METHOD FOR COLOR EVALUATION.*

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INTRODUCTION.

It is well known that the sense of color evaluation varies between the individual persons and even in the same individual. It is therefore preferable to use mechanical means for exact expression of the color, rather than to depend on visual determination.

It is further known that photoelectric cells have a different response for light of different colors so that if other factors can be held constant, photoelectric cells can be used for the evaluation of colors.

The null or zero deflection method is used in many electrical measurement circuits for matching or comparing values of resistance, voltage, *et al.*, and for these purposes is quicker and more accurate than comparison of deflections. On account of the difficulties in securing matched cells and operating under exactly comparable conditions the null method has not been generally used for color matching. It would seem, however, that the null method would be preferable if the difficulties could be overcome.

This paper covers the construction and method of use for a two-cell color evaluator, giving means used to compensate for differences in sources of illumination, cell sensitivity and other factors.

CONSTRUCTION.

In order to balance any variations in illumination from the light source due to manufacturing inequalities, as aging and variable line voltage—*et al.*, a single lamp is used to illuminate both the specimen to be evaluated and the standard used for comparison. The lamp is so placed that its position with regard to the two specimens and the two cells is symmetrical, thus minimizing effects of distance and angle of incidence and to some extent the reflection factor. A 100-watt lamp was chosen to give good illumination without too much heat. The photocells are protected from excess heat and stray illumination by an asbestos screen.

The Lowenberg Self Generating Dry Disk Electrocell, 75 x 38 mm. was chosen for the photocells after a comparison with several other makes. A housing was constructed of bakelite, using a window made from a large microscope slide. The cells were found to have a forward resistance of approximately 400 ohms.

A Triplett 0.5–0–.5 milliampere meter having a resistance of 33 ohms was selected to indicate the difference or balance in response between the specimen and the color standard. Since matched cells are difficult to secure, a circuit and technique had to be developed to balance out cell inequality effects. Many variations of circuit were carefully considered and tested.

In the circuit presented herewith, one cell is connected directly across the meter and the other cell with a 400 ohm potentiometer as a variable resistor in series is connected across the meter in opposite polarity. Thus if the terminal voltage

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across the meter from each cell is exactly equal, no current flows through the meter but the current flows through both cells and resistor in series. Any change in illumination on either cell will disturb the balance and the difference in current will flow through the meter.

TECHNIQUE.

On account of the voltage drop in this resistor which is necessary to balance the voltage and resistance differences of the two cells, a special technique is required to compensate for this factor since the factor changes with variations in the current. Two samples of the specimen to be tested identical in size and color are first placed one under one cell and the other under the other cell in exactly the same relative position and the potentiometer adjusted to zero reading on the meter. One of these then is removed and replaced with the standard color card. If only one specimen of sufficient area is available, it must be placed under one of the cells and a blank tray placed under the other, and the deflection noted, then the specimen and tray reversed, and the deflection in the opposite direction noted. The potentiometer is then adjusted to equalize the deflection. This must be repeated until exactly equal deflections are secured in the two directions. The standard color card is substituted for the empty tray in this latter method or the second tray of the two identical specimens in the first method and the card moved to a tint which gives zero deflection.

A mask of non-reflecting material must be provided to cover the specimen or the standard color card, as the case may be. In each mask should be an opening to leave a definite portion free to receive illumination. The openings in the two masks should be of the same area and in the same relative position with respect to the lamp and the cells, both for adjustment and final balance.

CONCLUSIONS.

With suitable selection and sufficient care in manipulation, null method equipment may be used for color evaluation of drugs and other samples with favorable accuracy; without suitable equipment and careful operation, the error may be much greater than by visual comparison.

CHOLESTEROL IN OINTMENTS.*

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INTRODUCTION.

Ointments have been extensively used as external applications for diseases of certain etiological origin. The effectiveness of such preparations depends upon the extent to which they diffuse and absorb, and also upon the potency of the major ingredient. In addition to the characteristic action of the major ingredient, the base employed also has a direct relationship to the above mentioned requirements.

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