

AN IMPROVED MILK-SCALE.

BY H. DROOP RICHMOND.

(Read at the Meeting, Nov. 3, 1897.)

WHEN determining the density of milk, it is frequently a matter of convenience to make the estimation at the temperature at which the milk happens to be, instead of adjusting it to the normal temperature. When this is done, it is necessary to make a correction to ascertain the value at 60° F.

Vieth has published a set of tables (ANALYST, x. 70) founded on those of Fleischmann, and these I have found correct; numerous experiments have shown that the difference between the density at 60° F. shown by Vieth's tables, and that actually determined, very rarely exceeds 0.0002.

Seeing the favour with which slide rules are regarded at the present time, it has long been my desire to incorporate a corrector of specific gravity with the "milk-scale." I have now succeeded in doing this. On the body of the instrument the temperature is engraved, each degree of temperature being of dimensions corresponding to the increase of specific volume (specific volume of milk at 32° F. = 1); on the slide the scale of specific gravity is marked, each degree having a value inversely proportional to the increase of expansion with the specific gravity. To use the instrument, the specific gravity found (*i.e.*, the apparent specific gravity determined in glass vessels) is placed against the line 60° F. (marked with an arrow); the true specific gravity is read off against the temperature at which the determination was made.

The "milk-scale" is now made by Messrs. Baird and Tatlock, London, with the addition of the specific gravity corrector.

DISCUSSION.

The PRESIDENT said that very many analysts were already much indebted to Mr. Richmond for the time saved in calculation by the use of his milk-scale, and the introduction of the modification now described would add to their obligation.

Mr. A. W. STOKES said that the working of the scale was greatly facilitated by the use of a simple index, made by bending a flat piece of metal, a plan which he had found to answer better than any of the other devices made, which were more or less complicated.

The PRESIDENT said that an ingenious little apparatus of a nature somewhat similar to that mentioned by Mr. Stokes had been introduced some time previously

THE ANALYST.

3

by Mr. Cassal. Among the advantages of such a device was that it prevented the temptation to make ink-marks on the scale.

[NOTE.—As the question of pointers was raised in the discussion, I may point out that the first was used by Mannheim nearly fifty years ago on the slide-rule. It was first applied to the milk-scale by A. E. Johnson, the most recent improvement being the use of a vernier instead of a pointer, as proposed by Sykes.] H. D. R.
