

Wave-length.	Class of Line.	Effect over Faculæ.
4306.078.....	Arc	No change
4443.976.....	Spark	Strengthened
4468.663.....	Spark	Strengthened
4501.445.....	Spark	Strengthened
4548.198.....	Arc	No change
4527.490.....	Arc	No change
4572.156.....	Spark	Strengthened

MOUNT WILSON SOLAR OBSERVATORY.

A NOTE ON MISSING SPECTRA.

By A. S. EVE.

MINING engineers use well-constructed sieves made of phosphor bronze wire with various sizes of mesh, ranging up to three hundred wires to the inch.

When a narrow beam of parallel light falls on the sieve diffraction bands and patterns are produced which may be observed directly, or after projection.

By a calculation involving simple proportion only, the wave-length of any light can be determined.

A sieve with 300 wires to the inch was found to have the intervals between the wires precisely equal to their diameters. It necessarily follows that the even order spectra are entirely absent, while the odd order spectra are enhanced in brilliancy. On inclining the sieve to the ray the gaps are effectively narrower while the circular wires are not, hence at about 30° the missing spectra suddenly appear.

A photograph of the sieve was taken with a white screen behind it. This photograph was used as a grating and all the spectra were found present. Possibly the light flooded the plate when the photograph was taken, so that the gaps were enlarged relatively to the image of the wires. There is no new principle involved in the above, but the method is a valuable and effective method of demonstrating missing spectra. Such sieves might have advantages over coarse gratings in astronomical work.

MCGILL UNIVERSITY.

THE ULTRAVIOLET ABSORPTION OF ANTHRACENE AND BENZENE.

By J. M. HYATT.

THE purpose of this investigation was to check the results previously obtained, by using the Hilger sector photometer according to the method described by Howe.¹

Anthracene.

The anthracene absorption was determined by using a number of different concentrations of the anthracene in ethyl alcohol, the thickness of the absorbing

¹ H. E. Howe, PHYS. REV., Vol. VIII., 1916.

layer being 1 centimeter in each case. Ten absorption bands were observed, four of them however were too faint to admit of quantitative measurements of the absorption coefficient. The four intense bands were double, the secondary bands being distinctly visible on the photographic plate.

The figures in the table give the frequency numbers of the absorption bands together with those obtained by Hartley¹ and by Glatzel.²

It may be seen from Table I. that there is an approximately constant interval of 150 in the frequencies between the first, third, fifth, etc., bands and an interval of approximately 140 between the second, fourth, etc., bands. The fourteen bands may be represented by two series, series A with a mean frequency interval of 147; and a series B with a mean frequency interval of 142. The third and fourth bands in the table were taken as references and two series were computed with an interval of 147 and 142.

TABLE I.

Hartley	Glatzel.	Observed.	Computed.
2,635	2,620	2,650	2,653
	2,680	2,700	2,658
2,780	2,780	2,800	2,800
	2,840	2,840	2,840
2,915	2,965	2,945	2,947
	3,025	2,990	2,982
3,050	3,100	3,095	3,094
		3,130	3,124
		3,240	3,241
			3,266
			3,388
		3,410	3,408
		3,540	3,535
			3,550
			3,682
		3,688	3,692
			3,829
			3,834
		3,975	3,976
			3,976
			4,123
		4,115	4,118

Benzene.

The absorption of the benzene was determined, using very thin layers of the solutions of benzene in ethyl alcohol. Ten absorption bands were observed, three of them being however very faint.

The position of the ten bands that were found are compared in the Table II. with the position of those that were found by previous observers.

¹ Hartley, Journal Chem. Soc., Vol. 39, 1881.

² Glatzel, Physikalische Zeitschrift, Vol. 2, 1900.

TABLE II.

Hartley and Dobbie. ¹	Glatzel. ²	Baly and Collie. ³	Observed.
3,710		3,725	3,720
		3,765	3,780
3,833	3,820	3,830	3,830
3,925	3,920	3,915	3,920
4,014	4,010	4,025	4,015
4,109	4,110	4,110	4,120
4,205	4,200	4,200	4,210
			4,295
			4,365
			4,465

CORNELL UNIVERSITY,
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THE ULTRAVIOLET TRANSMISSION OF BOILED ABSOLUTE ETHYL ALCOHOL.

By W. R. ORNDORFF, R. C. GIBBS AND M. SCOTT.

IN measuring the ultraviolet absorption spectra of two isomers of a certain organic salt when dissolved in absolute ethyl alcohol, it was found that the absorption of a solution of either isomer changed gradually on standing in such a way as to indicate a slow transformation to the other isomer. Although the absorption spectra of the two solutions differed widely when first made up, at the end of six months the absorption of the two had become almost identical.

In attempting to modify the equilibrium thus established between the two isomers in solution, one of the solutions was heated to the boiling point. The absorption of the solution after heating showed that instead of simply changing the ratio of the two isomers the heating had modified the solution in other ways. One possible explanation of the change was that the *solvent* had been modified in some way. The transmission of boiled absolute alcohol was therefore measured and compared with that of freshly distilled absolute alcohol. It was found that for a layer 1 cm. thick the transmission of the boiled alcohol was decidedly less than that of alcohol which had not been heated after distillation from about 0.37μ to about 0.24μ (the shortest wave-length studied). The maximum decrease in ratio of transmission for 1 cm. layer was about 90 per cent.

The decrease in transmission increases with the time of boiling up to a certain point. Within small limits the change in transmission is the same for alcohol boiled in flasks made of ordinary glass, pyrex glass, or Jena glass, or in a nickel-plated copper flask. In all these cases the vapor produced by

¹ Hartley and Dobbie, Journal Chemical Soc., 1898.

² Glatzel, Physikalische Zeitschrift, Vol. 2, 1900-01.

³ Baly and Collie, Journal Chemical Society, 1905.