

sulfate and sodium sulfite to be the more desirable ones for analyses by absorption. Of these three, ferrous chloride, which does not appear to have been used previously for analytical purposes, is the most satisfactory.

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NOTES

Vacuum Oven.—For drying in a vacuum at elevated temperature and for the absorption of moisture, an efficient apparatus (the Abderhalden vacuum drying tube) is on the market. This, however, allows the drying of only small samples of material, as used for combustion, etc. The Abderhalden apparatus cannot be appreciably enlarged, as great difficulty would be encountered in opening the tapered ground joint of the larger size apparatus after the drying in vacuum had been finished. This difficulty has been met by the substitution of a flange ground to fit a tubulated desiccator top as shown in Fig. 1. The apparatus is of Pyrex, is inexpensive, and maintains its vacuum well.

The tube is allowed to project 15 cm. outside the oven, thereby preventing the heat of the oven from softening the lubricant used upon the flange as a seal, and also providing a cooler section in which the absorbent (usually sodium hydroxide in copper trays) is placed.

To prevent the cover from falling when the vacuum is released, a copper band or hoop is placed around the tube next the flange. To this are soldered four copper strips at equal intervals. These are folded over the joint and their free ends are held in place by another hoop, which is slipped over the dome of the cover. The apparatus is evacuated with an oil pump and closed by a stopcock ground into the tubulature of the cover. Two such tubes may conveniently be placed side by side in the ordinary oven. The cover is removed easily by a turning motion, especially when the oven is still warm, not necessitating, as a rule, the use of a safety razor blade as applied to sticking desiccator covers.

It would seem possible to construct an efficient apparatus of larger size, either of Pyrex or copper. If copper is used, however, it may be necessary to cool the flange by means of a water jacket or spiral tube in order to maintain the seal. Concentric grooves in the rims might also prove helpful.

Thanks are due to the Corning Glass Works for the construction of the special glass apparatus and to A. G. Sterling of the Bureau of Chemistry for making the metal parts.

Thermoregulator.—The lower part of the regulator is the ordinary

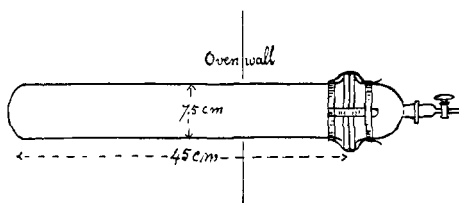


Fig. 1.—Vacuum drying tube.

reservoir filled with mercury or with toluene and mercury. The upper part is shown in Fig. 2. The apparatus is filled by introducing mercury at A until it reaches the level of Plug C. Plug C is inserted and the

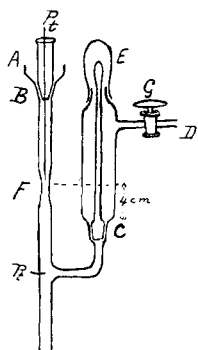


Fig 2.—Thermo-regulator.

filling continued until the mercury is slightly above the seat of Plug B, which is then inserted. No air should be left entrapped between the plugs. Mercury should be present above the two plugs when closed to serve as a seal. This makes unnecessary the use of any lubricant on the plugs. A water pump is connected at D. The thermoregulator is heated to the required temperature, vacuum is applied, and the stem of the plug under the rubber cap E is lifted, without removing the rubber cap, until the platinum wire¹ just makes contact with the mercury surface in the constriction at F and the pump is disconnected. The regulator is then ready for use. The writer has most frequently used a stopcock instead of the plug C, which is more convenient. The lubricant at the stopcock does not seem to affect the efficiency of the apparatus.

The advantages of the thermoregulator are a contact in vacuum between wire and mercury and ease of filling and cleaning.

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Sodium Hyponitrite.—Sodium hyponitrite has been prepared more easily, from more readily available materials, and with a slightly better yield than previously reported by Jones and the author.¹

Three and twenty-six hundredths g. of hydroxylammonium chloride was dissolved in the least possible amount of absolute ethanol. After cooling to -5° , slightly more than the calculated amount of sodium dissolved in the least amount of absolute ethanol was added. The sodium chloride was collected on a Büchner funnel and washed several times with absolute ethanol. To the filtrate was added 110 cc. of absolute ether and 3.24 g. of sodium dissolved in the least amount of absolute ethanol. The solution was cooled to -5° and twice the calculated amount of either

¹ Attention may also be drawn to the article by Beaver and Beaver, who have devised an efficient method for preventing sparking [*Ind. Eng. Chem.*, **15**, 359 (1923)].

¹ Jones and Scott, *THIS JOURNAL*, **46**, 2175 (1924).

amyl nitrite or propyl nitrite was added. After the solution had stood in a freezing mixture for one hour, the sodium hyponitrite was collected on a Büchner funnel. It was washed several times with absolute ethanol, then with absolute ether, and finally dried in a vacuum over sulfuric acid; yield, 0.69 g., or 13.9%.

The salt is not hygroscopic and will remain perfectly dry when exposed to the air in an open vessel for several days.

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CATALYTIC OXIDATION EFFECTS THAT RESEMBLE THE SPECIFIC DYNAMIC EFFECT¹

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By a rational extension of earlier experiments on the catalysis of the oxidation of butyric acid and of glucose, results were obtained that show analogies to physiological data on specific dynamic action, as developed by Lusk and others.² The results obtained indicate that this effect is a true chemical catalysis and that its foundations are now capable of being investigated *in vitro*. Results on catalysis with hydroxy acids and with amino acids are given in this paper.

1. Oxidative Catalysis with Hydroxy Acids

Previous experiments showed that ammonium hydroxide catalyzes the oxidation of butyric acid with hydrogen peroxide, while sodium and potassium hydroxides do not.³ This peculiarly specific action of ammonia suggested that perhaps substituted ammonias would also display this catalytic property. Experiments with glycine, which is one of the most abundant substituted ammonias present in living organisms, showed that they do. Additional experiments were then made with glycine, ammonium glycolate and potassium or sodium glycolate. All three compounds proved to be strongly catalytic for the oxidation of butyric acid. In fact the alkali glycolate appeared to be a little more strongly catalytic than either of the other two compounds. These results were surprising at first, since they indicate that when glycine is deaminized and ammonia

¹ These experiments were completed about five years ago while the author was a member of the Otho S. A. Sprague Memorial Institute, Chicago, Illinois, and are now published in this incomplete form because the writer may not have opportunity to pursue the subject again for some time.

² Lusk, "The Elements of the Science of Nutrition," W. B. Saunders, Philadelphia, 1919.

³ Witzemann, *J. Biol. Chem.*, **49**, 123 (1921).