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TRANSACTIONS.

I.—*The Preparation of Ethyl Bromide.*

By Alfred Holt.

In a recent paper (T., 1915, **107**, 1489) F. E. Weston discusses the best conditions for the preparation of ethyl bromide. As the present author has recently had occasion to prepare this compound on a fairly large scale, and, as Mr. Weston truly remarks, its preparation has assumed great importance, the following notes are possibly worth recording.

The problem presented was how to prepare the greatest quantity of ethyl bromide from any given weight of sodium or potassium bromides, for, owing to the high price of bromides compared with alcohol or sulphuric acid, a moderate waste of the latter substances was immaterial.

The great difficulty to contend with was the production of ether, since its separation from ethyl bromide by means of concentrated sulphuric acid and subsequent washing until free from acid is both tedious and wasteful.

The usual mixture was prepared as follows: To 1500 c.c. of concentrated sulphuric acid were gradually added 900 c.c. of water, and, after cooling, 1500 c.c. of absolute alcohol were slowly run in, care being taken to prevent the temperature rising too much. When cold, 1100 to 1200 grams of potassium bromide or an equivalent quantity of the sodium salt were added. [When sodium bromide ($NaBr,2H_2O$) was employed the volume of water added

to the acid was slightly diminished]. The whole mixture was then heated in a 14-litre flask on a sand-bath at the lowest temperature at which ethyl bromide would distil over. The distillation required about eight or nine hours.

The ethyl bromide was collected in water, washed by repeated shaking with water, and dried over calcium chloride.

Determination of the boiling point in order to test the purity of the compound is unsatisfactory, as a mixture of ether and ethyl bromide of constant boiling point can be obtained, so the purity of the product was determined by its specific gravity. Usually the ethyl bromide was practically free from ether.

The best yield obtained was 96 per cent. calculated on the weight of anhydrous bromide taken, and it rarely fell below 90 per cent., the variations undoubtedly arising from irregularities in the temperature at which the distillation was carried out.

Practically no hydrobromic acid distilled over.

The largest amount of reaction mixture employed in any single preparation was about 8000 grams, and the distillation, although tedious, presented no difficulties.

It is clear from both the preparations of Mr. Weston and the present author that low temperature with consequent slow distillation and a large quantity of a not too concentrated alcohol-sulphuric acid-water mixture are necessary for good yields.

Frothing never gave the least trouble.

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II.—*The Rate of Growth of Bacteria.*

By ARTHUR SLATOR.

CHEMICAL reactions brought about by micro-organisms usually proceed under conditions where development of the organism and changes in the composition of the nutrient medium take place simultaneously. In a study of the dynamics of such reactions the rate of development of the micro-organism is of fundamental importance.

The rate of growth of bacteria has received a considerable amount of attention (Lane-Claypon, *J. Hygiene*, 1909, **9**, 239; Penfold and Norris, *ibid.*, 1913, **12**, 527; and others).

The usual method of investigation is to allow small seedings of bacteria to grow in a suitable medium under definite conditions,