rayed area to a depth corresponding to the penetration of the rays.

The ear of a rabbit was rayed over a circular area 1 cm. in diameter with 0.1 milliampere of current for 0.1 second. Within a few days the rayed skin became deeply pigmented and the hair came out. It was not until seven weeks after the treatment that new hair appeared.

A second similar area was rayed with 1 milliampere of current for 1 second. After several days a scab formed over the rayed area and a few days later the scab came off taking the hair with it. Two weeks later a profuse growth of snow white hair started and soon became much longer than the original gray (drab colored) hair.

A third area on the ear was rayed with 1 milliampere for 50 seconds. In this case a scab developed on both sides of the ear and these scabs later fell out leaving a hole in the ear. The periphery of this hole was at first devoid of hair but is now covered with a growth of snow white hair.

Fruit flies, upon being rayed for a small fraction of a second with 1 milliampere, instantly showed almost complete collapse and in a few hours were dead.

Bacteria have been rayed and an exposure of 1/10 second has been found sufficient to kill even the highly resistant spores of *b. subtilis*.

The phenomena of luminescence, phosphorescence, thermo-luminescence and change of color which take place as a result of electron bombardment from the tube are very striking and easily demonstrated, and many substances which could not be brought into a vacuum can be subjected to electron bombardment in this way.

Detailed reports of this work are now being prepared for publication.

W. D. COOLIDGE

RESEARCH LABORATORY, GENERAL ELECTRIC COMPANY, SCHENECTADY

THE TRANSFER OF TOBACCO AND TOMATO MOSAIC DISEASE BY THE PSEUDOCOCCUS CITRI[1]

AMONG several thousand tobacco and tomato seedlings in the greenhouse during a year and a half, in no instance was there observed spontaneous mosaic disease. Almost all these plants were repotted during this period, many were cut back and over two hundred were injured and injected with non-mosaic materials. These observations support the opinion of Allard and others that mosaic disease in these species does not arise spontaneously in healthy growths. They are not, however, in agreement with the belief of Woods and of Heintzel that the active agent is an enzyme present in all healthy tobacco plants, or of Hunger and of Sturgis, among others, that mosaic is a physiological disease which arises as a result of unfavorable conditions. In addition, three hundred plants, grown from seeds obtained from a tobacco growth that had had this affection for at least six months, remained healthy; thus we have demonstrated, as others have done previously (Allard, Gardner and Kendrick), that the disease is not seed-borne.

Recently—in June, 1925—an infestation occurred in the greenhouse with the *Pseudococcus citri* (family *Coccidae*; sub-family *Dactylopinae*). These "mealy" bugs were found not only on the normal, but also on the mosaic plants, all having been kept under the same roof. About one month after the insects appeared, twenty of fifty tobacco plants, uninoculated or uninjured, but infested with the bugs, showed typical mosaic disease. Twenty-four normal tomato plants, similarly infested, were removed from the greenhouse and replanted in a field. After a month all developed into typical mosaic growths. On the other hand, thirty-six tomato plants free from *Pseudococcus citri* remained normal after transfer to the field. Insecticides were applied and the greenhouse was freed from these insects. At least five hundred tobacco and tomato plants, forty of which were injured by thoroughly scratching two leaves of each, were subsequently grown there. All these remained healthy. Finally, the pseudococci were removed from mosaic tissues on which they had been feeding and three to five were gently transferred to each of nine tomato and five tobacco plants. Of the former, seven, and of the latter, three exhibited typical mosaic disease after incubation periods of from ten to twenty-one days.[2]

It appears, therefore, that the *Pseudococcus citri* is a vector of the mosaic virus.

To summarize, it may be stated that spontaneous mosaic does not occur in healthy or injured tobacco or tomato, or in these plants injected with non-mosaic materials; nor is the disease seed-borne. If the affection occurs under these conditions, care should be taken to eliminate as a factor the *Pseudococcus citri*, which is a carrier of the mosaic virus in greenhouses, in the same way as are the *Aphididae* in the field.

PETER K. OLITSKY

THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH

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[2] The incubation period, after injection of mosaic virus, is generally about ten days. Concentration of the virus, however, to one tenth of its original volume shortens this period to five days.