The optical rotation of the substance was the following:

$$[\alpha]^{20}_{D}\frac{0.56 \times 100}{1 \times 4} = + 14.0°.$$

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The influence of X-rays on the development of the crown gall.

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Crown gall is an infectious disease of plants which may be induced artificially by inoculating with the aid of a needle prick of a drop from an agar culture of *Bacterium tumefaciens*. Erwin F. Smith, of Washington, who investigated the condition continually for the last 10 years, is of the opinion that the disease is identical with human cancer. Irrespective of the stand one takes in regard to the identity of the two conditions, it must be conceded that there is a great deal of analogy between them. Crown gall as well as cancer is a new growth caused by a continuous, limitless proliferation of a group of cells within a tissue which normally do not proliferate at all. As a result of the rapid proliferation the new cells remain young and undifferentiated.

Clinical and experimental evidence indicates that the main biological and therapeutic action of X-rays consists in inhibition of the proliferating power of young undifferentiated cells. In man and vertebrates the mechanism of the action of X-rays on tumor cells is obscured by the changes in the cellular elements of the blood, lymph and the fixed connective tissue cells of the surrounding regions which is always encountered side by side with the changes in the tumor cells themselves. The crown gall, on the other hand, is an ideal subject for the study of the direct biological action of the X-rays on the tumor cells, since there is no other tissue present which may be changed by the rays.

For the present study ricinus plants and agar subcultures of *Bacterium tumefaciens* were used. The seeds for the former and the primary culture for the latter were obtained through the

courtesy of Dr. Erwin F. Smith. The plants were X-rayed by the modern methods, using hard rays. Preliminary experiments have shown that with the technique employed normal plants were not disturbed by the X-rays in their growth and development. Preliminary inoculation with the *Bacterium tumefaciens* have also shown that the inoculations were uniformly successful and were followed by the development of a large crown gall. 43 plants were inoculated with the microörganism and the inoculation was followed immediately by X-ray treatment. The treatment was given to each plant 6 times in the course of 2 weeks at intervals of 2 days. Simultaneously with the X-rayed plants, control plants of the same age and size were inoculated with the microörganism from the same subculture. All the control plants developed a large crown gall, the majority of the X-rayed plants on the other hand developed no growth, and only a slight swelling appeared at the place of inoculation. In 10 plants there developed a small stunted growth.

The microscopical study of X-rayed galls, a full report of which will be given later, indicates that the main immediate action of the X-rays on the cells of the crown gall consists not in a direct destruction of the cells, but in the arrest of the proliferating power. The analysis of the mechanism of the action of the X-rays on the crown gall seems to indicate at the same time that the rays influence and inhibit the functions of the cells directly and do not destroy the bacteria. But this phase of the subject will also be discussed in greater detail in a subsequent publication.

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The two forms of glycine.

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The two forms of glycine, plates from water, and needles from alcohol and water, were studied.

Emil Fischer[1] had shown that an acid chloride could be ob-

[1] E. Fischer, *Ber.*, 38, 2914 (1905).