commercial sodium was employed in all the work. Some of this sodium was redistilled under reduced pressure in hard glass tubes but the resulting product proved no purer and was sometimes even less pure, due to the action of sodium on the glass. The unchanged commercial material, then, proved the most satisfactory. The sticks were carefully trimmed and 3 or 4 grams were melted under pure toluene. The lustrous surface of the globule was washed with pure benzene and immediately converted into sodium hydroxide in an atmosphere charged with water vapor, but free from carbon dioxide. Examination of the hydroxide, when neutralized with nitric acid and treated with silver nitrate, showed that the amount of chlorine varied but little in the several samples, a maximum quantity when converted into silver chloride amounting to only 0.0002 gram of silver chloride per 4 grams of sodium hydroxide. In some samples absolutely no chlorine was found. In addition to chlorine, the sodium contained a very slight trace of iron which, however, does not detract from the value of the reagent.

Silver.—Two samples of silver were prepared according to methods of Stas,[1] one from recrystallized silver nitrate by means of formic acid in ammoniacal solution, the other from thoroughly washed precipitated silver chloride by means of invert sugar in the presence of pure sodium hydroxide. The finely divided material thus obtained was fused on charcoal, cleaned, boiled with dilute sulphuric acid and then with water.

Water.—The water was twice distilled, the last time from a solution containing a small amount of sulphuric acid and potassium permanganate. A block-tin tube was used as a condenser.

Nitric Acid.—A chemically pure preparation was redistilled, using a quartz condenser, and the middle fraction, entirely free from chlorine, was retained.

Ammonia.—This was obtained by heating the chemically pure material of commerce and passing the gas into pure water. No chlorine was found present.

Nitrogen.—The ordinary laboratory method of passing a mixture of moist ammonia and air over heated copper gauze was employed. The excess of ammonia was absorbed by water and dilute sulphuric acid, the nitrogen then being passed through wash bottles containing a solution of lead oxide in sodium hydroxide to absorb any sulphides originating from rubber connections. The gas then passed into the drying towers constructed wholly of glass tubes, containing beads moistened with concentrated sulphuric acid.

CLARK COLLEGE, WORCESTER, MASS.

NOTE.

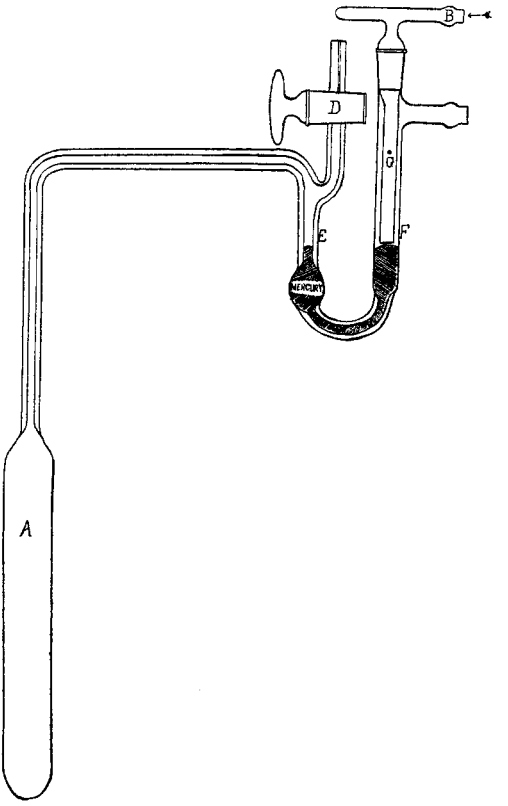
A New Thermoregulator for Use with Gas.—The large coefficient of expansion of air renders it especially suitable for use in thermoregulators but, as far as we are aware, no regulator in which it is used has been described.

The diagram shown herewith represents such a regulator as applied in practice.[2] The bend of the U-tube E and F is filled with mercury as shown. Gas enters at B. The cylindrical bulb A is placed in the incubator or oven, which is to be kept at constant temperature, while the stopcock D is left partly open. As the temperature increases the air in

[1] *Oeuvres*, 3, 13.

[2] Dr. W. A. Noyes informs me that he has used an apparatus identical in principle with the above for several years but has never described it.

A expands, forcing the mercury to a higher level in F, provided stopcock D is not open to allow the air to escape. From time to time, as required, the stopcock D is opened to allow the air in A to escape, which causes the mercury in E to again become level with the mercury in F. Operating in this manner, as soon as the desired temperature is attained in the incubator or oven, the stopcock D is turned off, the level of the mercury in both arms E and F being equal. The tube B reaches to just above the mercury in F and is provided with a small hole G in the side, which allows the passage of enough gas to prevent the flame from being extinguished when the main supply is cut off. The regulator thus operates in the same manner as other forms that are well known.



The extreme sensitiveness, combined with ease of manipulation and simplicity in cleaning, render the instrument particularly advantageous for general use. It may be used in air baths at temperatures even above the boiling point of mercury, where the ordinary forms of thermoregulators cannot be applied. Its sensibility to changes of atmospheric pressure prevents its use where differences of a few hundredths of a degree are important. The connection between A and E may be lengthened indefinitely with a capillary tube to carry the mercury away from the heat of the oven or air bath. Messrs. Eimer and Amend have taken up the manufacture of this apparatus.

PAUL POETSCHKE.