

## AN ELECTRIC TEST RETORT.<sup>1</sup>

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THE apparatus described in this paper is the result of demands made to carry on distillations of many samples of wood in small pieces. After its development was reached, it appeared also to afford so many opportunities for use in the laboratory in situations where the crucible is used, and even for the combustion of carbon, the ignition of minerals, etc., that I have thought it worthy of description here.

It consists of a vessel of Jena glass about 4 cm. in diameter, with a dome-shaped piece attached to it by clamps and from which a tube leads to a proper absorption apparatus. The upper edge of this glass vessel is turned flat and ground to a perfect matt and plane surface. The dome is provided to match this and fit with a similar flat surface. A simple form of clamp may be used to hold the dome upon the retort. At present I am using a small and not elegant, but very satisfactory, wood clip such as is used in holding photographic papers. With a very slight lubrication of the ground glass surfaces and two of these clips, a higher pressure can be resisted than is likely to be met with in using gas burettes and reservoirs. The globe of this glass apparatus terminates below in a tube about 1.5 cm. in diameter cemented into a wood base, up through which go two leading-in wires of copper. In the terminals of these are fastened the terminals of a platinum wire which is wound to make a basket-like coil, and this forms the retort proper in the center of the glass globe. In the side of the large glass tube is a smaller one provided with a stop-cock to admit air, oxygen, etc.

In operating with this apparatus, the connections are duly made with a lighting circuit, and the current regulated by a metal or water rheostat, or perhaps by both, if convenient. For the work and the purposes for which this instrument has so far been used, I have made some temperature observations by means of the Le Chatelier pyrometer. The current was left as closely as possible at 7.5 amperes, with a difference of potential of 120 volts. The temperature within the coil, when protected from cooling by air, was found to be 680° C. Using a 10 ampere current, the temperature

<sup>1</sup> Read at the Washington meeting of the American Chemical Society.

rises at the end of three minutes to  $840^{\circ}$  C. Of course it is possible to reach temperatures of any degree up to the fusion of the wire.

I have found this, as already stated, to be extremely useful in conducting several distillation tests with small charges of wood. It could be adapted for use as an ignition crucible by replacing the semi-spherical coil with wire wound as a cone and preparing cone-shaped asbestos pads to fit in the same. It would then be possible to use the apparatus for igniting limestones, cements, etc. It could, I believe, be equally as well adapted for the combustion of carbon from steel, since the carbon residue could be filtered upon an asbestos cone pad and placed in this coil, and by preparing the proper train of apparatus, a perfect combustion could be made. Its size and convenience and adaptability seem to me to promise much in this and similar uses.

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## THE DETERMINATION OF POTASH IN FERTILIZERS BY SUBSTITUTING MILK OF LIME FOR AMMONIA AND AMMONIUM OXALATE AS THE PRECIPITANT.

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THE Lindo-Gladding method for the determination of potash in fertilizers possesses one particularly objectionable feature. The evaporation and ignition of an aliquot portion with sulphuric acid for the purpose of expelling ammonium salts and destroying dissolved organic matter is a tedious process and involves loss from spattering during evaporation.

A reliable modification which would exclude this feature would be highly desirable. At the sixteenth annual meeting of the Association of Official Agricultural Chemists, Ross presented a method based upon the use of barium carbonate as a precipitant for phosphates, iron, alumina, etc. He later suggested milk of lime as a precipitant and the writer in 1901 reported results obtained by collaborators on official methods for potash determinations.

The method employed is as follows: Weigh out 10 grams of the sample and boil with about 350 cc. of water for thirty minutes; while hot, add milk of lime till slightly alkaline. Cool, make up