Flask.	Nitrate, duplicate determinations. Mg.	Mg.	Mean Mg.	Nitrite. Mg.
46	31.42	32.55	31.83	0.046
47	29.52	29.44	29.48	0.053
48	38.57	39.17	38.87	0.051
49	33.70	33.94	33.82	0.071
50	....	....	0.14	0.010
51	....	....	0.0013	0.002

It appears that more nitrate was formed where 1 per cent. of organic matter was present than where only 0.5 per cent. was present. On the other hand, but traces of nitrates were found at the end of the experiment in flasks Nos. 50 and 51, where 3 per cent. of organic matter was used.

RAPID METHOD FOR THE VOLUMETRIC DETERMINATION OF MOLYBDENUM STEEL.

BY FRANCIS T. KOPP.

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WEIGH 0.5 gram of sample in a platinum crucible of about 100 cc. capacity, adding 2 cc. of sulphuric acid (sp. gr. 1.58), and 12 cc. of water. When thoroughly dissolved, which may be assisted by heating, evaporate over the Bunsen burner until white fumes are given off, cool, add 30 grams fused potassium hydrogen sulphate, and gently raise the temperature to a bright heat, holding it at this temperature until the sample is thoroughly fused, which usually will require ten to fifteen minutes.

Care is required in both evaporating and fusing the sample that no particles be carried over the top of the crucible, by the water being driven off too swiftly and thereby causing a spattering, or by fusing too briskly, the gas given off by the potassium hydrogen sulphate either carrying particles away, or causing the fusion to foam over the top.

When thoroughly fused, run the fusion around the side of the crucible and allow to cool. When cold, place the crucible and fusion in a No. 5 beaker containing 500 cc. of *hot* water, and keep it nearly boiling until the fusion is dissolved and the solution has become transparent; then wash the crucible with water into the beaker containing the solution.

Cool the solution to normal temperature and transfer to a liter flask, rinsing the beaker with water, and add 100 cc. ammonia

(sp. gr. 0.90) and make up with water to the liter mark ; transfer the solution back and forth from the flask to a *dry* beaker several times to thoroughly mix.

Allow the precipitate to settle, and filter on a *dry* filter ; take 500 cc. of the filtered solution and add 40 cc. sulphuric acid (sp. gr. 1.58) and run through a zinc reductor which consists of a column of zinc, some 12 inches long and 0.5 inch in diameter (Jones' reductor).

Add 10 cc. sulphuric acid (sp. gr. 1.58) to the reduced solution, and titrate with standard solution of potassium permanganate (1 cc. of potassium permanganate = 0.003053 gram of iron).

A "blank," consisting of 450 cc. water, 50 cc. ammonia (sp. gr. 0.90), and 40 cc. sulphuric acid (sp. gr. 1.58), must be run through the reductor to correct error due to the impurities in the zinc ; add 10 cc. sulphuric acid (sp. gr. 1.58) and titrate with permanganate (standard solution), the number of cubic centimeters used to be subtracted from the reading of the permanganate used to oxidize the molybdenum trioxide solution.

Subtract the "blank" reading from the reading for the molybdenum trioxide solution and multiply by 0.71776, which will give the Mo. The permanganate used must be of such concentration that 1 cc. =0.003053 gram iron for use in this calculation. The presence of chromium is not determined.

TUNGSTEN STEELS.

When tungsten is present, weigh 1 gram of sample into a No. 1 beaker and dissolve in 25 cc. dilute nitric acid (sp. gr. 1.20) and, when violent action has ceased, add 10 cc. strong hydrochloric acid ; when thoroughly dissolved, evaporate on a hot plate to dryness, bake to separate silica, and redissolve in 15 cc. strong hydrochloric acid, which will precipitate the tungsten as tungsten trioxide; cool and dilute with water to 100 cc., filter on a *dry* filter, and measure 50 cc. of filtered solution (which should be free from tungsten) into a No. 1 beaker and add 10 cc. sulphuric acid (sp. gr. 1.58). Evaporate the solution in the beaker till fumes are given off, transfer the solution from the beaker to a platinum crucible, and rinse the beaker, evaporating the solution in the crucible over a Bunsen burner until fumes are given off, then add 30 grams potassium hydrogen sulphate (fused) and proceed as in ordinary steel.

FERROMOLYBDENUM.

Weigh 0.5 gram of the sample into a platinum crucible (100 cc. capacity) and dissolve it with 15 cc. strong nitric acid; when thoroughly dissolved add 2 cc. sulphuric acid (sp. gr. 1.58) and evaporate over a Bunsen burner until fumes are given off. Care must be exercised here that no nitric acid remains in the crucible. Add 30 grams potassium hydrogen sulphate (fused) and proceed as in the case of steel.

The following are some results obtained by the above methods. Three molybdenum steels were made in crucible fires; the molybdenum contents and analyses are as follows:

Steels. No.	Molybdenum added. Per cent.	Molybdenum found. Per cent.
1	5.00	5.040
2	8.00	8.050
3	10.00	10.014

These analyses were made in duplicate.

A ferromolybdenum was also analyzed by Messrs. Booth, Garrett, and Blair, of Philadelphia, Mr. McCreath, of Harrisburg, and myself. Mr. Whitfield, the chemist who made the analysis for Messrs. Booth, Garrett, and Blair, used the sulphide method given in Blair's "Chemical Analysis of Iron," fourth edition. What method Mr. McCreath used I do not know; I used the method described above.

Messrs. B. G. and B. Per cent.	Mr. McCreath. Per cent.	Volumetric. Per cent.
50.53	50.34	50.45

A molybdenum steel containing chromium was analyzed by Mr. McCreath and myself with results as follows: Mr. McCreath, 7.42; volumetric, 7.81. A tungsten molybdenum chrome steel was made, the amount of molybdenum added to steel being 3.6 per cent.; molybdenum found was 3.59 per cent. All of my analyses were made in duplicate.

TELLURIUM TETRACHLORIDE.

BY VICTOR LENHER.

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WHEN an excess of sulphur monochloride is brought in contact with metallic tellurium at the ordinary temperature, the tellurium is rapidly attacked, heat is evolved, and in a few moments white needle-like crystals of tellurium tetrachloride separate. The reaction may be represented as follows:

$$Te + 2S_2Cl_2 = TeCl_4 + 4S.$$