The growth of the diatoms, which were cultured on a substrate used by me[2] earlier[3] and known to be free from anti-sulphanilamide factors, was more inhibited by sulphanilamide than by sulphapyridine, which in turn had a somewhat stronger effect than sulphathiazole. In other words, the action of the sulphanilamides mentioned on the growth of the diatoms was the reverse of that on bacteria.

The antagonistic power of *p*-aminobenzoic acid on sulphanilamides in these experiments with diatoms was, however, similar to that in corresponding experiments with bacteria, the inhibitory activity being strongest against sulphanilamide, less strong against sulphapyridine and least against sulphathiazole. Although *p*-aminobenzoic acid probably is an essential metabolite (in the sense of Fildes[4]) for diatoms as well as for bacteria and fungi, the conditions—at least for the diatoms investigated—seemed to be more complicated, and it was assumed that the pyridine and thiazole groups of sulphapyridine and sulphathiazole made these influence also vital processes in the metabolism of the cell other than those connected with the *p*-aminobenzoic acid (cf. the opinion of West and Coburn[5] concerning the competition of sulphapyridine with nicotinic acid in the formation of coenzymes).

A connexion between my experiences with diatoms and the results from the investigations on bacteria was seen when Landy and Dicken[6] reported their experiments on the neutralization of sulphanilamides through *p*-aminobenzoic acid in yeast. Their growth diagram shows a crossing between the sulphanilamide and sulphapyridine curves, indicating that at certain higher concentrations of *p*-aminobenzoic acid the growth of yeast is less inhibited by sulphanilamide than by sulphapyridine, whereas at lower concentrations the reverse is true. This probably explains my own experiences with diatoms, although the response to sulphathiazole does not seem to be identical in the two groups of organisms.

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[1] Wiedling, *Botaniska Notiser*, 375 (1941). Preliminary communication: *Naturwiss.*, 29, 455 (1941). Cf. also *Science*, **94**, 389 (1941).
[2] Wiedling, *Botaniska Notiser*, 33 (1941).
[3] Wiedling, *Botaniska Notiser*, 37 (1941).
[4] Fildes, *Lancet*, **238**, 955 (1940).
[5] West and Coburn, *J. Exp. Med.*, **72**, 91 (1940).
[6] Landy and Dicken, NATURE, **149** 244 (1992).

## Rapid Determination of Fat in Animals and Plants

THE living organism or tissue is weighed, preferably by the displacement method[1], and placed in a weighed Soxhlet thimble. It is then distilled under xylol and the percentage of water estimated[2]. Any fat will remain in the xylol. A further extraction is carried out with xylol in the ordinary Soxhlet extractor and then the whole of the xylol used is made up to a litre or some other standard volume. Then 200 ml. of this xylol is placed in a round-bottomed flask together with about 200 ml. of distilled water and steam-distilled.

The vapour pressure of the xylol being well above that of steam and that of the fat being well below, the fat remains in the flask and the xylol is carried over. The water and fat from the flask are washed out into a separating funnel while still warm and allowed to cool. A small amount of hydrochloric acid is added to bring about demulsification and the whole is shaken up vigorously with petroleum ether. The fat dissolves and is estimated in the ordinary way by evaporating off the petroleum ether.

The method has been tested out thoroughly with lard and pure olive oil. It is obviously limited in its application but has the great advantage that it is unnecessary to dry the material containing the fat.

If a little of the original material is first steam distilled it will be seen at once if it contains volatile oils or fats and if it does the method is clearly unsuitable.

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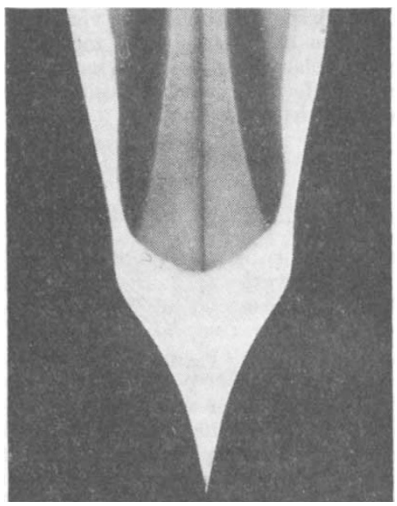
[1] Lowndes, A. G., NATURE, **141**, 289 (1938).
[2] Lowndes, A. G., NATURE, **148**, 594 (1941).

## Luminous Radiation from Hot Gases

THE question as to whether normal gases become luminous when heated is of the greatest importance to those interested in the physics and chemistry of flame gases. Pringsheim did a great deal of work with the view of deciding this, and found that they remained dark at the highest temperature he could command in the laboratory[1]. In recent books by Lewis and von Elbe[2] and Gaydon[3], however, doubt is expressed whether at temperatures of the order of 2,000° C. they would still remain dark.



I think there is no doubt that they would. Weston's spectrograms from carbon monoxide – air flame gases and the higher temperature carbon monoxide – oxygen flame gases show that when hydrogen is added, the characteristic carbon monoxide flame gas spectrum disappears—even though the flame gas temperature is higher[4]. The explanation would appear to be that, with addition of hydrogen, the carbon dioxide produced is much more normal, for it has been shown that the latent energy in carbon monoxide flame gases decreases with addition of hydrogen. (Gaydon suggests that the luminous radiation from carbon