ON THE SPECTROSCOPIC EXAMINATION OF LAUTH'S VIOLET AND METHYLENE BLUE.

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For some time these two dyestuffs have attracted the attention of chemists, and several interesting papers on the subject have been published.

Up to the present however, nothing has been said concerning the optical properties of these two interesting bodies. It was, therefore, for the purpose of finding some simple method of detecting these coloring matters that the present investigation was undertaken.

Lauth's violet is produced by saturating a solution of paraphenylendiamine with H_2S, and then treating the mixture with an oxidizing agent, as $Fe_2\ Cl_6$. The coloring matter is precipitated with Na Cl and Zn Cl_2 and then dried. It dissolves in water with a bluish violet color.

Methylene blue is produced by passing H_2S, into an aqueous solution of nitrosodimethylaniline chloride, until the yellow color of the latter has disappeared. This is a sign that the nitroso-compound has been reduced to the corresponding amido-compound. At the same time, also one of the hydrogen atoms is replaced by an atom of sulphur, thus giving rise to a thio-compound. This substance is then treated with Fe_2Cl_6, which oxidizes the body and forms methylene blue, which is precipitated from solution by means of Zn Cl_2.

It dissolves in water with a deep greenish-blue color. It therefore seemed probable that the difference in shade between these two coloring matters would give rise to absorption bands, likewise differing from one another in proportion to the intensity and peculiarity of the color. This hypothesis was fully verified on experiment.

LAUTH'S VIOLET.

1 pt. Lauth's violet in 40,000 pts. of water, was found to be too deeply colored to show the absorption bands distinctly. On diluting this solution to 1 pt. in 400,000 pts. of water, a dark band extending from C 43–D 54 was observed.

The greatest absorption is located between C 46–D 51. (See *a* on the Diagram.) The same made alkaline with a drop of NH_4OH, shows a dark band, ranging from C 44–D 51.

The region of greatest absorption ranges from C 48–D 50. (See *b* on Diagram.)

The same acidified with a drop of HCl, gave a band ranging from C 43–D 52. Greatest absorption from C 48–D 50. (See *c* in Diagram.)

A rather curious phenomenon may be mentioned here. If a solution of the dyestuff be treated with a few drops of KOH and Ag NO_3 the solution turns reddish, and if it be now examined with the spectroscope, no absorption band whatever is seen.

METHYLENE BLUE.

1 pt. dissolved in 40,000 pts. of water, was found to be much too strongly colored to show the absorption bands.

1 pt. in 400,000 pts. of water shows a very dark band ranging from B 30–C 38, having its greatest absorbtion at B 32–C 36, and a very faint band to the right of this ranging from C 42= C 46. (See *e* in Diagram.)

No change in the position of the absorption bands is observable when the solution is acidified with HCl.

KOH and NH_4OH and Ag NO_3 likewise produce no change.

MIXTURE OF LAUTH'S VIOLET AND METHYLENE BLUE.

Equal parts of both solutions (1–400,000) were mixed and examined. Two distinct dark bands were observed, located respectively from B 31–C 35 and C 42–C 48. (See *f* on Diagram.) If the above mixture be now treated with KOH, the violet color is cut out entirely, and nothing but the absorption band due to methylen blue is left. This is a very characteristic test for mixtures of both dyestuffs, as it is very sharp, and showing the reaction plainly in solutions of 1 pt. in 400,000 pts. of H_2O.

In this investigation the solutions were contained in square white glass bottles, having 4 cm. external diameter.