In practice, for a variety of reasons, complete extinction cannot be obtained. There is always a certain amount of background light (of the order of 0·5 per cent of the maximum illumination). Hence instead of adjusting for zero intensity, one adjusts for minimum intensity. This, however, does not reduce the accuracy of the settings, provided the light source is steady. When the light source is unsteady, as for example in a carbon arc, large irregular fluctuations of the electrometer needle are produced. This effect is eliminated by using a compensating beam of light, derived from the same source, and a second photo-electric cell. The accuracy of the results obtainable compares favourably with the accuracy obtainable by visual methods.

Although not expressly designed for the purpose, the same method may be used for determining optical rotatory power.

Full details will be published elsewhere.

J. BOR.

Physics Department,
College of Technology,
Manchester.
March 17.

Determination of Vitamin C in the Living Organism

WHILE determining the vitamin C content of urine taken from healthy individuals or patients suffering from various diseases by titration with 2-6 dichlorophenolindophenol, we tried to perform this test in the living organism itself. First we injected small quantities of a 1/1,000 normal sterile solution of the dye into the sole of healthy and scorbutic guinea pigs. We observed that decoloration of the dye takes place much more rapidly in healthy animals than in guinea pigs suffering from scurvy. When methyl blue was injected simultaneously, its colour remained unchanged, which shows that decoloration of dichlorophenolindophenol was not due to resorption but to reduction.

Next we tried to show that this reduction is caused by ascorbic acid, and performed similar experiments on human beings. Patients were kept on a vitamin C deficient diet for 10 days and then 1/400 normal dye solution was injected into the forearm. Using a 1·0 ml. tuberculin syringe, it is not difficult to produce a bubble of about 2 mm. diameter. After observing the time of decoloration, various amounts of ascorbic acid were given intravenously. The colour of the newly injected dye disappeared in a much shorter time than before.

Detailed experiments have shown that the time of decoloration depends on the amount of ascorbic acid present in or administered to the organism. We concluded from our numerous experiments that a decoloration time of about 5 minutes indicates *saturation*, that of more than 10 minutes *deficiency* of vitamin C, while decoloration times of 5–10 minutes show *normal* content of vitamin C of the body.

We believe that this simple reaction may prove useful for many purposes.

H. ROTTER.

Gynæcological and Obstetrical Section,
Jewish Hospital,
Budapest.
Jan. 15.

Churning for Butter

THE familiar process of churning cream to yield butter has led to two different theories of the mechanism involved. The Fischer-Hooker[1] theory is that churning is due to the reversal of an *O/W* emulsion (cream) to a *W/O* emulsion (butter), a view accepted by Palmer[2]. Rahn[3] believes that churning involves æration or frothing with consequent accumulation of milk proteins adsorbed at the newly-created air/liquid interface.

We accept Rahn's theory and hold that emulsion *inversion* is not concerned; rather is it emulsion *breaking*, due to the preference of the proteins for an air/liquid interface rather than a fat/water interface. The subsequent kneading together of butter granules results in an accidental resemblance to a *W/O* system.

If the milk proteins be restrained from accumulating in the froth (where surface denaturation occurs) churning could progress indefinitely without butter granules forming. We tested this idea by adding very surface-active materials to fresh cream of 50 per cent butterfat content (*p*H 7), so that these materials would undergo preferential adsorption in the froth. Saponin and bile salts have proved excellent anti-churning agents. Thus, 1 in 1,000 of saponin in the aqueous phase, added to cream which normally churned in 60 minutes, totally inhibited butter formation for hours. Its effect was still apparent even when the cream contained 50 per cent of sucrose to load the water phase and assist emulsion breaking; without saponin, such cream churned dramatically in 15 minutes. Egg albumen delayed butter formation until surface denaturation of this colloid allowed the accumulation of the milk proteins at the air/liquid interface.

Colloids which are not particularly surface-active have, as anticipated, no influence on the progress of churning; for example, 1 per cent of gum arabic in the cream.

Our complete results are being prepared for publication elsewhere.

WILLIAM CLAYTON.
JAMES FREDERICK MORSE.

Research Laboratory,
36 Crimscott Street,
London, S.E.1.

[1] "Fats and Fatty Degeneration", 93 (New York, 1917).
[2] "Colloid Symposium Monograph", 1, 410 (1928).
[3] cf. Rahn and Sharp, "Physik der Milchwirtschaft", 111 (Berlin, 1928).

Reactions Caused by 'Activated' Alumina

WE have observed that passage of a chloroform solution of diacetyltoxicarol through alumina activated for chromatographic adsorption causes 'hydrolysis'; in one experiment, 1·1 gm. of pure toxicarol was isolated from 2 gm. of ester. Of the two acetoxy groups attacked, one was derived from a phenolic, the other from an enolic hydroxyl group; both are very readily hydrolysed by alcoholic alkali. This hydrolysis, which is the more remarkable in that it occurred in a non-polar solvent, was traced to the alkalinity of the alumina used. Commercial 'activated' alumina in water reacts alkaline to phenolphthalein and the alkalinity can be titrated with sulphuric acid; the colour returns if the mixture is kept after neutralization; further quantities of acid are consumed after six and again after eighteen hours; thereafter the supernatant solution remains