

this class under *specified conditions*. This will be more difficult to fix definitely, for a certain latitude must always be permitted to satisfy special conditions. This limit will certainly be different for different sections of the country. I think, however, that for the vicinity of Philadelphia on the Pennsylvania side of the Delaware River the figures for free and albuminoid ammonia will be found closely to approximate those given by Wanklyn in his book on water analysis. In certain parts of New Jersey, for instance, the limit is probably higher.

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“ON A SOURCE OF ERROR IN THE DETERMINATION  
OF NITRATES IN WATER BY THE PHENOL  
SULPHONIC ACID METHOD.”

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BY GEORGE H. BARTRAM.

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[Read at the stated meeting of the Chemical Section, March 17, 1891.]

Owing to certain discrepancies in duplicate estimations of nitrates, by the phenol sulphonic acid process, I was requested by Dr. Samuel C. Hooker to make a series of experiments to ascertain under what conditions this process, which had hitherto been considered reliable, gave these varying results. The work was performed in Dr. Hooker's laboratory and under his direction.

As the principal result of these experiments it was found that phenol sulphonic acid undergoes a change shortly after preparation, as shown by the fact that chlorides, which have no effect on the determinations when made with freshly prepared phenol sulphonic acid, bring about low figures when the acid has been kept for some time before use.

The disturbing action of the chlorine is already well marked, when the quantity present in a given volume of water is about four times as great as the nitrogen of the nitrates. Correct figures were, however, obtained even when the phenol sulphonic acid had been kept eighteen months, with water in which the chlorine did not much exceed the

nitrogen of the nitrates. Water containing twenty parts chlorine to .5 parts nitrogen gave the following decreasing quantities of N as the age of the solution increased:

<i>N. present.</i>	<i>N. found.</i>	<i>Age of phenol sulphonic acid.</i>
.5	.5	Freshly prepared.
.5	.5	1 day old.
.5	.45	2 days "
.5	.42	13 " "
.5	.40	17 " "
.5	.40	27 " "

Water containing ten parts chlorine to .5 parts nitrogen gave a similar series of figures:

<i>N. present.</i>	<i>N. found.</i>	<i>Age of phenol sulphonic acid.</i>
.5	.5	Freshly prepared.
.5	.5	2 days.
.5	.42	13 " "
.5	.40	17 " "

With water containing two parts chlorine to .5 part nitrogen the results similarly fell off.

<i>N. present.</i>	<i>N. found.</i>	<i>Age of phenol sulphonic acid.</i>
.5	.50	Freshly prepared.
.5	.50	13 days.
.5	.40	27 " "

The above determinations were made in duplicate and the standards were always freshly prepared.

A solution of phenol sulphonic acid two and a half months old gave, as the mean of four determinations, .30 instead of .5 N, in the water containing ten parts chlorine to .5 N.

A solution eighteen months old also gave .30 N for the same water.

By the removal of the chlorine correct results were obtained.

The above experiments show that in the presence of relatively large quantities of chlorine twenty per cent of the nitrates, or in extreme cases even as much as forty per cent. may fail to be recorded by the use of this process, unless the precaution be taken to use freshly prepared phenol sulphonic acid, or to remove the chlorine.