

W = mass of counterpoise weights, ribbon and clamp.

W' = the wheel constant for that particular machine.

a = the overweight.

a = the observed acceleration.

AN EXPERIMENT TO ILLUSTRATE CHEMICAL EQUILIBRIUM.

BY FELIX LENGFELD.

Professor of Chemistry, University of Chicago.

The subject of chemical equilibrium is of such fundamental importance that it should be taught the beginner as soon as possible. It is certainly less difficult to understand than much that one sees in every elementary text-book of chemistry. The student who has a working knowledge of the underlying ideas will find it useful in his later work, whether it be in chemistry or in subjects extremely remote from chemistry. A number of experiments illustrating chemical equilibrium have lately been collected by Noyes and Blanchard,* and deserve the careful attention of all teachers of the subject. To this list I desire to add the following experiment which, on account of its simplicity, is especially adapted to the needs of the secondary school:

Three explosion eudiometers (Hofmann's are best, but not essential) are connected so that the same series of sparks may be sent through all. In the first I put about 10 cc. of dry ammonia over mercury; in the second exactly twice as many cc. of a mixture of three volumes hydrogen and one volume nitrogen, also over mercury; and in the third some of the same mixture of nitrogen and hydrogen over dilute sulphuric acid. Sparks are now passed and in the course of a few hours the volume of gas in the first two is the same, showing that whatever be the initial stage, the final is identical. In the third eudiometer the liquid will rise to the platinum ears, showing that as fast as ammonia is absorbed, more is formed, and that the action is complete, because there is a tendency to a state of equilibrium, and not in spite of this tendency. As the experiment with the quantities given takes several hours, it is best to begin it one day and show the results the next, or to diminish the volumes taken.

**Jour. Am. Chem. Soc.*, XXII., 726 (1901).