SUPPLEMENTAL NOTE ON TESTING OF ETHER.

BY A. B. LYONS.

In the formula published in the June number of the JOURNAL for deducing from specific-gravity determinations the proportions, respectively, of alcohol and water in samples of official ether, there occur two errors which should be corrected with pen and ink in the text.

On page 554, line 6, change Dif. to Dif.′

On page 554, line 7, change Dif.′ to Dif.

The corrected formula will read:

Let Dif. stand for the difference in specific gravity taken accurately at 25° C. before and after dehydration with potassium carbonate, the unit of comparison being water at 25° C.; also let Dif.′ stand for the difference in specific gravity between anhydrous ether and the dehydrated sample. According to Perkins, anhydrous ether on the foregoing basis has a specific gravity of 0.70968. This assumes a mercurial thermometer, no correction being made for vacuum weighings. If one prefers, the temperatures can be adjusted according to the hydrogen scale, and they may be reduced to a vacuum basis, provided the same basis be employed in all the determinations. In such case, of course, the figure given above as the specific gravity of anhydrous ether must be changed.

The formula in any case will read:

Dif.′ × 895 = Volume percent of alcohol.

Dif. × 185.5 = Volume percent of water.

However the percentages in the U. S. P. description of ether are percentages by weight, not by volume. To give the former, the foregoing factors must be changed, so that the formulas become:

Dif.′ × 975 = percent by weight of alcohol.

Dif. × 260 = percent by weight of water.

The results will approximate quite closely to the truth—considering that we are dealing with a fluid which is at once highly volatile and having a large coefficient of expansion by heat.

There remains the question of the exact specific gravity of anhydrous ether. My attention has only recently been called to the determination of this constant made two years ago by E. Mallinckrodt and A. D. Alt, published in the September 1916 issue of the *Journal of Industrial and Engineering Chemistry*. A mean of four determinations gave as the specific gravity *in vacuo* on basis $\frac{25° C.}{25° C.}$ (hydrogen scale) 0.70988. The figure seems to be lower than that of Dr. Squibb which again is lower than that of Perkins. I incline to accept provisionally Dr. Squibb's figure, *viz.*, 0.70958 at $\frac{25° C.}{25° C.}$ (mercurial scale, not corrected to vacuum equivalent). Reduced to vacuum and hydrogen scale, the figure would be 0.70993, which is very close to the value accepted by Mallinckrodt and Alt, *viz.*, 0.70991.

It is simplest in practice to use uncorrected specific gravities, adopting the value given above as that of Dr. Squibb, *viz.*, 0.70958 for the specific gravity of anhydrous ether.