two separate frequencies. Unless we assume an entirely different arrangement for electrons in these neutral atoms it is difficult to explain in any other way the remarkable similarity between the doublets of these sequences and those of Li, Na, Cu, Ag and Au, from all of which the electrons are removed from the outermost shell in each successive stage of ionization.

[1] R. C. Gibbs and H. E. White, these PROCEEDINGS, **12**, 448 (1926).

[2] A. Fowler: *Series in Line Spectra*, pp. 105, 108, 132, 137, Fleetway Press, **1922**.

[3] J. M. Eder and E. Valenta, "Atlas Typischer Spektren;" pp. 92, 94, 96, 98, 107, *Kaiserliche Akademie der Wissenschaften*, Wien, **1911**.

[4] F. Exner und E. Haschek: *Die Specktren der Elemente*, Bd. III, pp. 20, 105, 176, 321, 324, Franz Deuticke, Leipzig und Wien, **1912**.

THE FINE STRUCTURE OF CERTAIN LINES AND ENERGY LEVELS OF CADMIUM

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From photographs of the fringe systems caused by each of two different quartz Lummer-Gehrcke plates crossed with a quartz prism or grating spectrograph the fine structures of a number of lines of a water-cooled cadmium arc have been determined. The results appear in the following table in which a component marked +0.077(2) is a component which is 0.077 A.U. away from and on the long wave-length side of the strongest component of the line observed and has an estimated intensity of 2 as compared with 10, the intensity assigned to the strongest component.

TABLE I

WAVE-LENGTH	LINE	STRUCTURE			
5085.9	$2p_1-2s^{(2)}$	+0.077 (7);	0.000 (10);	−0.025 (4)	
4799.9	$2p_2-2s^{(2)}$	+0.058 (6);	0.000 (10);	−0.034 (3);	−0.081 (3)
4678.2	$2p_3-2s^{(2)}$	+0.031 (8);	0.000 (10);	−0.056 (4)	
3252.5	$2p_1-3s$	+0.031 (2);	0.000 (10);	−0.010 (3)	
3133.2	$2p_2-3s$	+0.024 (1);	0.000 (10);	−0.012 (1);	−0.033 (1)
3080.9	$2p_3-3s$	+0.013 (3);	0.000 (10);	−0.023 (2)	
3614.4	$2p_1-3d''$	+0.037 (2);	0.000 (10);	−0.023 (4)	
3610.5	$2p_1-3d$		0.000 (10);	−0.036 (3)	
3466.2	$2p_2-3d'$	+0.031 (3);	0.000 (10);	−0.015 (5)	
3403.6	$2p_3-3d''$	+0.017 (5);	0.000 (10)		
2980.6	$2p_1-4d$		0.000 (10);	−0.026 (1)	
2881.2	$2p_2-4d''$	+0.021 (1);	0.000 (10);	−0.010 (5)	
2836.9	$2p_3-4d''$	+0.011 (4);	0.000 (10)		
4413.1	$2p_2-3S$	+0.028 (1);	0.000 (10);	−0.015 (3)	
3499.9	$2p_2-3D$	+0.017 (2);	0.000 (10);	−0.010 (4)	

The positions of the components as recorded are probably correct to 0.001 A.U. Care was taken so as not to mistake the two parts of a self-reversed component for two separate components. The fine structure of these lines and the fine structure of several others reported by other observers can be accounted for by assigning certain fine structures to the lower energy levels of cadmium.

In a paper which has been submitted to the *Philosophical Magazine* for publication the experimental work is discussed giving methods and indications of the probable accuracy of the results and also a diagram of the lower energy levels is given showing the fine structure of the levels and the origin of each component of all the lines of cadmium whose fine structure is known.

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[2] The fine structure of these lines has been recorded by several other observers. Janicki, L., *Ann. Physik*, **19**, 1906 (36–79); *Ibid.*, **29**, 1909 (833–868); Wali-Mohammad, Ch., *Ibid.*, **39**, 1912 (225–250); Takamine, *Proc. Tokyo Math. Phys. Soc.*, **8**, 1915 (51). No two of these observers, including the writer, disagree on the position of a component by more than 0.001 A.U.

ON THE SPECTRUM OF ARGON

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The structure of the spectrum of the normal Argon atom has been sought for by several investigators, but the problem is a difficult one on account of the complexity of the spectrum. Last year Professor Lyman and the writer[1] published the wave-lengths of the "resonance" lines of Argon in the extreme ultra-violet, and these furnish a key to the solution, following the general plan of the spectrum of Neon, which is similar and has been completely worked out by Paschen. This subject has been pursued as occasion permitted, and this spring an abstract of the conclusions reached at that time was published.[2] Recently K. W. Meissner has given a grouping of the red and ultra-red Argon lines.[3]

During the past year we have obtained photographs of this spectrum in the extreme ultra-violet and throughout the ordinary part of the range with large prism spectrographs of glass and quartz from low-current arcs and various vacuum-tube discharges. The results from all these plates have yielded a large number of new lines and of combinations. Certain series can be given with some assurance. As there will not be opportunity to return to this work for some time, it seems best to publish what has been obtained so that others may benefit by it. The present note, then, gives