when. The writer feels that the subject should be covered as a whole rather than by the "now and then" method so generally followed. It does seem wise to discuss the subject for a little while, drop it, and then take it up again at a period when the mental attitude of the student is apt to be different than when the subject was first discussed. The whole question simmers down to—"Is it not better to devote the first year of algebra study entirely to hammering on the fundamentals?" The job there ought to be that of building a firm foundation. Graphs may be given a little attention merely as a matter of interest, but to treat them too seriously at this stage in the course is somewhat of a mistake. They can be studied much more effectively later.

The pad method of studying graphs is the most practical and effective. Every sheet on these pads has an explanation at one side and a place for the solution of a similar problem at the other side. One is taught how to do a graph problem in a neat and accurate manner if the pad method is followed, and there is the added advantage of tying the explanation and the problem together.

When should the study of graphs be undertaken? The answer "the last subject covered should be graphs." The student has by this time learned all processes needed for their proper solution. He can then attempt them with some assurance that he will know what he is doing.

THE SETTLING OF PRECIPITATES BY CENTRIFUGATION.

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The application of centrifugal force in settling of precipitates in liquids is by no means new. Advanced agricultural, biological, and chemical laboratories have made use of machines for centrifugation for a number of years.

However, the High School and even the college chemical laboratories have failed almost unanimously in recognizing the great amount of time saved in filtering processes by centrifugation. It is astonishing the little use made of the Babcock apparatus, and machines of a like nature.

Most High School chemical laboratories have in their equipment Babcock milk testing apparatus. By a simple modification, this tester can be changed to accommodate the average sized test tube. A cork is selected which will fit snugly in the top of the receptacle, which ordinarily carries the Babcock

bottle. The cork is then cut in two, parallel to its base. The smaller piece, after having had a small hole scooped out in its center to accommodate the bottom of the test tube, is placed in the bottom of the Babcock receptacle. The larger upper half of the cork is fitted in the top of the Babcock receptacle and a hole (large enough to admit the test tube) is bored through it. If the receptacles are all fitted in this manner, several test tubes can be accommodated at one time. The usual precaution with regard to a balanced load must necessarily be followed. The time saved in filtering processes for a class in one day will warrant the installation of this modified apparatus in any chemical laboratory. The method of operation is as follows:

The test tube containing the liquid and the precipitate is placed in the machine and properly balanced with another test tube of water or another test tube containing an equal amount of precipitate. The machine is rotated at normal speed. The length of time of rotation depends upon the nature of the precipitate. Barium sulphate, copper oxide, or any heavy precipitate requires about two minutes. A light gelatinous precipitate, such as aluminum hydroxide, requires about five minutes. A semi-colloid, such as arsenic sulphide, requires more time and may not entirely be settled out by this process. In every case, the major portion of the precipitate settles out during the first minute of rotation. The additional time is necessary to clear up the filtrate (that which corresponds to the filtrate in the ordinary filtering process). For the average precipitate, the separation of precipitate and filtrate is as complete and satisfactory as in the old filtering process.

The points of advantage in the process are:

1. Time saved. The ordinary process of filtering is long and tedious.
2. A clear separation of filtrate and precipitate.
3. The precipitate is left in a compact form in the bottom of the test tube while the filtrate is poured off. This makes the process a great time-saver in qualitative chemistry.
4. Immiscible liquids which have become emulsified may be settled rapidly without resort to waiting for the natural gravity process.

The laboratory operation of this modified Babcock machine has proven its great value. Once installed it is of inestimable value. Two machines will generally accommodate the average laboratory section.