

he confidently expects the cause of passivity to be found to be an altered state of the metal itself, being produced by any one of several agents." The above experiments coupled with those of Nichols and Franklin seem to show that this altered state may be analogous to that of a number of magnets, the negative poles of which are all presented to the electrolyte, this orientation being produced by the various agents which cause the passive state. This view is not presented as proved but is tentative, and may lead to better work in this direction.

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THE INFLUENCE OF CHLORINE UPON THE DETERMINATION OF NITRIC NITROGEN.

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It is known that chlorine has an appreciable effect upon the determination of nitric nitrogen by the phenyldisulphonic acid method. Very little information, however, is available as to the amount of chlorine which may be present and not affect the reliability of the results. In connection with the study of the influence of irrigating water upon the movement and production of nitric nitrogen in the soil, this question was investigated quite thoroughly in this laboratory.¹ The results are of interest to others working along similar lines and also to chemists who are working with problems in sanitary water supply.

The chlorine in the soil under consideration was determined as follows: An aliquot portion of the extract of the soil, prepared as for the nitric nitrogen determination, was titrated against a one-hundredth normal silver nitrate solution. The results obtained are given in Table I. The results are expressed as parts of chlorine per million parts of soil.

TABLE I.—AMOUNT OF CHLORINE PRESENT IN THE SOIL EXTRACT.
Depth of soil in feet.

No of plot.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
41 G.	0.849	0.814	0.496	0.923	0.567	0.779	0.744	0.673	0.815	0.496
42 G.	0.886	0.779	0.697	0.838	0.795	0.602	0.567	0.602	0.673	0.496
43 G.	0.780	0.425	0.921	0.709	1.134	0.496	0.922	0.496	0.425	0.425

These results indicate quite clearly that the chlorine in the soil under consideration did not exceed 1.134 parts per million.

It was then necessary to determine whether this amount of chlorine would interfere with the determination of nitric nitrogen by the phenyldisulphonic acid method. With this object in view, varying amounts of sodium chloride were added to given quantities of the standard potassium nitrate solution. The nitric nitrogen was then determined in the usual way. The results are very interesting and will be found in Table II. The results are expressed as parts per million.

¹ Utah Experiment Station, *Bull.* 106, p. 80.

TABLE II.—THE EFFECT OF CHLORINE ON THE SENSITIVENESS OF THE METHOD.

Chlorine added.	Nitric nitrogen present.	Nitric nitrogen found.	Chlorine added.	Nitric nitrogen present.	Nitric nitrogen found.
0.5278	0.1	0.1	5.278	0.1	0.1
1.056	0.1	0.1	5.886	0.1	0.095
1.584	0.1	0.1	6.342	0.1	0.094
2.113	0.1	0.1	6.856	0.1	0.092
2.638	0.1	0.095	7.362	0.1	0.092
3.167	0.1	0.090	7.917	0.1	0.092
3.694	0.1	0.098	8.446	0.1	0.092
4.224	0.1	0.090	8.9776	0.1	0.090
4.749	0.1	0.090	9.496	0.1	0.086

Similar determinations were made until a concentration of thirty parts per million of chlorine was reached. No further decrease in the amount of nitric nitrogen found was obtained, *i. e.*, the amount of nitric nitrogen found tended to approach a constant value of nine-tenths of the amount actually present.

The results show that chlorine, when present in quantities as low as 2.638 parts per million, affects the results for nitric nitrogen obtained by this method, less nitric nitrogen being found than is really present.

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ON A NEW VOLUMETRIC METHOD FOR COBALT AND NICKEL.

BY GEORGE S. JAMIESON.

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The well-known application of potassium ferrocyanide to the volumetric determination of lead and zinc has led the writer to investigate the application of this method to the determination of cobalt and nickel, and conditions have been found under which concordant and accurate results may be obtained. As far as can be found by consulting the literature, this method has not been previously suggested.

It is believed that the most important practical application of the method will be in the determination of nickel in steel, for it can be carried out in the presence of iron, it is rapid and requires no expensive reagents. As far as ease and rapidity are concerned, it appears that the cyanide method as applied in the presence of iron by C. M. Johnson¹ and also by Campbell and Arthur² is the only one which can compete with it. The writer has found that by combining the modifications of the authors just referred to, the cyanide method may be decidedly improved, as will be shown by the description and the results which are given beyond. The choice between the ferrocyanide and the cyanide methods for nickel in steel would depend upon the preference of the operator, but it is to be observed that the cyanide method is not applicable to large amounts

¹ THIS JOURNAL, 29, 1201 (1907).

² *Ibid.*, 30, 1116 (1908).