The data, although limited, suggest that taxonomically related species may have blood-sugars quantitatively similar. This point is to be further investigated.

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REUBEN BLUMENTHAL

SPECIAL ARTICLES

THE STUDY OF AN ULTRAVIOLET TRANSMITTING MATERIAL

THE beneficial effects of sunlight have long been known, but the discovery that the ultraviolet portion of the sun's radiation is of value in the prevention of rickets in the human being, leg-weakness in chickens and leg-stiffness in swine, is of recent date. Furthermore, data are being accumulated from different sources which point to the conclusion that the portion of the ultraviolet spectrum which is concerned with normal bone formation lies between 2,800 Å and 3,200 Å.

For the measurement by chemical means of the relative amount of ultraviolet light which passes through a given material, the acetone-methylene blue method described by Webster, Hill, and Eidinow[1] was selected. The acetone-methylene blue reagent is decolorized by radiations shorter than 3,200 Å. Although this reaction has not been studied critically, and the exact limits of the spectrum between which it is sensitive are not known, it is significant that the maximum chemical susceptibility[2] of acetone is between 3,000 Å and 2,470 Å, and that this section of the spectrum lies in the physiologically active range. When the reagent is placed at a distance of three feet from a quartz mercury lamp, the change in color caused by the light filtered by ordinary window glass is less than 5 per cent. of that noted when no filter is used. Measurements made by Coblentz and Fulton[3] show that window glass permits the passage of little or none of the radiations of wave length less than 3,200 Å. Hence the acetone-methylene blue reagent is apparently sensitive only to wave lengths shorter than about 3,200 Å.

Fundamental and practical studies of the ultraviolet transmitting properties of a glass substitute, Cel-O-Glass, are under way. According to the acetone-methylene blue reaction, 47 per cent. of the light from a quartz mercury lamp, of wave length less than 3,200 Å, is transmitted when the reagent is at a distance of three feet from the lamp. Daily readings by the colorimetric method, of the total ultraviolet portion of sunlight, less than 3,200 Å, made over a period of five months, show that 50 per cent. of this radiation passes through the material.

In view of the use to which the ultraviolet transmitting material would be put, it was desirable to determine whether or not the percentage transmission, as measured by physical and chemical means, could be confirmed physiologically. A series of experiments is under way, using the chicken as the experimental subject, to determine the percentage of light, effective in the normal formation of bone, which is passed by Cel-O-Glass. The basal ration[4] used is 99 per cent. yellow corn, 1 per cent. sodium chloride and skimmed milk *ad libitum*. The birds in one set of pens receive a daily dosage of light from a quartz mercury lamp (Uviarc Poultry Treater Lamp), while those of another set are exposed to the light which has been filtered by the glass substitute.

The ash, and in some cases the calcium and phosphorus, of the dry, alcohol-ether extracted femurs and wing bones, are determined in four to eight birds selected from each pen, each week, for an eight- or ten-week period, and these values are used as a measure of the effectiveness of the rays in bone formation. Preliminary results indicate that the percentage of the effective rays which pass through Cel-O-Glass is between 33 per cent. and 40 per cent. A detailed report will be made in the near future of experiments with about 900 birds.

Further experiments are to be conducted which seek to express hours of ultraviolet light of sunlight in terms of hours of this radiation from a quartz mercury lamp. The comparison will be made by the physiological method mentioned above, and the results will also be expressed in methylene blue units.

A critical study of the acetone-methylene blue method and of its modification for use in a colorimeter is being made in the department of chemistry of Rutgers University.

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[5] Cel-O-Glass Industrial Fellow. This investigation is being conducted on a fellowship grant from Acetol Products, Inc., New York.