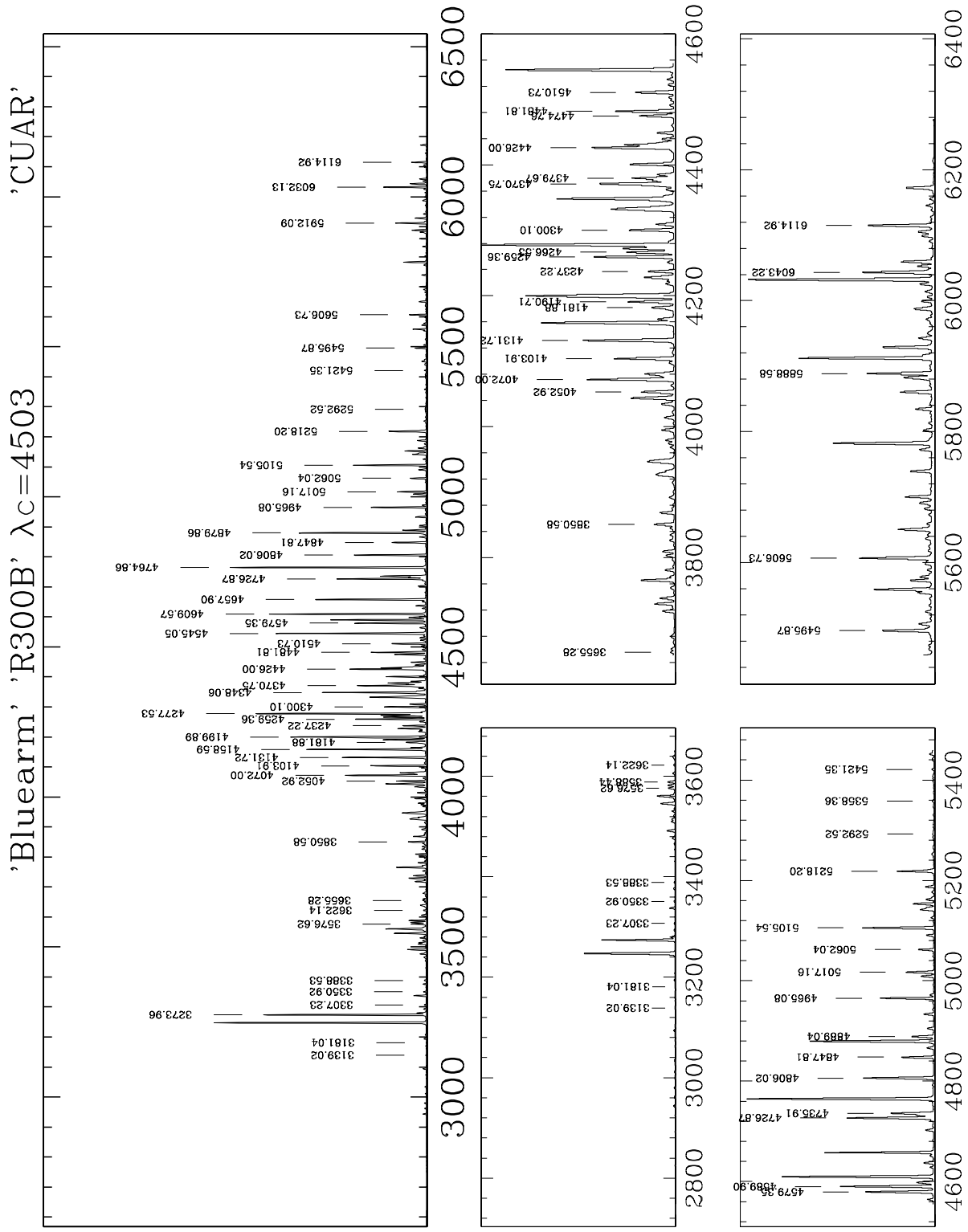

Figure 4: Copper-Argon Lamp with R300B. Central wavelength = 4500 Å.

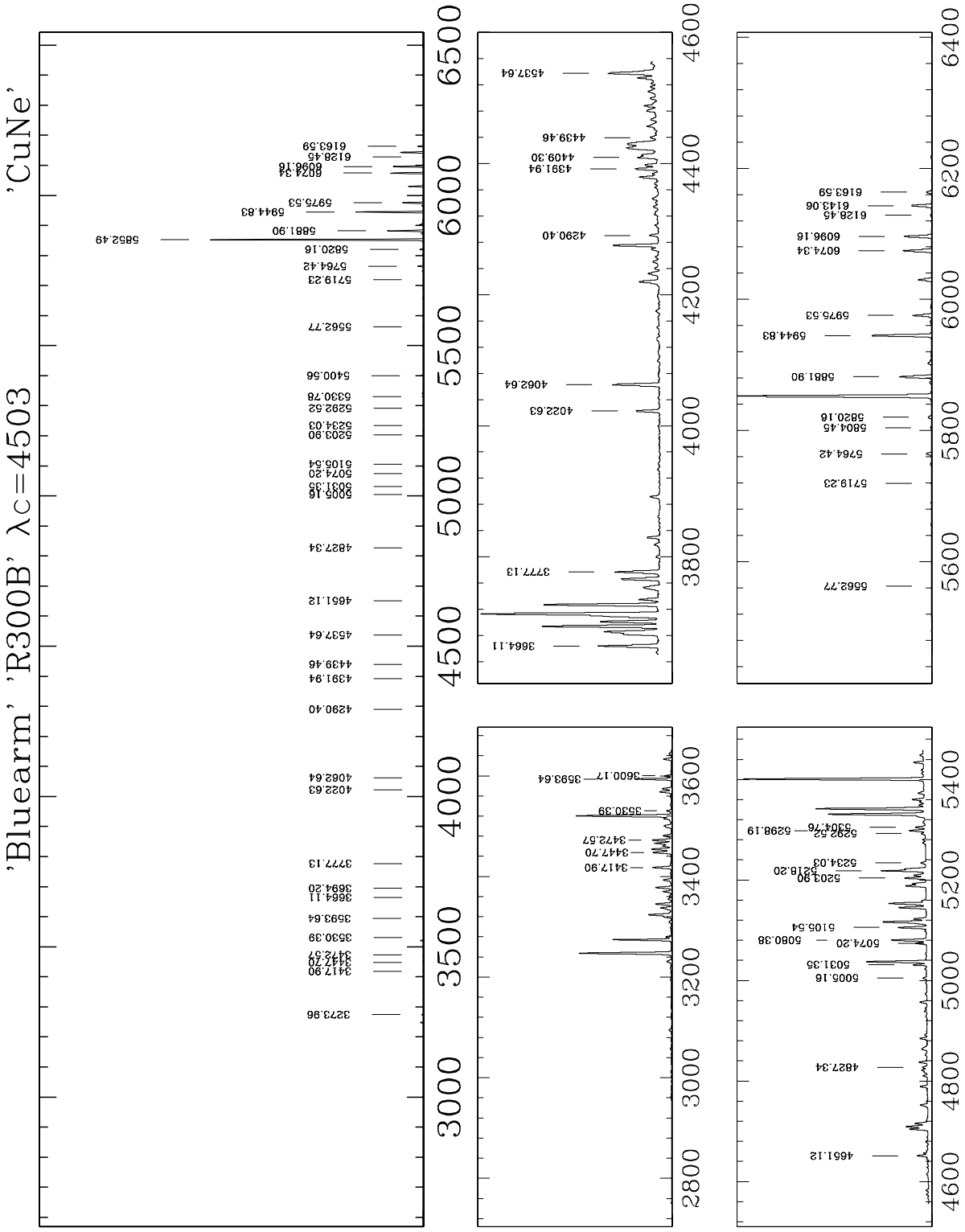

Figure 5: Copper-Argon Lamp with R300B. Central wavelength = 4500 Å.

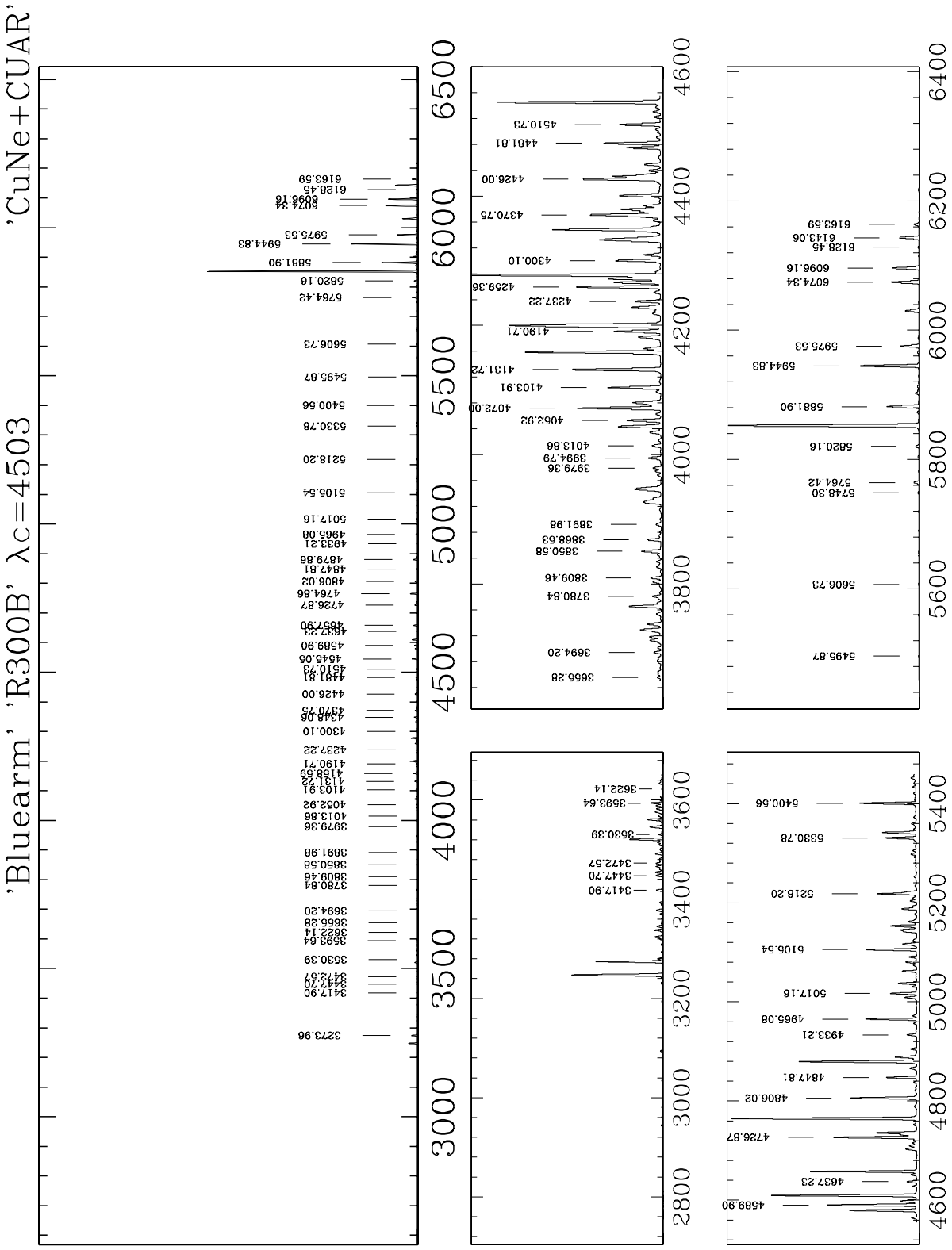

Figure 6: Copper-Neon & Copper-Argon Lamps with R300B. Central wavelength = 4500 Å.

3 R600B Grating

Table 8: Copper-Argon Lamp with R600B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
2895-4726	60	—	0.436	64	0.076
4440-6287	60	—	0.439	64	0.080

Table 9: Copper-Neon Lamp with R600B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
2895-4726	60	—	0.436	34	0.121
4440-6287	60	—	0.439	34	0.064

Table 10: Copper-Argon and Copper-Neon Lamps with R600B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
2895-4726	60	—	0.436	74	0.075
4440-6287	60	—	0.439	74	0.039

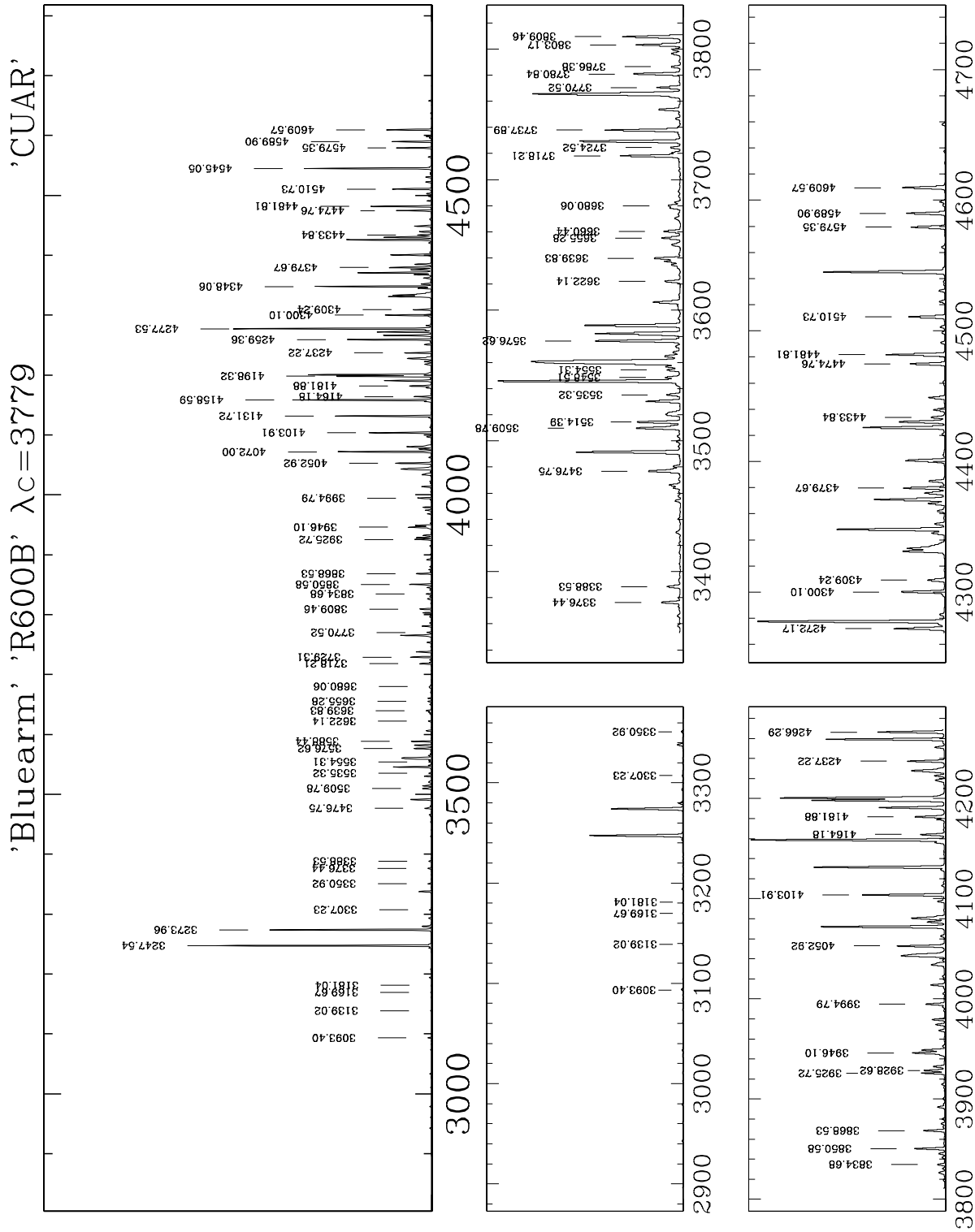

Figure 7: Copper-Argon Lamp with R600B. Central wavelength = 3780 Å.

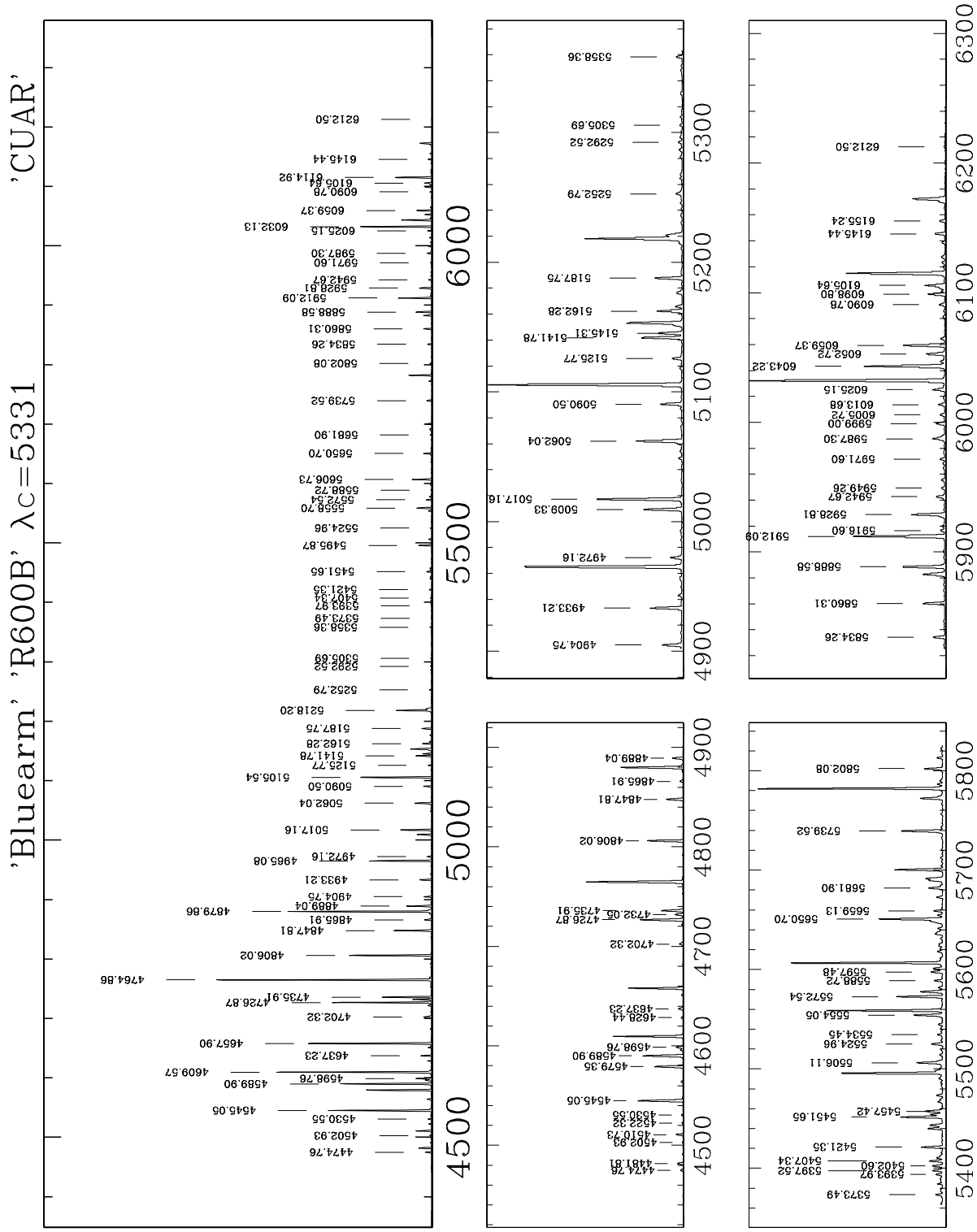

Figure 8: Copper-Argon Lamp with R600B. Central wavelength = 5330 Å.

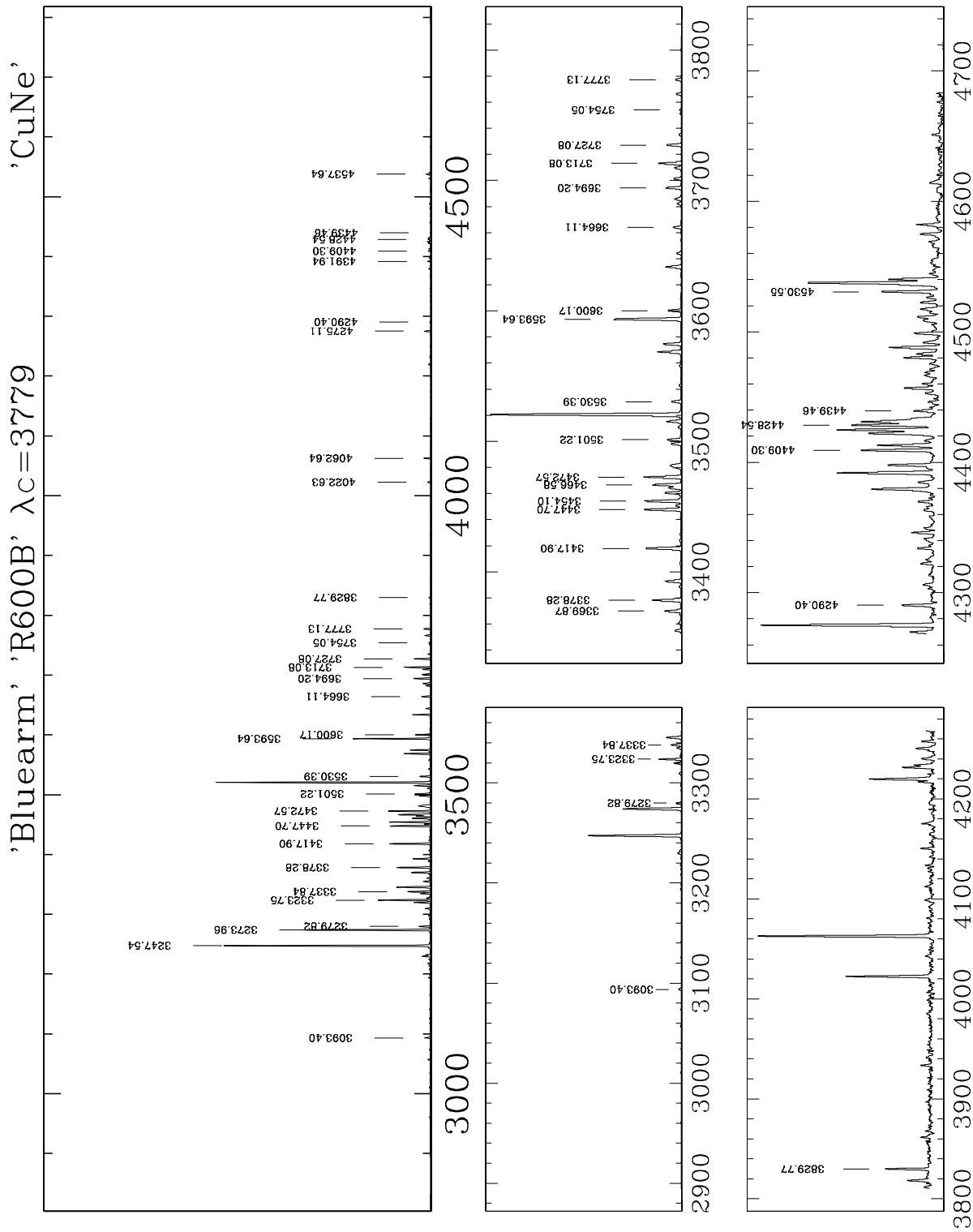

Figure 9: Copper-Argon Lamp with R600B. Central wavelength = 3780 Å.

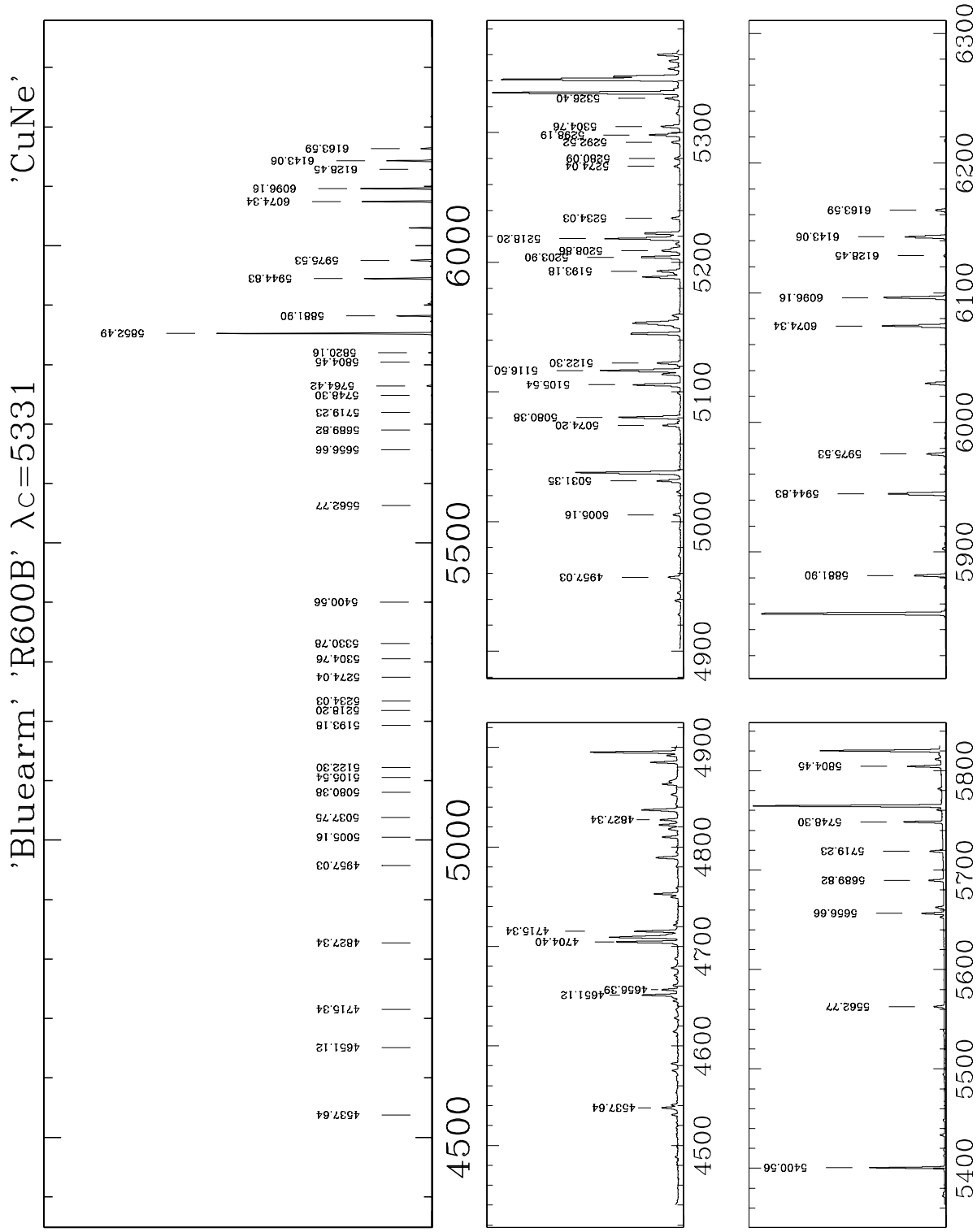

Figure 10: Copper-Argon Lamp with R600B. Central wavelength = 5330 Å.

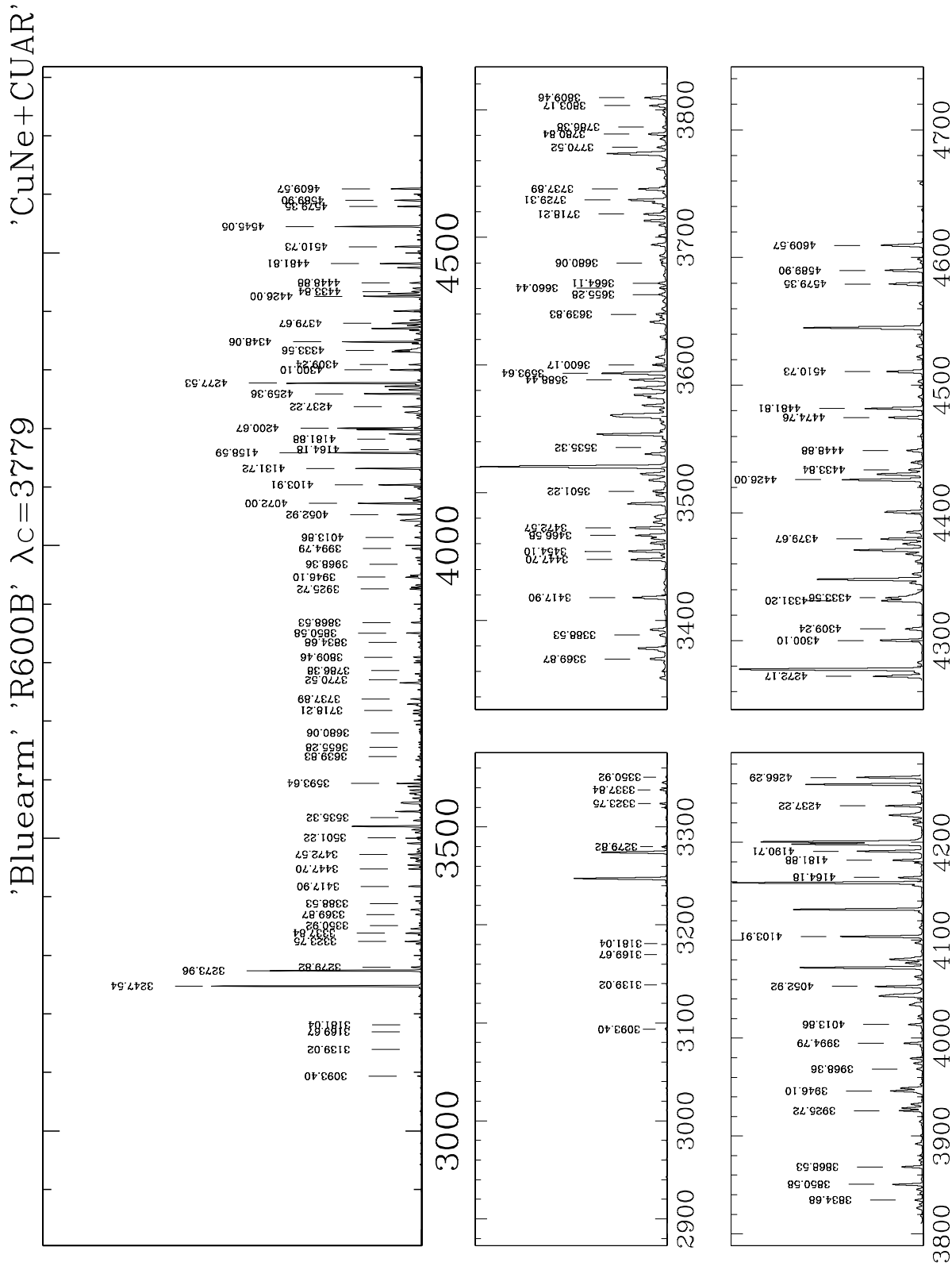

Figure 11: Copper-Neon & Copper-Argon Lamps with R600B. Central wavelength = 3780 Å.

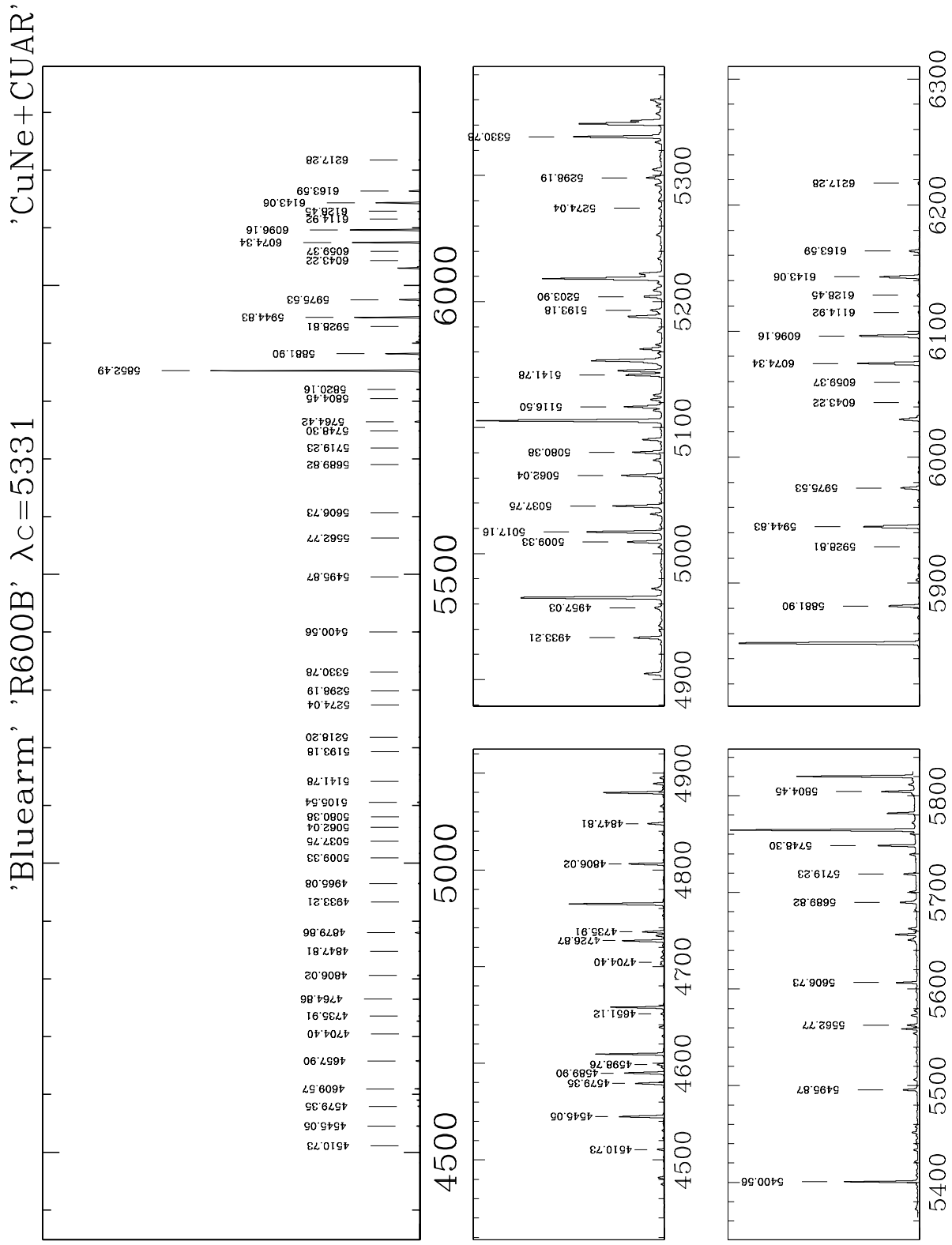

Figure 12: Copper-Neon & Copper-Argon Lamp with R600B. Central wavelength = 5330 Å.

4 R1200B Grating

Table 11: Copper-Argon Lamp with R1200B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
2952-3885	120	—	0.222	52	0.058
3751-4688	120	—	0.222	47	0.009
4546-5484	120	—	0.223	45	0.020
5348-6286	120	—	0.223	42	0.013

Table 12: Copper-Neon Lamp with R1200B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
2952-3885	120	—	0.222	39	0.046
3751-4688	120	—	0.222	42	0.102
4546-5484	120	—	0.223	37	0.036
5348-6286	60	—	0.223	21	0.018

Table 13: Copper-Argon and Copper-Neon Lamps with R1200B

Range (Å)	**Exp. (s)**	**Filter**	**Disp (Å/pixel)**	**Lines**	**RMS (Å)**
2952-3885	120	—	0.222	57	0.064
3751-4688	120	—	0.222	49	0.014
4546-5484	120	—	0.223	42	0.018
5348-6286	30	—	0.223	29	0.019

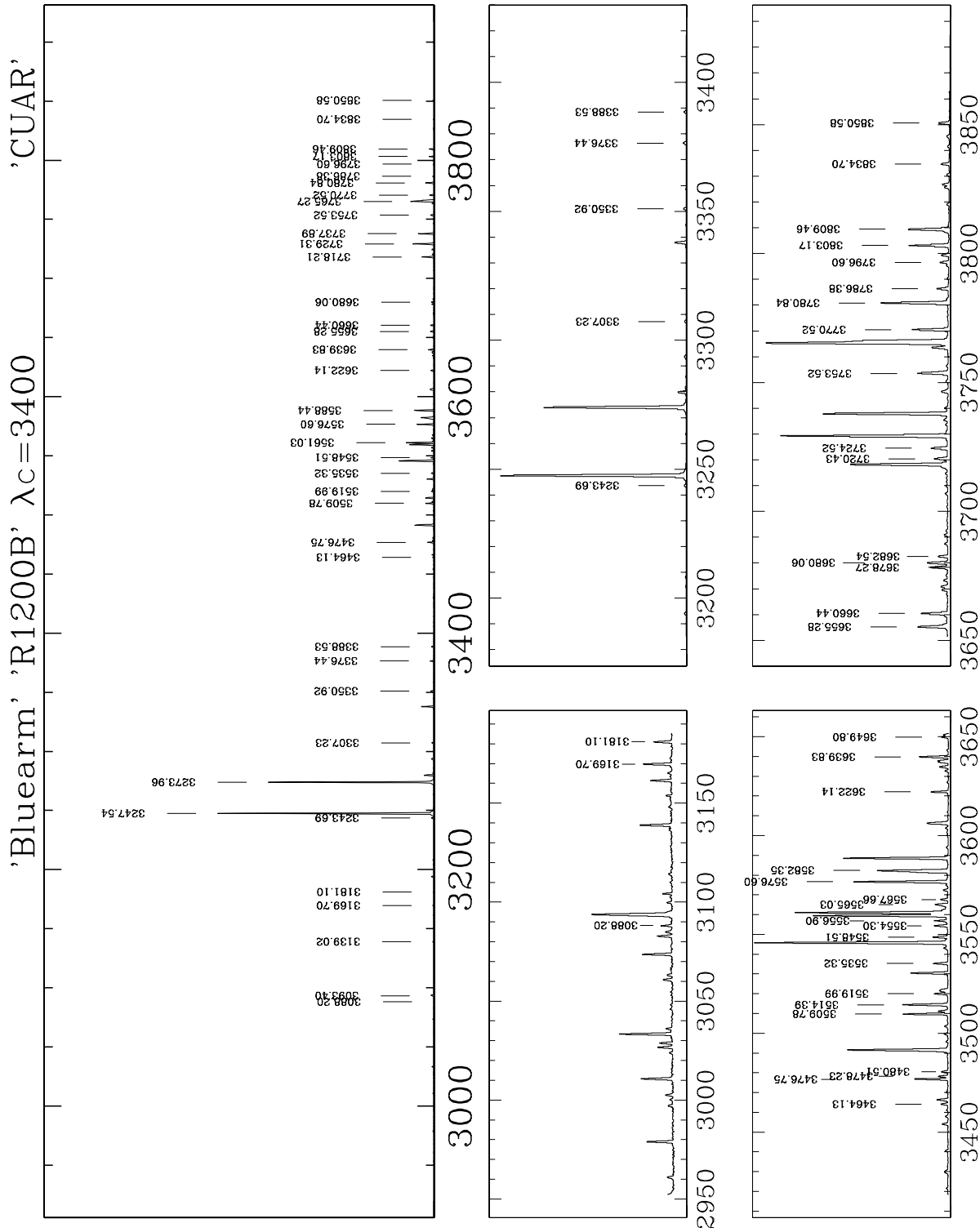

Figure 13: Copper-Argon Lamp with R1200B. Central wavelength = 3400 Å.

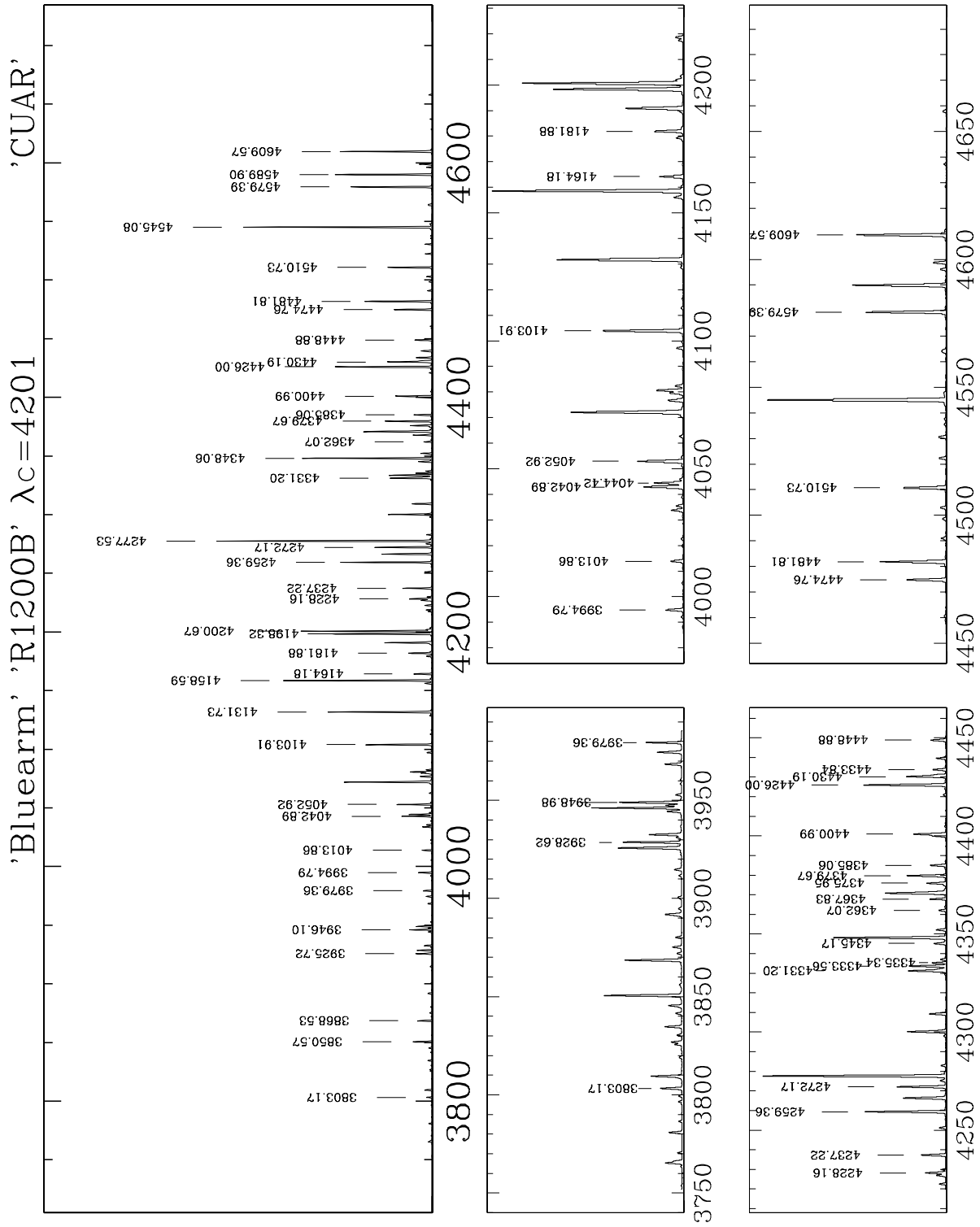

Figure 14: Copper-Argon Lamp with R1200B. Central wavelength = 4200 Å.

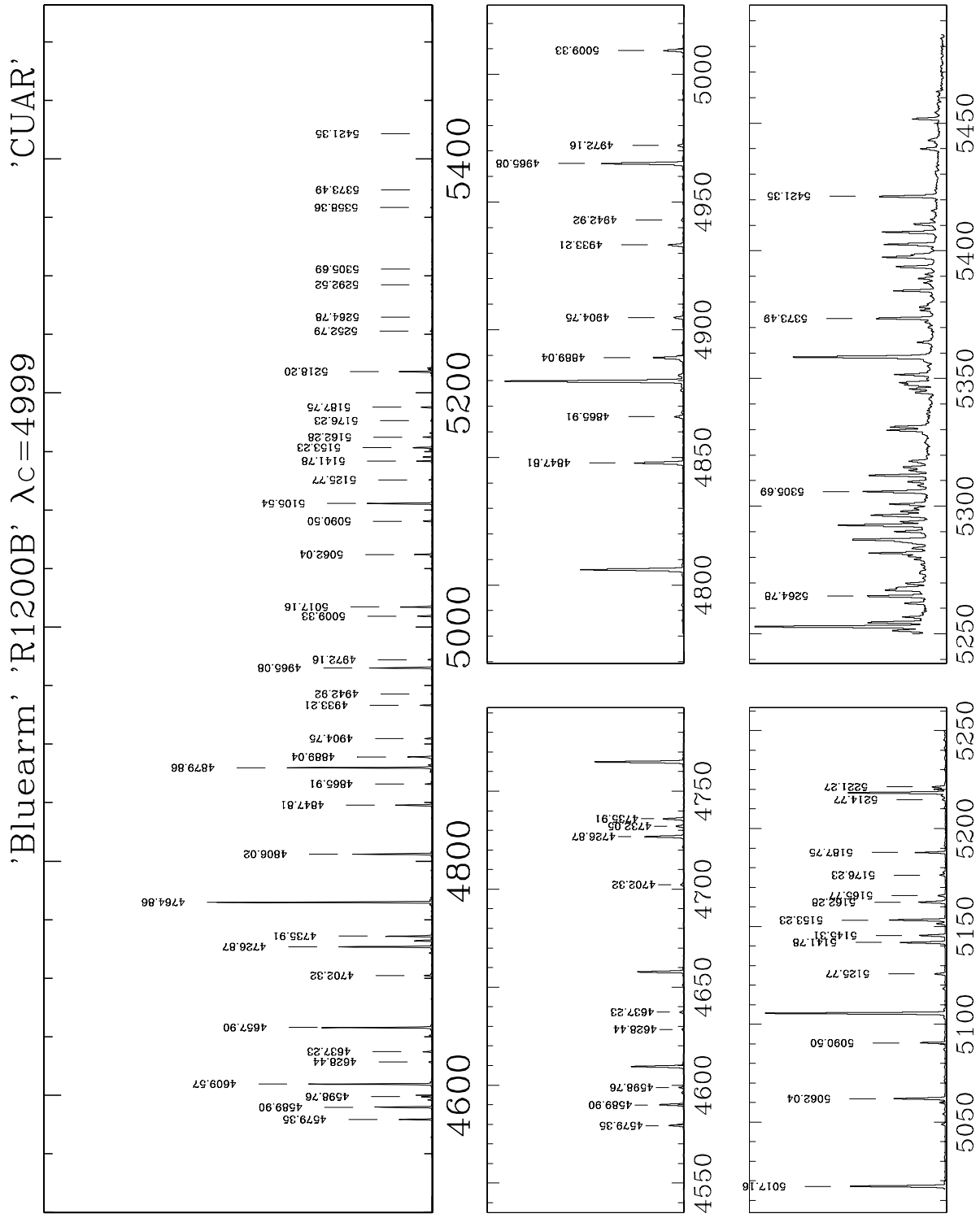

Figure 15: Copper-Argon Lamp with R1200B. Central wavelength = 5000 Å.

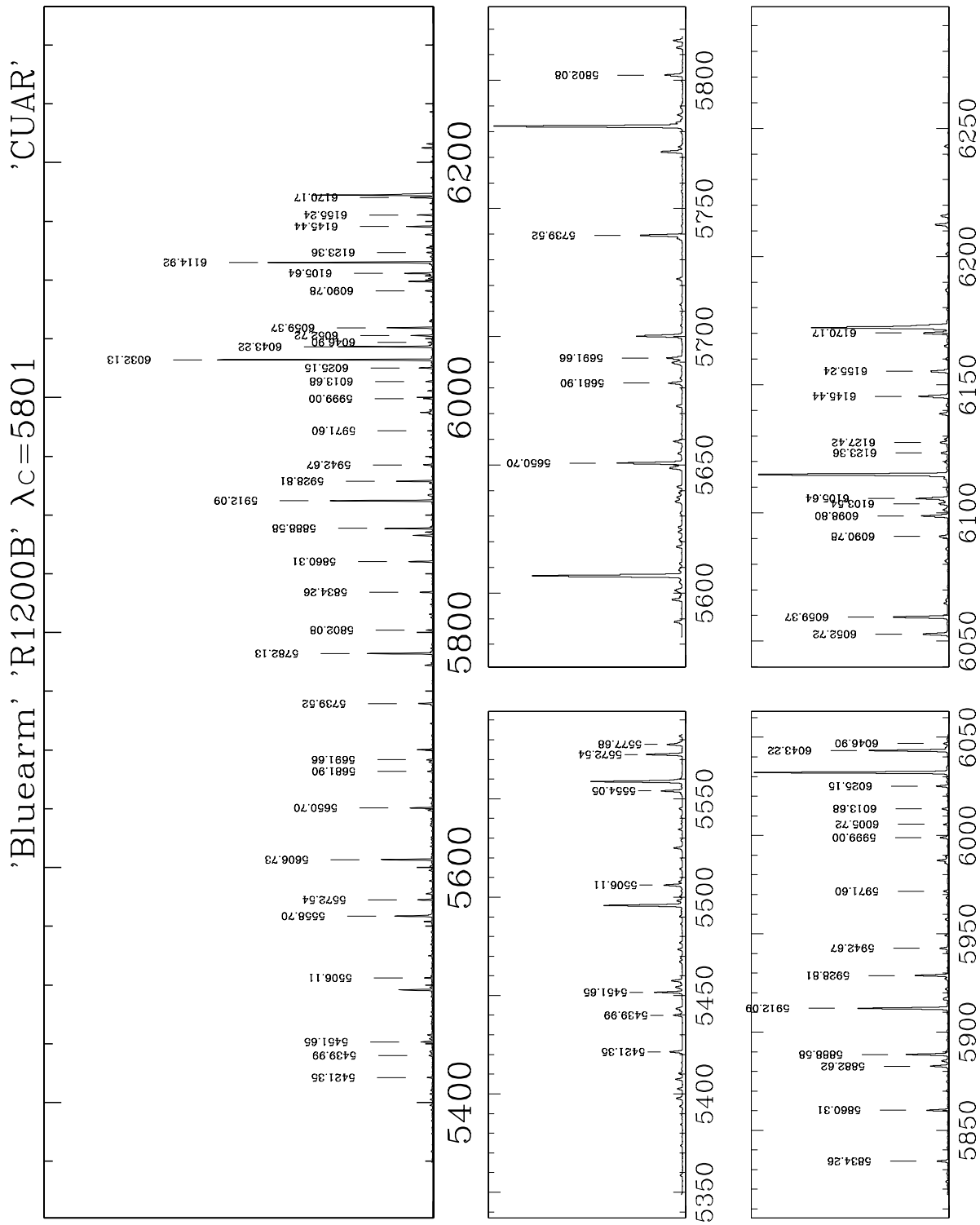

Figure 16: Copper-Argon Lamp with R1200B. Central wavelength = 5800 Å.

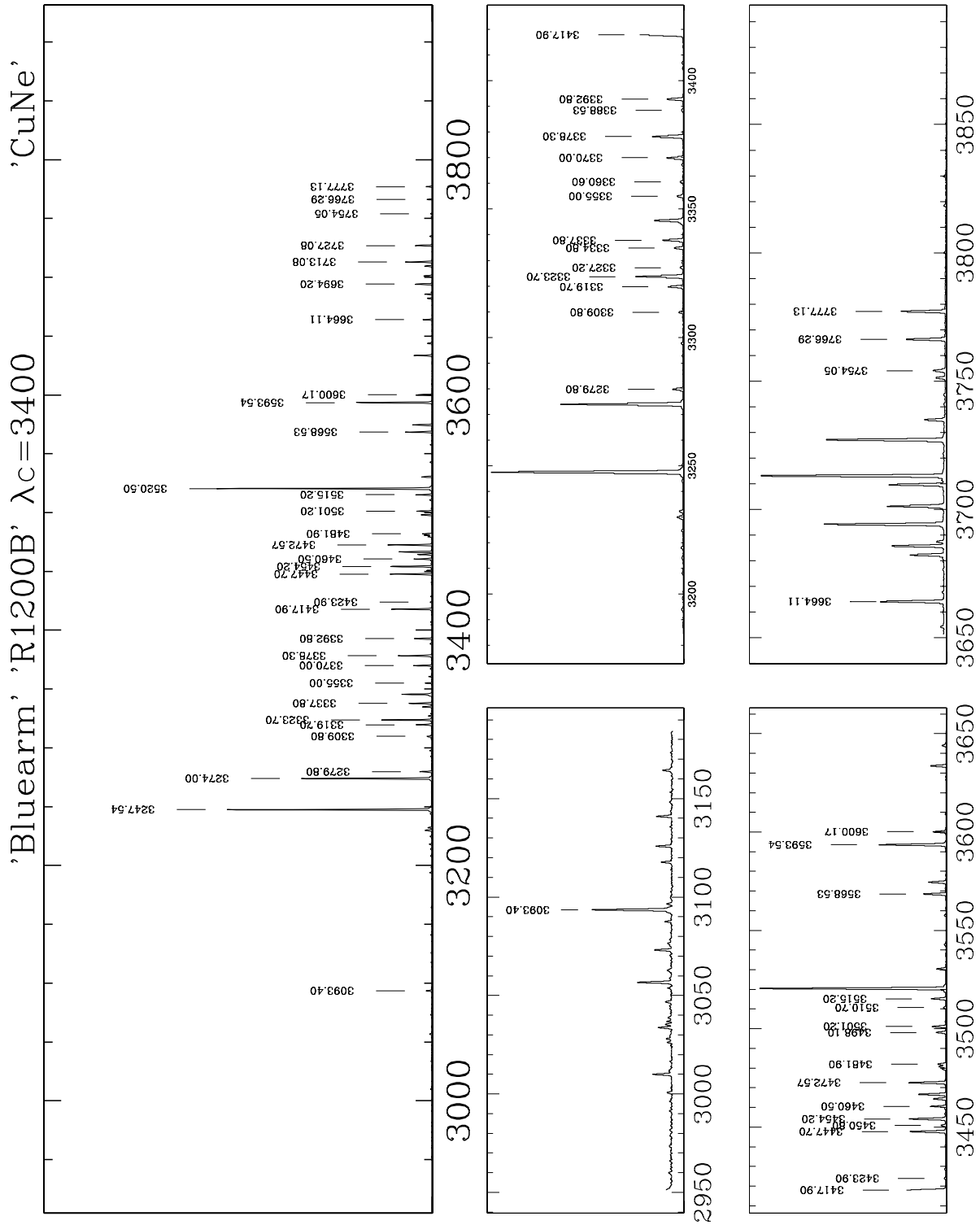

Figure 17: Copper-Argon Lamp with R1200B. Central wavelength = 3400 Å.

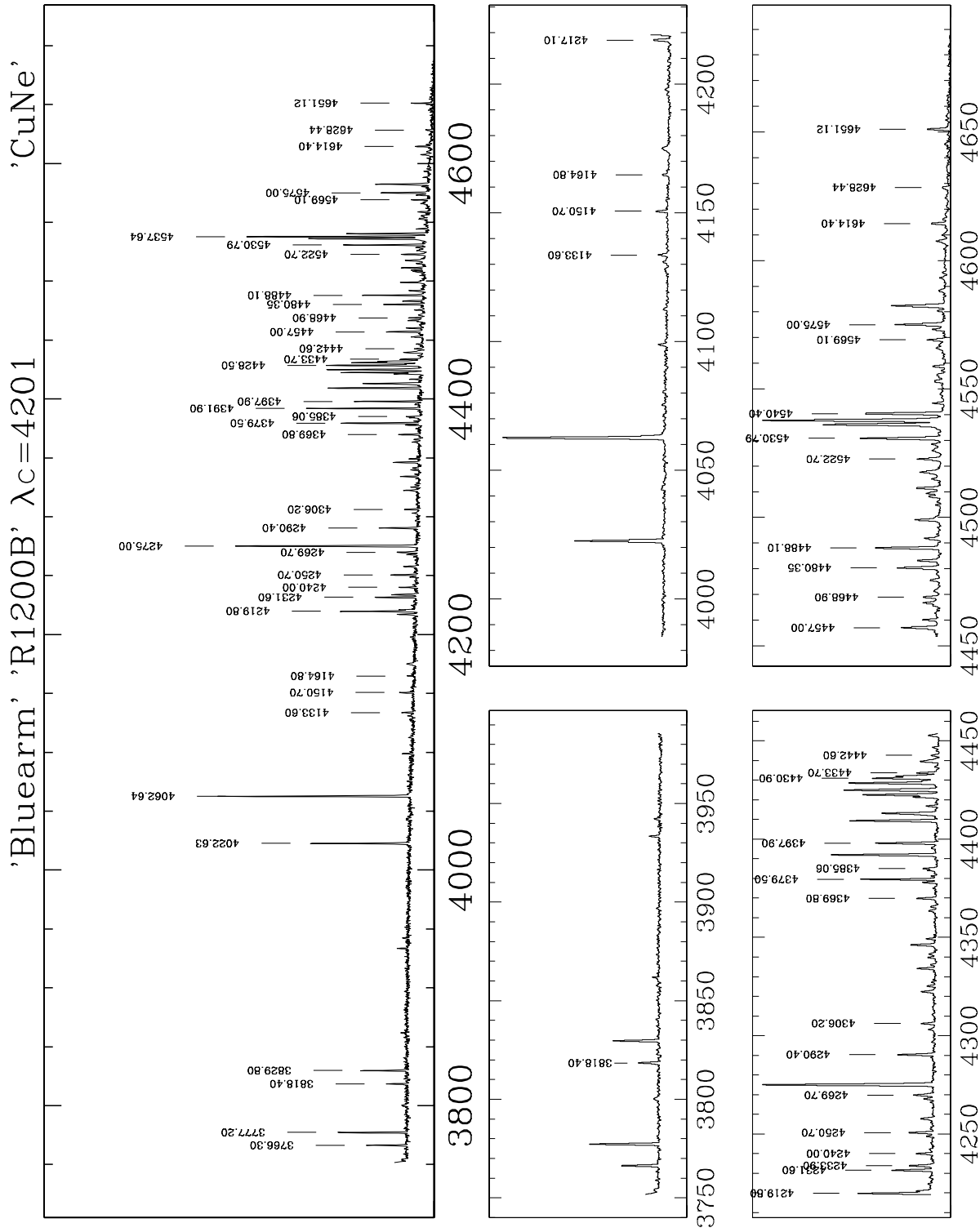

Figure 18: Copper-Argon Lamp with R1200B. Central wavelength = 4200 Å.

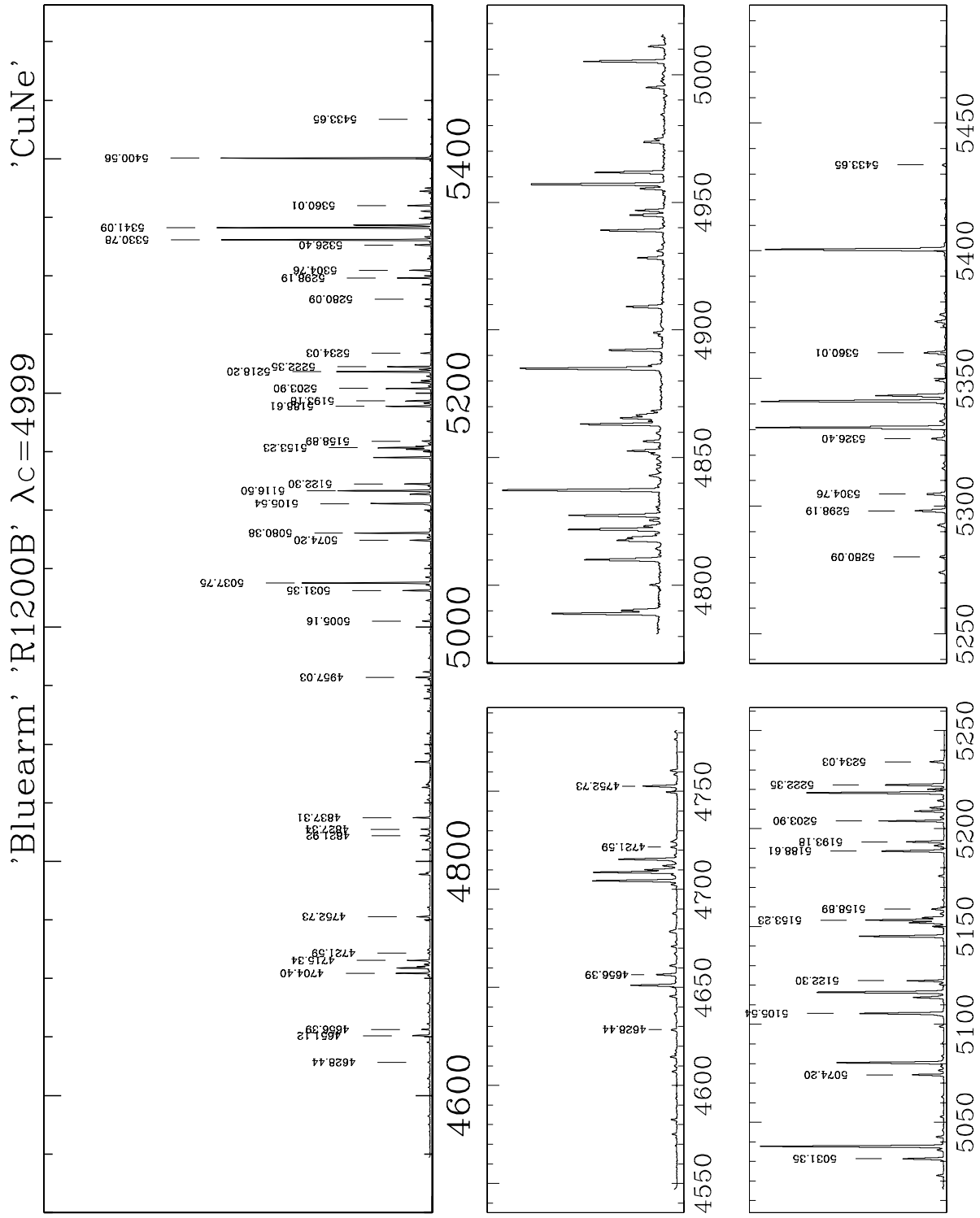

Figure 19: Copper-Argon Lamp with R1200B. Central wavelength = 5000 Å.

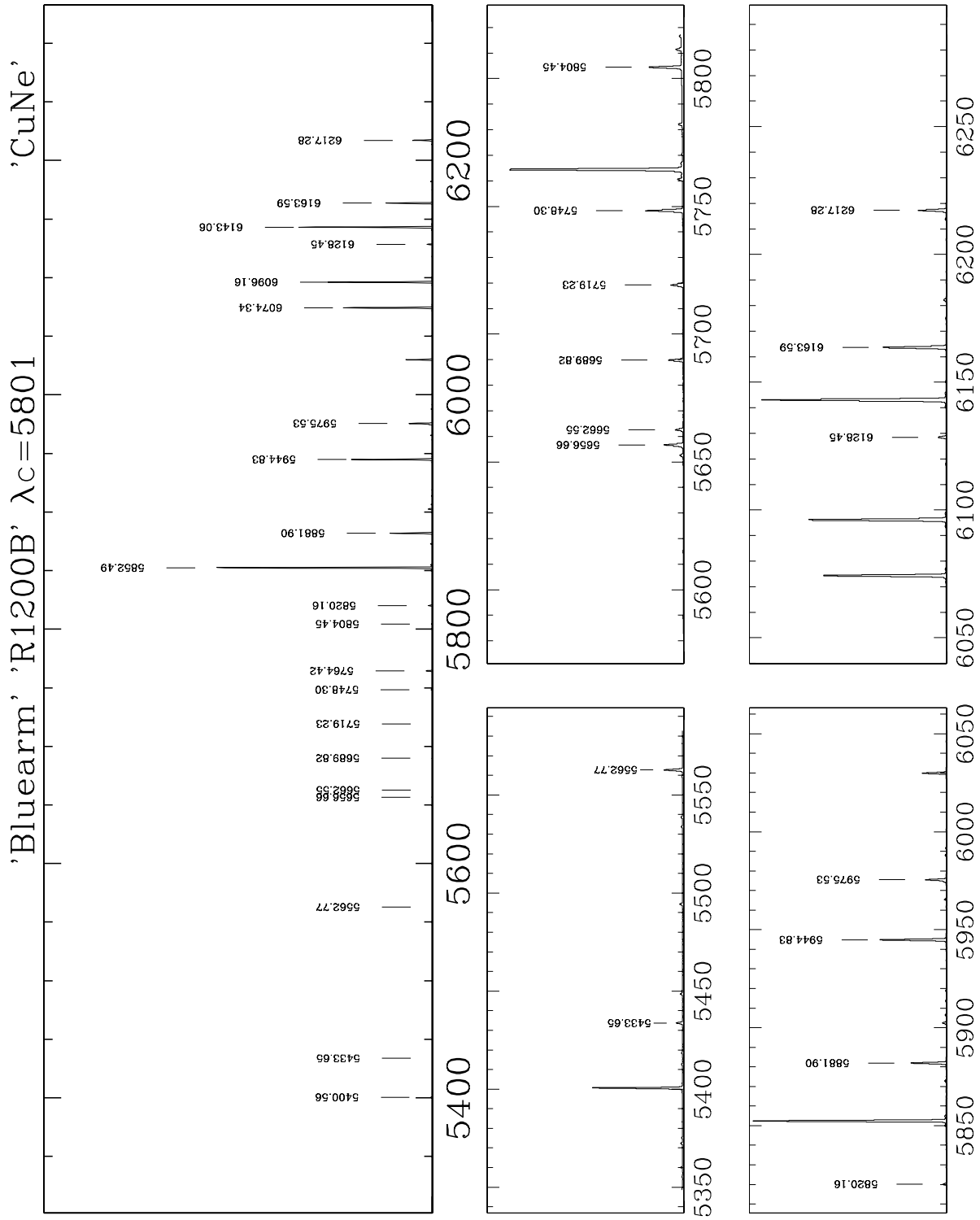

Figure 20: Copper-Argon Lamp with R1200B. Central wavelength = 5800 Å.

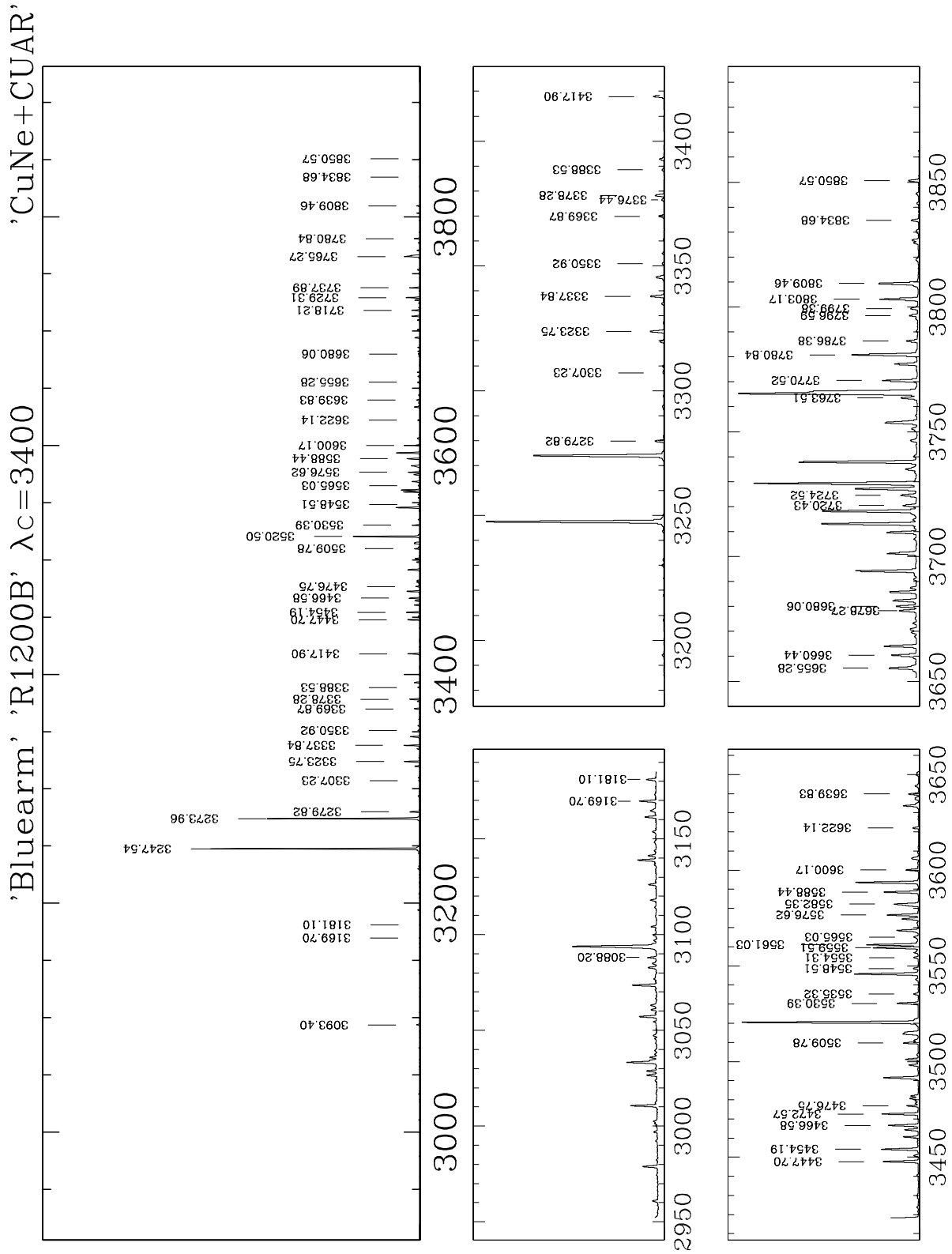

Figure 21: Copper-Neon & Copper-Argon Lamps with R1200B. Central wavelength = 3400 Å.

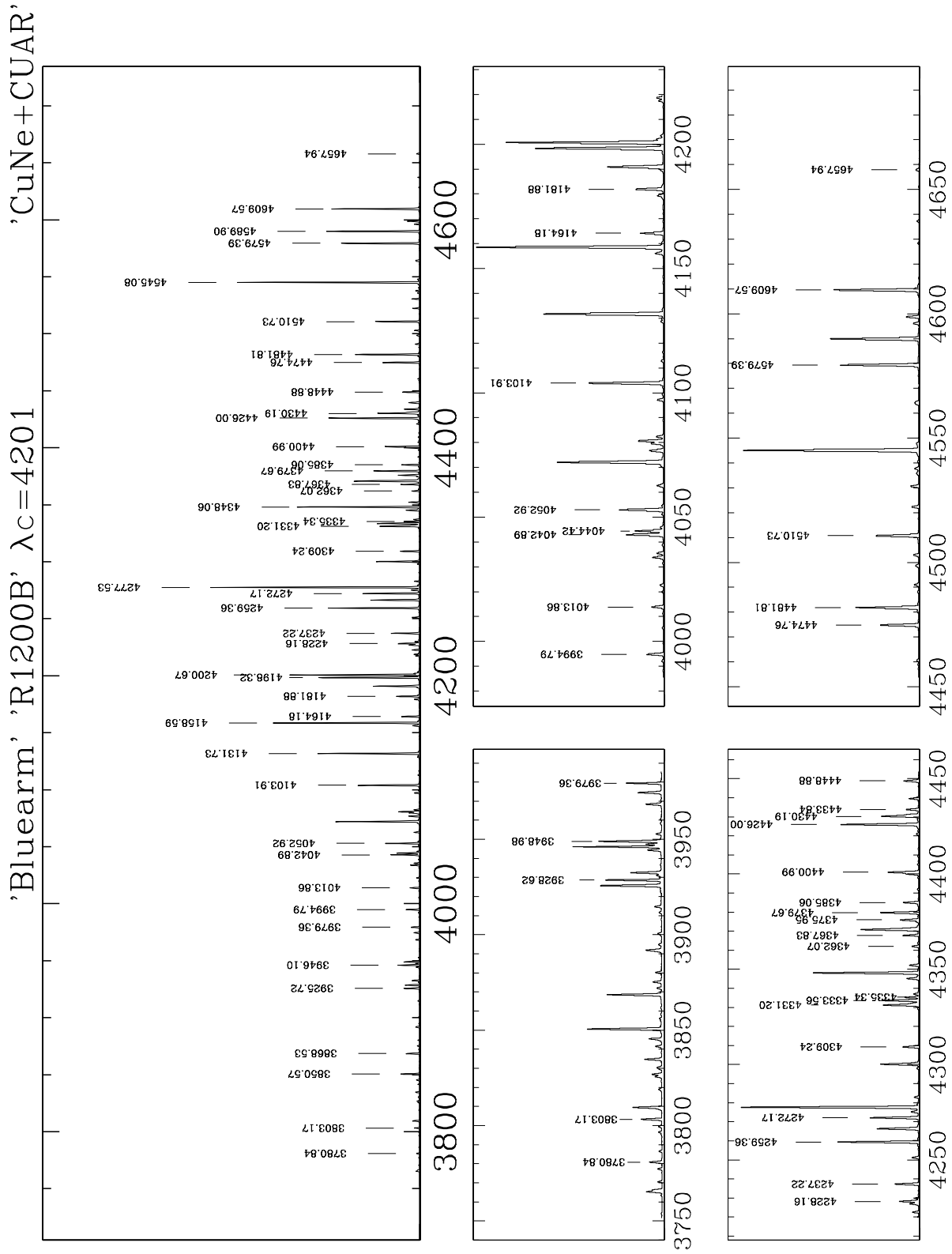

Figure 22: Copper-Neon & Copper-Argon Lamp with R1200B. Central wavelength = 4200 Å.

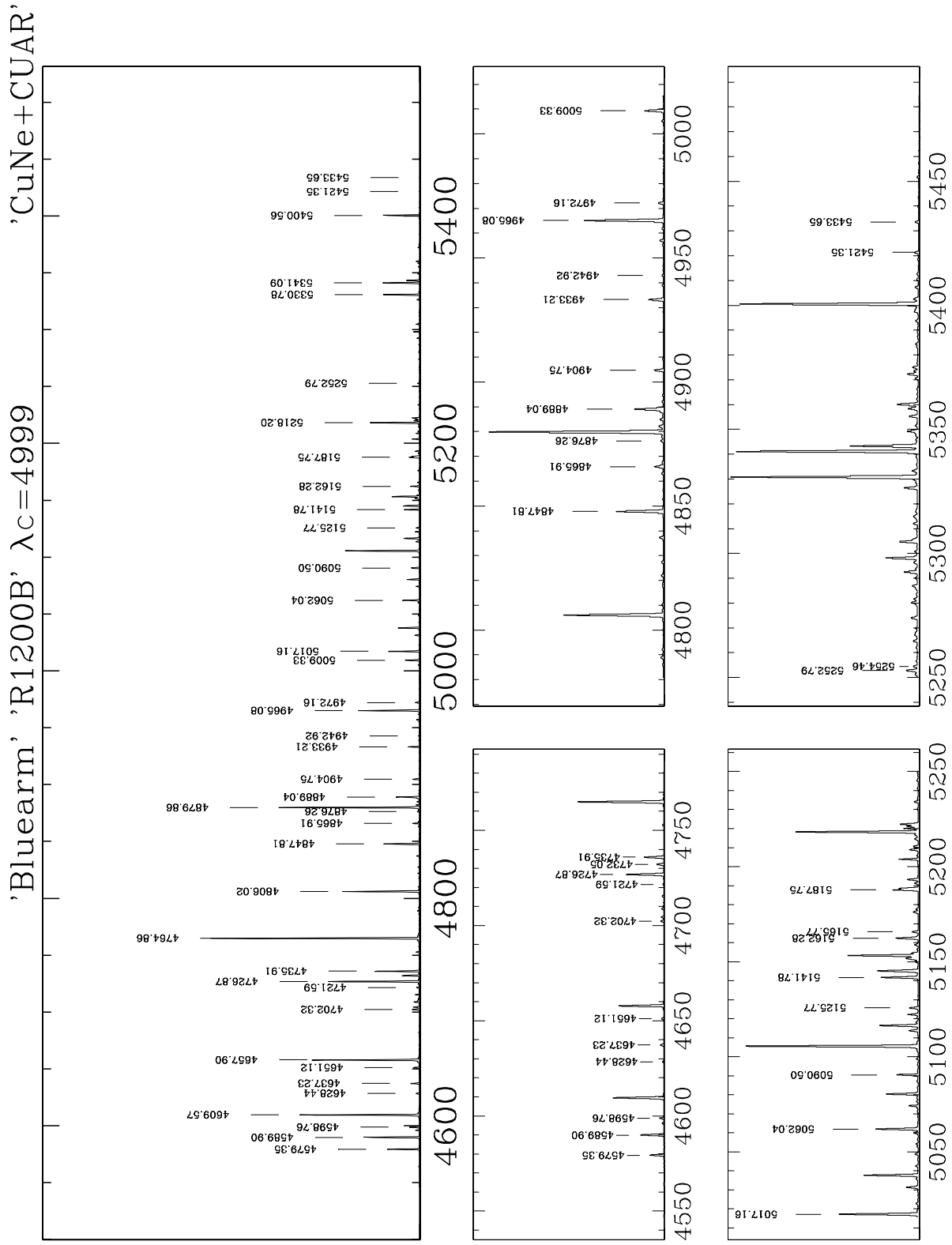

Figure 23: Copper-Neon & Copper-Argon Lamp with R1200B. Central wavelength = 5000 Å.

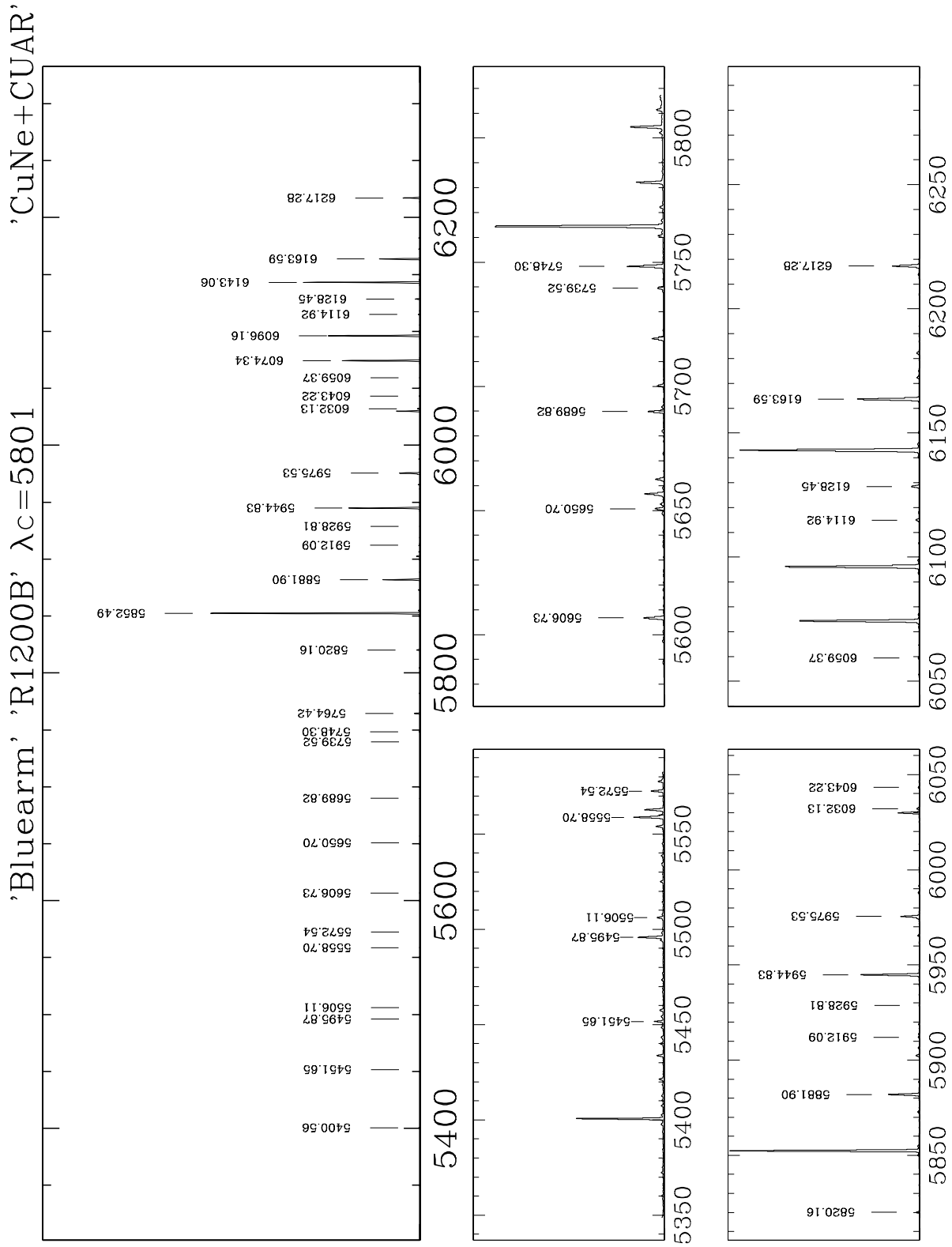

Figure 24: Copper-Neon & Copper-Argon Lamp with R1200B. Central wavelength = 5800 Å.