fatty acids (expressed as elaidic acid) in the presence of *cis* unsaturated fatty acids and saturated fatty acids. Such an analysis is complicated by the fact that the *trans* double-bond peak at 965 *K** lies on the side of a major carboxyl peak at 933 *K*. It is therefore masked by this peak; but when a solution of mixed C_{18} fatty acids in carbon disulphide in the sample cell is measured against a similar concentration of stearic acid in carbon disulphide in a compensating cell of the same thickness, the carboxyl peak can be completely compensated and the resultant graph is that due to the *trans* double-bond alone. By this method 0·5 per cent *trans* unsaturated acids in the presence of *cis* unsaturated acids and saturated acids was accurately determined. Similarly, a mixture of DDT *pp'* and *op'* isomers and BHC γ-isomer was analysed by first compensating for total DDT at 1,015 *K* and measuring γ-isomer BHC at 686 *K* and 910 *K*, and secondly compensating for γ-isomer BHC at 910 *K* and measuring total DDT at 1,015 *K* and *pp'* to *op'* ratio at 806 *K*.

The method is also recommended as a criterion of purity. Similar weights of pure compound and sample are separately dissolved in equal volumes of an appropriate solvent and placed in matched sample cells. If the pure compound and sample are identical, the resultant trace is a line at 100 per cent transmittance and any impurity is readily detected.

Compensation by the above techniques may lead to low-energy transmission by each beam, and precautions may be needed to maintain instrument performance under the conditions of low energy and low signal-to-noise ratio. Such precautions include increasing energy from source, increasing slit widths, increasing electronic gain, and reducing consequent noise by the use of appropriate filters and slow scanning speeds.

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* Following the recommendation of the Joint Commission of Spectroscopy, the symbol *K* is used for denoting the unit of wave number previously designated as $cm.^{-1}$.

[1] Beroza, M., *Anal. Chem.*, **25**, 112 (1953).

A New Circuit for balancing the Characteristics of Pairs of Valves

In circuits containing balanced valves, as used in such applications as push-pull output stages or in d.c. amplifiers, it is customary to balance the valves by means of external circuit adjustments so that errors caused by differences in their characteristics are reduced. There are various methods of doing this[1]; but none of these gives compensation for all characteristics simultaneously, as it is possible to make adjustments to only one of the three properties, namely, zero balance (equality of static plate currents), stage gain and effect of changes of cathode-supply voltage.

Two valves of the same type rarely have identical characteristics, the variations being greater than can be accounted for by variations in electrode geometry. This is due to the well-known variations in the emission characteristics of the oxide cathode.

At a given operating point, differences in the characteristics of two valves caused by variation of the work function can be compensated by an appropriate adjustment of the cathode temperature and hence of the heater supply voltage.

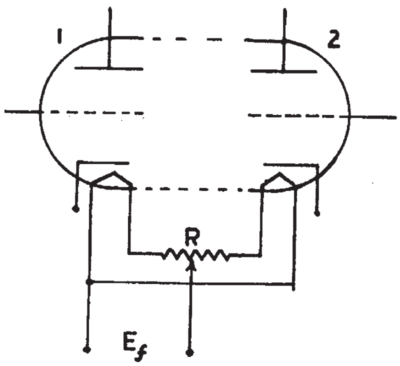

Fig. 1. A new circuit for balancing both static and dynamic properties of a pair of triodes by adjustment of the heater voltages

This approach leads to the very simple circuit of Fig. 1 for the balancing of a pair of triodes (or pentodes at fixed screen voltage). A small difference in the heater supply voltages is introduced by the potentiometer *R*, of a few ohms resistance, in series with the heater supply circuit. A suitable method of balancing is to adjust *R* until the static plate currents are equal. Experimental measurements on a number of valves of different types have shown that, when this is done, the other parameters of the valves are also brought into balance. That is, the mutual conductances of the two valves are almost equal (to within 2 per cent), and the compensation for heater supply voltage changes is also balanced. This result would presumably apply only to valves in which the differences in geometry are negligible.

It is found experimentally that it is necessary to provide for a difference of 10 per cent in the heater supply voltages, and that approximately 50 per cent of valves of the same type can be balanced with differences of only 5 per cent. In many cases (that is, d.c. amplifiers) it is desirable to operate the heaters at a reduced voltage, and the voltage drop in *R* is then unimportant.

Full experimental details will be published elsewhere.

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[1] Verhagen, C. M., *Proc. Inst. Rad. Eng.*, **41**, 616 (1953).

Cytological Polymorphism in the Nematode *Haemonchus contortus* (Rudolphi 1803) Cobb 1898

Recent observations by Roberts, Turner and McKevett[1] have indicated that the so-called ovine and bovine 'strains' of *Haemonchus contortus* (Rud. 1803) are distinct species. This conclusion is based mainly on differences in the morphology of the infective larvæ and in the type of cuticular vulval process dominant in adult females in natural populations in each host. Supporting evidence was also found in heritability tests involving these differences. The measurements of the infective larvæ presented