

extend into the flame (Fig. 1a). The spectrogram of the pure oxygen band, which is obtained in the torch flame in oxygen at atmospheric pressure, is reproduced in Fig. 1b.

If the torch is struck in a closed vessel containing air, the absorption bands due to NO_2 appear in the visible and near ultra-violet region, and the NO (0,0), (1,0) bands become 'self-reversed'.

It is to be noted that the torch spectrum is found to be essentially the same as that of the high-tension D.C. arc³ (*stromstarke Glimmentladung*⁴), so that, so far as the nature of the spectrum is concerned, no features distinctively characteristic of the ultra high-frequency oscillations can be detected.

A complete analysis of the Runge band will be published elsewhere.

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¹ Mochalov, *C.R. Acad. Sci. U.R.S.S.*, **18**, 329 (1938); **20**, 297 (1938).

² Rohde and Schwarz, *Z. Phys.*, **85**, 161 (1933).

³ Grottrian and Runge, *Phys. Z.*, **15**, 545 (1914).

⁴ Thoma and Heer, *Z. tech. Phys.*, **13**, 464 (1932).

Comparing Resistances of Four-Terminal Resistors

Two communications regarding the comparison of four-terminal resistances, the first by Mr. Arvon Glynne and a further one by Prof. John Dowling, have recently appeared¹ in NATURE.

I would like to point out that the method described by Mr. Glynne is already well known and will be found in Law's "Electrical Measurements", published by the McGraw-Hill Book Company, first edition, 1917, on p. 190, where the identical formula is given.

There is considerable practical difficulty in applying this method, first owing to the presence of thermoelectric effects at the terminals, which are usually different for each position of the galvanometer, and secondly, owing to the dependence on the constancy of the connexion between the two resistances under test. In order to obtain accurate comparisons, it would be necessary to compensate for the thermoelectric effects and to make the change-over from position one to position two with great rapidity. This cannot easily be done when the resistance *B* has to be altered for the two balances.

To overcome these difficulties, I modified the method², and the complete instrument was exhibited at the Physical Society in January 1938. This method has been in continual use for precision comparisons since then, with the addition of a circuit for compensation for thermal E.M.F.'s at the terminals. The compensating circuit avoids the use of two zeros on the galvanometer—one for each balance.

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¹ NATURE, **144**, 596 and 865 (1939).

² *J. Sci. Instr.*, **15**, No. 7 (July 1938).

Points from Foregoing Letters

HANS H USSING describes a method of analysing protein by means of amino-acids containing deuterium. The author claims that the method overcomes the difficulty met with in most types of amino-acid analysis, which usually lead to inevitable losses and are therefore only approximate. He also suggests that his method can be used for such an amino-acid series as alanine, valine, isoleucine and aspartic acid, for which no very reliable methods of estimation are at present known.

E. Chain and E. S. Duthie report on an enzyme occurring in purified 'spreading factor' extracts from testis hydrolysing rapidly a polysaccharide in synovial mucin with liberation of reducing sugars. A large and rapid decrease in viscosity occurs during the early stages of hydrolysis and the mucin becomes non-precipitable by dilute acetic acid. The possible identity of this enzyme with 'spreading factor' is discussed.

The vitamin A content of the liver of a hundred presumably healthy dogs was found by R. G. Linton and A. Brownlee to average 678 'blue units' per gram of liver tissue, with a medial figure of 153.5 and a range of 4.5 to 19,625.

In *Armadillidium vulgare* Latr. there are found broods consisting of one sex only. H. W. Howard finds that the male parent probably has no effect in determining the type of brood produced. This supports Vandel's theory that the segregation of sex chromosomes is determined by the cytoplasm of the female.

J. M. Muñoz, E. Braun-Menéndez, J. C. Fasciolo and L. F. Leloir report that renal hypertension is

caused by the formation of 'hypertensin', a substance which is different from other known pressor substances. It has been found in venous blood of ischaemic kidneys and can be prepared *in vitro* by the interaction of renin and pseudo-globulins of normal serum.

A. M. Melland stresses the probability of the nucleolus producing the secondary constriction in a chromosome, rather than the nucleolus arising from that constriction. R. Ruggles Gates, commenting on this letter, points out that while the growing nucleolus can separate the gyres of a chromosome spiral, yet the nucleolus takes its origin at a predetermined locus of the chromosome whether the latter has a satellite or a secondary constriction.

The unbalance obtained by reducing the calcium content of physiological solutions can to some extent be offset by the addition of small quantities of lipoids to the solution in the case of the beating of frog heart and of *Mytilus* cilia. According to G. S. Carter *et al.*, the use of adsorbants and dispersants of protein film and of lipid film suggests that ciliary and muscular cell membranes have some lipid constituents on their outer sides. It seems that the role of lipoids in questions both of ion balance and of muscular activity needs investigation. The data are not inconsistent with the hypotheses of Heilbrunn concerning mitosis and excitability.

D. C. Gall gives an earlier reference and comments upon a method of comparing four-terminal resistances, recently described. Attention is also directed to an improved method.