in the atomic volume curve from cesium to barium as abrupt as heretofore. It however affects the symmetry of the vertical column. The specific gravity of rubidium is probably not correct. I expect to redetermine it shortly.

The following parts of the atomic volume tables illustrate the points in question :

TABLE OF ATOMIC VOLUMES WITH SP. GR. OF CESIUM 1.88.

K..... 45.4	Ca..... 25.4	Sc..... 17
Rb 56.2	Sr..... 35	Y..... 24.8
Cs 70.6	Ba 36.5	La 22

TABLE OF ATOMIC VOLUMES WITH SP. GR. OF CESIUM 2.40003.

K..... 45.4	Ca..... 25.4	Sc..... 17
Rb 56.2	Sr..... 35	Y..... 24.8
Cs 55.3	Ba 36.5	La 22

These experiments confirm Beketoff's results on the atomic volume of cesium.

UNIVERSITY OF BERLIN.

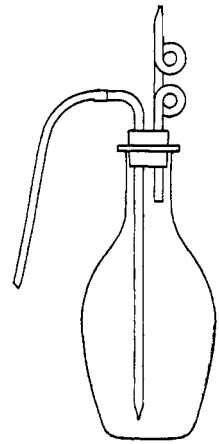
[CONTRIBUTION FROM THE CHEMICAL LABORATORY OF LAFAYETTE COLLEGE.]

AN APPARATUS TO FACILITATE HYDROGEN SULPHIDE PRECIPITATIONS.

BY RICHARD K. MEADE.

Received January 21, 1899.

THE piece of apparatus described below has been in use here for the past term by the students of my class in qualitative analysis and answers fully the purpose for which it was designed : to hasten the precipitation of the copper-arsenic group by hydrogen sulphide. It consists of an ordinary flask or gas bottle of any suitable form and capacity, provided with a closely-fitting two-hole rubber stopper. A piece of glass tubing bent at right angles passes through one hole to the bottom of the flask, serving as an inlet for the gas. This is connected with the hydrogen sulphide generator by a half or three quarters of a yard of light rubber tubing. A piece of glass tubing bent in the gas flame to the form shown in the cut passes through the other hole and serves as an outlet for the gas.



The solution to be precipitated is poured into the flask, this in turn corked up, and the apparatus stood in the hood. The gas is now passed into the solution and the flask violently shaken by hand. The bends in the exit tube keep any of the solution from being thrown out of the flask. The churning up of the solution with the hydrogen sulphide gas quickly throws out of solutions the metals of the copper-arsenic group.

The young men tell me that not only is the time necessary for complete precipitation greatly shortened but the sulphides are obtained in a form more easily filtered and washed, by the use of this apparatus.

EASTON, PA., January 19, 1899.

ACTION OF A HARD WATER ON CERTAIN METALS.

BY JAS. LEWIS HOWE AND J. L. MORRISON.

Received February 25, 1899.

THE work described in this paper was undertaken for the purpose of studying the action of the town water supply of Lexington, Va., on brass, as complaint had been made by plumbers and others that brass faucets, valves, etc., were rapidly corroded by the water and rendered useless.

An analysis of the water furnished me by Col. N. B. Tucker, of the Virginia Military Institute, is as follows.

	Parts per 100,000.
Lime	7.30
Magnesia	4.065
Ferrous oxide	0.2057
Soda	0.3608
Carbon dioxide	30.196
Sulphur trioxide	0.2127
Silica	0.730
Chlorine	trace
Potash	absent

The relatively high proportion of magnesia is due to the fact that most of the limestone of the region is highly magnesian. Several different metals were tested and in each case a duplicate was made with distilled water. The method used was as follows: The metals were in thin strips except the brass which was in the form of wire. The surface was thoroughly cleaned with emery paper, the metal weighed, and the area of exposed