the act of 1897—a commercial term by which wool grease is known, as it is also known under the name of brown grease. The point I wish to make is that the degras there mentioned means wool grease but it does not embrace sod oil which in no way resembles it except in use. From this it can be seen that the term degras which originally had a limited meaning has come to be applied indiscriminately to the two substances used for currying and stuffing leather, and was mentioned in paragraph 279 to make that paragraph stronger in covering wool grease.

Paragraph 279 mentions two substances, tallow and wool grease. Degras is not mentioned in that paragraph excepting as a wool grease degras. Brown grease is mentioned also in this same connection.

Paragraph 568 mentions "all other greases and oils used for stuffing leather." Here also is included a degras but this degras is not that specially mentioned in paragraph 279 which is a wool grease, but is the original degras, or sod oil made from oil expressed from leather, and therefore having no connection with a wool grease which comes from wool. Sod oil is the English name for the substance known to the French as degras or moëllon and the term degras is the original French name for this oil extracted from oiled chamois leather and has been borrowed by the English to be misapplied to wool grease.

The term sod oil is unknown in the French currying trade excepting as an English translation of their own word degras or moëllon, and the process of making degras might be said to have originated in France in the manufacture of chamois leather.

(CONTRIBUTION FROM THE CHEMICAL LABORATORY OF LAFAYETTE COLLEGE.)

A METHOD FOR THE DETERMINATION OF ZINC BY THE USE OF STANDARD THIOSULPHATE SOLUTION.[1]

BY RICHARD K. MEADE.

Received May 4, 1900.

AT the spring meeting of the Lehigh Valley Section, the author read a paper[2] upon a new volumetric method for magnesium. The method depended upon the precipitation of

---

[1] Read at a meeting of the Lehigh Valley Section, January 18, 1900.

[2] This Journal, **21**, 746.

the magnesium as magnesium ammonium arsenate, $Mg_2(NH_4)_2$-$As_2O_8+H_2O$, and the determination of the arsenic in this precipitate by digestion with potassium iodide in a strongly acid solution, and titration of the liberated iodine with standard thiosulphate. When a solution of arsenic acid contains sufficient sulphuric or hydrochloric acid, the arsenic is quickly reduced by potassium iodide even in the cold from the higher to the lower state of oxidation. The reaction is expressed by the equation

$$As_2O_5 + 4KI + 4HCl = As_2O_3 + 4HCl + 2H_2O + 2I_2.$$

Zinc is usually determined as a pyrophosphate by precipitation as zinc ammonium phosphate and ignition of this latter. Since the method above outlined for magnesium was suggested by the analogy between the phosphates and arsenates, the thought also occurred to me to make use of a volumetric method for determining zinc, somewhat similar to that for magnesium, by precipitating the zinc as an arsenate instead of a phosphate and determining the arsenic in the precipitate by titration with standard thiosulphate solution. From the equation given above and the formula for the zinc ammonium arsenate, each cubic centimeter of decinormal sodium thiosulphate should be equivalent to 0.00327 gram of zinc.

The method as tried for zinc was as follows: Pure zinc oxide, ZnO, was dissolved in dilute hydrochloric acid, an excess of ammonia added, and then 50 cc. of a 10 per cent. solution of sodium arsenate. The solution, after dilution to about 750 cc., was next warmed and nitric acid added until a slight turbidity was produced when the addition of nitric acid was discontinued and acetic acid added in its place, 1 cc. at a time, until the solution reacted acid to test paper. The precipitate was changed from curdy and flocculent to heavy and granular by heating and stirring. After allowing the precipitate to settle it was filtered off and washed. A hole was next punctured in the filter-paper, the zinc ammonium arsenate washed into a beaker, and 50 to 60 cc. of dilute hydrochloric acid added. The paper and the beaker in which the precipitate was formed were washed with the dilute acid until the solution and washings measured 85 to 100 cc. when from 2 to 3 grams of potassium iodide were added to the solution, and after allowing this latter to stand in the cold a few minutes, the standard thiosulphate was run in from a burette until the color of the solution faded from red-brown to pale straw color and then, drop by drop, until all color vanished. The addition of starch for an indicator of the end of the reaction was found unnecessary in both the determination of magnesium and zinc by this method. Below are the results:

	Zinc oxide taken. Gram.	Equivalent in Zinc. Gram.	Zinc found. Gram.
1	0.2490	0.2000	0.1998
2	0.2490	0.2000	0.1994
3	0.2490	0.2000	0.2002
4	0.1245	0.1000	0.1004
5	0.1245	0.1000	0.1002
6	0.1245	0.1000	0.0998

Since calcium and magnesium are precipitated from alkaline solutions by sodium arsenate while zinc from an acid one, the successful attempt was made to separate the latter from the former two by first making the solution strongly ammoniacal, adding sodium arsenate, filtering off the calcium and magnesium arsenates, then making the solution acid with nitric and acetic acids and filtering off and determining the zinc as described above. The completeness of the separation is shown by these results.

Zinc oxide taken. Gram.	Equivalent in zinc. Gram.	Calcium carbonate added. Gram.	Magnesium oxide added. Gram.	Zinc oxide found. Gram.
0.2490	0.2000	0.2000	0.1000	0.1996
0.2490	0.2000	0.2000	0.1000	0.1992
0.2490	0.2000	0.2000	0.1000	0.2004
0.0623	0.0500	0.2000	0.2000	0.0500
0.0623	0.0500	0.2000	0.2000	0.0502
0.0623	0.0500	0.2000	0.2000	0.0496

Unfortunately manganese can not be so easily separated from zinc. In the case of ores, etc., it may, however, readily be gotten rid of by treatment with potassium chlorate and nitric acid after the solution of the ore.

The determination of zinc in a sample of ore was tried by first throwing down the manganese as a dioxide with potassium chlorate and nitric acid and filtering, separating the iron and alumina by double ammonia precipitations, then adding a large excess of sodium arsenate and filtering off the calcium and magnesium arsenates formed, and finally precipitating the zinc by addition of nitric and acetic acids. The iodine liberated by digesting this precipitate in an acid solution of potassium iodide was then titrated with standard thiosulphate and the zinc calculated from the reading on the burette. The time required to run four determinations, without any effort at speed, was about eight hours.

The analysis of the ore by careful gravimetric methods was

	Per cent.
Zinc oxide	37.58
Manganese monoxide	15.33
Ferric oxide	29.69
Calcium oxide	1.12
Magnesium oxide	0.77
Silicon dioxide	12.77
Carbon dioxide	1.23
Water	0.76
	99.25

Metallic zinc, 30.18 per cent.

By the volumetric method, outlined above, the results were

	Metallic zinc. Per cent.
1	30.00
2	29.98
3	30.04
4	29.98

LAFAYETTE COLLEGE, EASTON, PA.,
January 18, 1900.

NOTES.

The Alleged Adulteration of Milk with Brain-matter:[1]—In the 1898 report of the Dairy Commissioner of the State of New Jersey, page 50, one of the chemists acting for the Commissioner, refers in rather intemperate language to the statements made in some text-books, concerning brain-pulp as a possible adulteration of milk and asserts that such adulteration has never occurred. He quotes the statement of König[2] to the effect that such addition to milk involves practical knowledge and resources which would hardly be possessed by milk-producers or purveyors, but Dr. König has not foreseen

---

[1] Read before the Philadelphia Section of the American Chemical Society, March 15, 1900.

[2] *Nahrungs- u. Genussmittel*, **2**, 256.