

result that an overload of fluid is thrown upon already hydrated internal structures, including the upper respiratory tract. Bacteria may then play a complicating rôle after excessive secretions have thus been established.

¹ Kohman, E., *Am. J. Physiol.*, 1920, li, 378.

² McClure, W. B., and Aldrich, C. A., *J. Am. Med. Assn.*, 1923, lxxxii, 293.

³ Kunde, M. M., *Arch. Int. Med.*, 1926, xxxviii, 57.

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The Penetration of Ultra Violet Light Into the Human Skin.

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The problem of the penetration of ultra violet light into the human skin is not yet solved. This problem is of great interest, however, particularly from the point of view that certain limited parts of the ultra violet spectrum produce certain characteristic biological effects, such as erythema, pigmentation, bactericidy, antirachitic action, and others. For the scientific explanation of this reaction it is of interest to know to what depth of the skin these biologically active rays penetrate and by what substances they are selectively absorbed. In order to contribute to the solution of this problem absorption measurements were made for the various parts and biological constituents of the human skin.

Two methods have been used, the photographic and the photoelectric, both in connection with a mercury quartz arc and a Hilger spectrograph. The photoelectric method has the advantage that the whole spectrum can be obtained within a few minutes, and that it gives a crucial test about the end absorption in the far ultra violet. The photoelectric method gives more exact quantitative results, except at the farthest ultra violet end, where a trace of spectral impurity lowers the exactness of the measurements. Besides, it takes a long time to go over the whole spectrum, and it is difficult to keep the conditions of biologic specimens constant for such a length of time. Both methods used are superior to the thermoelectric method as their pronounced ultra violet selectivity makes them more independent from scattered visible and infrared light.

Results: (1) The difference between living and dead tissue kept

in Ringer solution and on ice for one or two days is smaller than can be exactly measured. (2) The penetration of ultra violet light is stronger than given in the older literature, particularly by Hasselbalch,¹ and smaller than suggested by Macht and his co-workers.^{2, 3} (3) The various layers of skin (horny layer, epidermis, corium, sub-cutaneous fat, connective tissue, plasma, blood, melanin, etc.) exert a very different absorption and show characteristic selective absorption bands. (4) The corrected skin sensitivity curve toward erythema, as observed by Hausser and his co-workers⁴ can be explained by the passive absorption of ultra violet by the horny layer and the active absorption by the proteins in the skin.

¹ Hasselbalch, K. A., *Strahlentherapie*, 1913, ii, 403.

² Macht, D. I., Bell, F. K., Elvers, C. F., *PROC. SOC. EXP. BIOL. AND MED.*, 1925, xxiii, 210.

³ Macht, D. I., Anderson, W. T., Bell, E. K., *J. Am. Med. Assn.*, 1928, xc, 161.

⁴ Hausser, K. W., and Vahle, W., *Strahlentherapie*, 1921, xiii, 41.

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Digestive Function in Avitaminoses.

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McCarrison¹ and others have observed marked pathological changes in the gastrointestinal tracts of animals kept on diets deficient in vitamins and other substances. From such observations it has been inferred that lesser degrees of vitamine deficiency continued over long periods of time might be responsible for various gastrointestinal disturbances in man. Farmer and Redenbaugh² prepared extracts of the pancreas and upper intestines of polyneuritic pigeons and found a decrease in the digestive enzymes as compared with controls.

The present paper represents the first of several attempts to obtain a quantitative index of various gastrointestinal digestive functions in animals and man based on the principle of feeding an excess of difficultly digestible food substances and estimating the percentage digestion by fecal analysis. Iron oxide was used as a key substance to simplify the utilization determinations.³

Eight groups of albino rats and 3 groups of guinea pigs were used, each group consisting of 6 animals. Severe conditions of