

ments were made of energy reflected by the epithelium inside the cheek, it may still be assumed that about one-third of the energy entering the cheek passed through.

These studies indicate that living tissue is generally impermeable to all but a narrow band of ordinary radiant energy lying between wave lengths of 0.6 to 1.6 micron. Maximum penetration seems to occur at a wave length of 1.15 micron. What physiological or therapeutic effects such radiant energy has is still largely undetermined. A lamp specially designed to deliver rays in the range indicated has been made and is available for study.

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### The Effect of X-Ray Upon Bacteriophage and Upon the Bacterial Organism.

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A number of workers recently have demonstrated that it is possible to produce variants among both plants and animals by exposure to the effect of X-rays. We, in turn, have endeavored to demonstrate change by a similar procedure applied to the Bacteriophage and to the organism susceptible to the Bacteriophage, following suggestions made by Dr. Olson.

Seven strains of *B. coli* bacteriophage were selected and for each of these we cultured the particular strain of *B. coli* acted upon by its respective strain of bacteriophage. There were selected 7 coli bacteriophages and 6 strains of *B. coli* for this series of experiments. These bacteriophages were effective as follows upon the bacterial strains: one for all the strains, one for 5, one for 2 and 3 could lyse only one strain each of the organisms. There were thus 42 combinations possible in such a set up of tubes in case any variation were to appear.

The following methods for exposure were followed. The organisms were young cultures in the phase of positive logarithmic growth in beef infusion broth and the phages were recent filtrates in the same medium. These were contained within lead free glass test tubes. Exposure to X-ray was carried out at a distance of approximately fourteen inches from the target of a Roentgen tube actuated by approximately 75,000 volts of electricity. The exposure period was 30 minutes. Following this treatment each bacterio-

phage was placed in contact with untreated organisms of each culture and the exposed bacterial culture was set up with each of the unexposed bacteriophages. For control purposes a similar series of unexposed bacteriophages and bacterial cultures were used.

The following results were obtained. By this method of treatment 3 of the bacteriophages developed reduced effectiveness when brought into contact with organisms shown previously to be susceptible to them in the control series. But this reduction in lytic effectiveness does not of necessity appear when this same portion of X-rayed bacteriophage is brought into contact with other strains of the colon bacillus. The diminution of effect thus may be selective as the result of the X-ray treatment. Likewise in three instances, treatment of the cultures reduced the activity of the bacteriophage upon them. Again the effect may be selective inasmuch as this same treated suspension when brought into contact with other strains of *B. coli* bacteriophage may still show the usual lysis. The effect, therefore, cannot be ascribed to sterilization of the culture in all instances for they were not killed by this treatment.

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**Parenteral and Gastro-Intestinal Types of Proteolysis.\***

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In a previous note<sup>1</sup> we reported that under the influence of canine leucocytic extract horse proteins undergo an initial pseudo-proliferation, presumably due to immunologically symmetrical proteolysis. A similar apparent multiplication of horse proteins takes place on 14-day incubation with an excess (20:1) of normal canine serum. In both cases the apparent multiplication is followed by a marked flattening and distortion of the precipitin graph<sup>2</sup> which we interpret as an index of horse protein denaturation.<sup>3</sup>

In contrast with this parenteral type of proteolysis, gastro-intestinal proteolysis has thus far given in our hands no suggestion of

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<sup>1</sup> Sox, H. C., and Manwaring, W. H., *PROC. SOC. EXP. BIOL. AND MED.*, 1929, xxvii, 72.

<sup>2</sup> For typical graphs see *PROC. SOC. EXP. BIOL. AND MED.*, 1929, xxvii, 14.

<sup>3</sup> Sox, H. C., and Manwaring, W. H., *PROC. SOC. EXP. BIOL. AND MED.*, 1929, xxvii, 110.