SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN APPARATUS FOR DETERMINING THE PURITY OF LIMESTONE IN THE FIELD

THE wide distribution of lime deposits, the variability in the carbonate content of the deposits, and the wide-spread use of portable grinding equipment makes the perfection of an accurate field test, whereby the purity of the stone may be determined, highly desirable. McHargue[1] and Hopkins[2] have devised an apparatus for measuring the amount of carbon dioxide produced by treating the lime with an acid. The amount of apparatus required and the difficulties encountered in calculating the results have tended to limit the application of the method.

The author has devised an apparatus which will accomplish the same result, with the same degree of accuracy and within a period of ten minutes. The entire apparatus may be carried in a small kit weighing approximately eight pounds. The essential features of the apparatus are:

(1) A 25 x 250 mm Pyrex tube, graduated in such a manner that, by the use of standardized acids and alkalies, the percentage of lime (as pure $CaCO_3$) in the sample may be read directly.

(2) A standardized acid containing an indicator, and a standardized alkali of such strength as to correspond with the volumes indicated by the graduation on the tube.

(3) A modified hydrometer equipped with a removable pan on the tip, and so constructed as to float free in the graduated tube yet will be capable of weighing one gram of limestone with an accuracy of ± 2 per cent.

The sample is weighed by dropping it on the pan of the floating hydrometer until the proper point is reached. The tube is emptied and a definite quantity of acid added. The sample is then added and, after the violence of the reaction has subsided, the height of the liquid is adjusted to a definite volume. The contents are then boiled for five minutes over an alcohol flame. The volume is again adjusted and sufficient alkali added to produce the neutral point. The graduation at the height of the total volume shows the percentage of lime. A detailed explanation of the apparatus will appear later.

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A SIMPLE, QUICK AND INEXPENSIVE METHOD OF PREPARING LANTERN SLIDES

THE advantages of a quick method for preparing lantern slides which may be simply done and without the usual cost are especially valuable in the case of taking diagrams from a text or journal, or for producing necessary slides on short notice.

I have found the following preparation to have the above qualifications and to be very effective. Take a plain glass lantern slide, thoroughly clean it and allow to dry. When the slide has become quite dry apply a thin coat of albumin from a fresh egg and again allow the slide to dry. A smooth brush is essential in getting the coat of albumin evenly placed to avoid a streaked appearance when done.

As soon as the albumin has completely dried, place the plate with its coated side uppermost, over the diagram or other copy, and trace on the slide with India ink. The width of the lines may be varied by using pens of different sizes. Colored effects may be added in the same manner except that inks made from aniline dyes (such as the common writing fluids) should be used. The pigmentation in colored India inks make them all appear black on the screen.

Mount in the usual manner after the ink has dried by placing the newly made plate face down on another clean slide and fastening together with the usual lantern slide material or with adhesive tape.

These slides are not temporary as might be supposed but may be left in the lantern for long periods of time without injury in spite of the intense heat of some lanterns. I have used this preparation for the past five years and it is now being used by others in this department.

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SPECIAL ARTICLES

A NATURAL COPPER DEFICIENCY IN CATTLE RATIONS

A PRELIMINARY report was made at the recent meeting of the American Dairy Science Association in Davis, California, of a naturally occurring nutritional anemia of cattle in Florida. This anemia is caused by a deficiency of iron, or of iron and *copper* in the native vegetation growing on white or gray sand,

[1] J. S. McHargue, "County Agents' Calcimeter," Kentucky Agric. Expt. Sta. Circ. 9, 1915.

[2] C. G. Hopkins, "A Limestone Tester," Illinois Agric. Expt. Sta. Circ. 185, 1916.