Gates, Elmer. "Electrographs." *The American Inventor* (Washington, D.C.: February 13, 1900), pp. 1-3.

ELECTROGRAPHS:

Photographs Made Without a Camera

Some of the Latest Discoveries in Electrography

Article and Illustrations by Prof. Elmer Gates.

When a sensitive plate is placed in a light-proof envelope and subjected to the action of a spark from the static machine or from an induction coil, the current travels through the film in preference to either the air or glass, and selects for itself a number of mutually divergent paths which are represented by these electrographs.

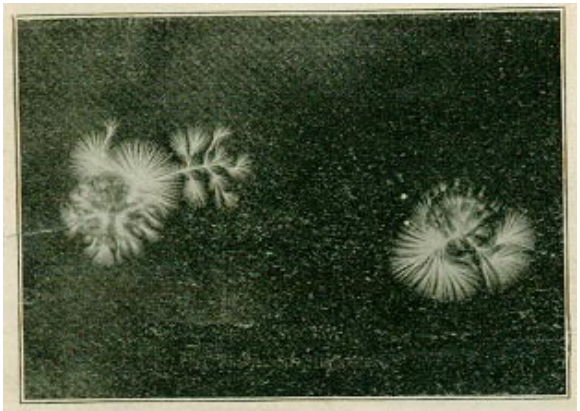

Fig. 1.

A one-inch spark from the small charging plates of the static machine produces a small electrograph as shown in Fig. 1. A 5-inch spark produces a larger electrograph, as shown in Fig. 2, and a 10-inch spark produces an electrograph still larger, as shown in Fig. 3. That is, the area of the electrograph increases with the potential.

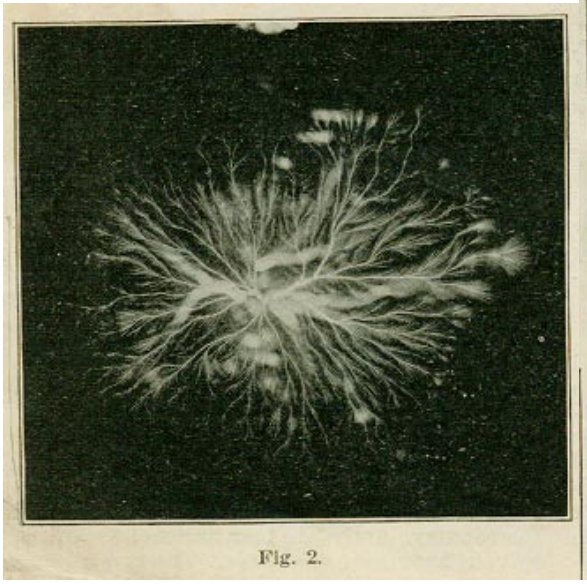

Fig. 2.

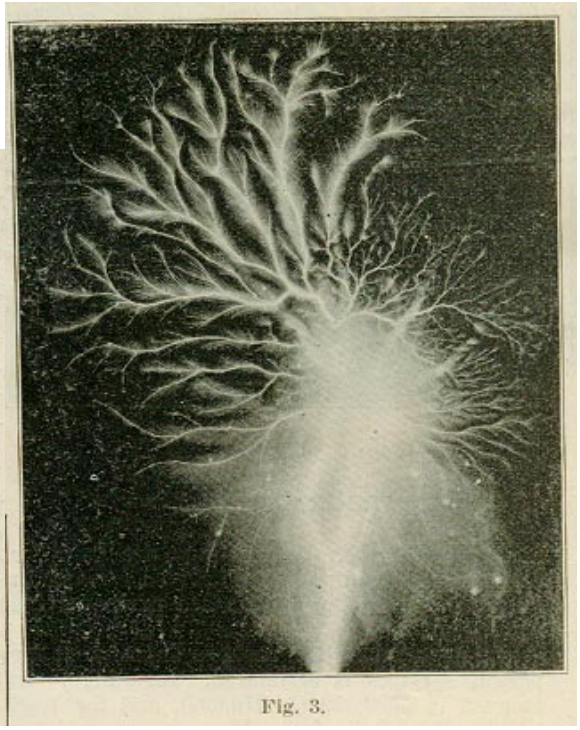

Fig. 3.

If we place next to the film a better non-conductor of the current than air, such as a shellacked plate, we get a marble effect, as shown in Fig. 4, indicating that the distribution of the current is modified by the relative conductive capacity of the substance in contact with the conductor.

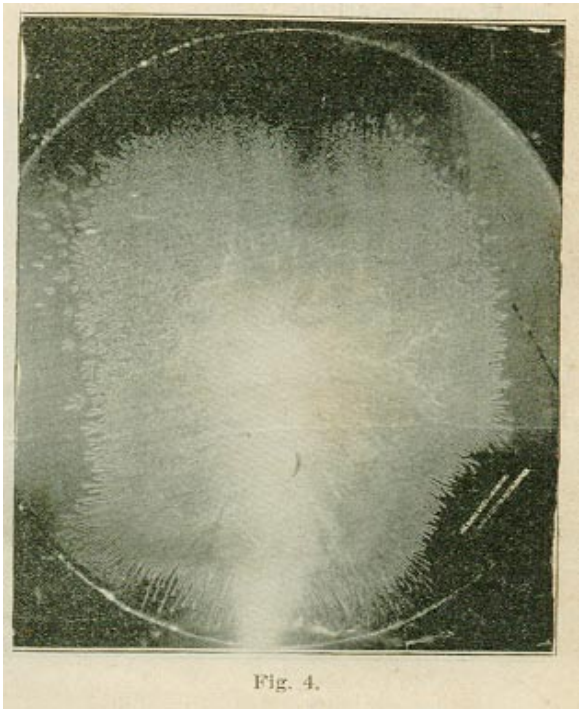

Fig. 4.

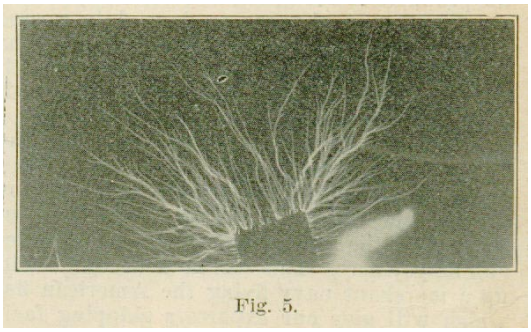

Fig. 5.

Fig. 5 was made by placing two sensitive plates face to face with tin foil projecting a short distance between them at the ends, and the sparks passed. Fig. 6 is a brush discharge. In Fig. 7 the branches emanating from the dark spot in the Figure were produced by placing an iron tack in the envelope. This tack caught part of the current.

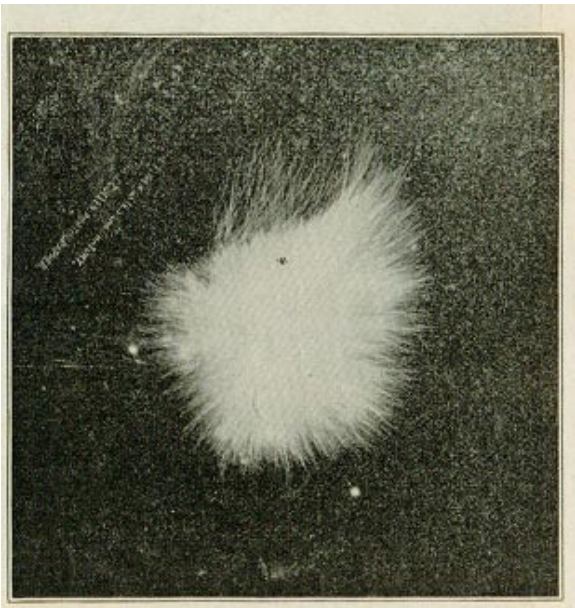

Fig. 6.

Fig. 7.

That an electrograph is not a photograph is conclusively proved by Fig. 8. The black mark on the face of the picture was produced by placing a narrow square paper frame on the sensitive plate; the paper was transparent, and was moistened with sulphuric acid, so as to make it a better conductor than the air, glass, paper, or the dry film. The current of electricity branching outwardly struck the paper film, which, being a better conductor, carried the current away from the film, and while traversing the film no electrographic precipitation of silver was produced. After crossing the conductor the branchings again appear. The paper strip, being a better conductor than the film, diffused the current, and more branchings are seen going from the film than to the film, which is as we would expect. This Figure conclusively proves that the electrographic effect is not a photographic one.

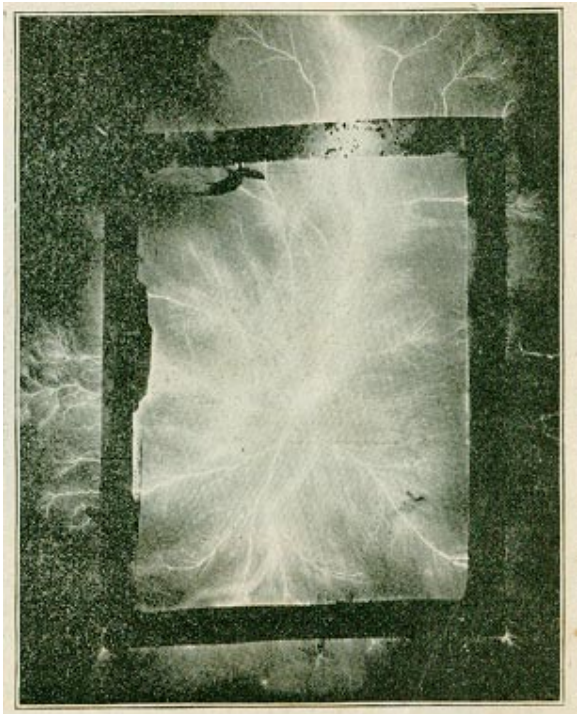

Fig. 8.

Fig. 9 was made with an induction coil, showing the general similarity between the static and the coil current. That the branching effect of this spark discharge does not take place wholly in the air outside of the film, as has been asserted by an electrical journal, and that the film has something to do with the effect, is proved by Fig. 10. The negative terminal was connected with the water in a basin, through a hole in the bottom of said vessel, and the other pole was brought down from above until it nearly touched the water. The spark entered the water and could been seen branching out in the water. Now, if this conductive medium, namely, the thin sheet of water, exercises no effect upon this branching appearance, then to alter the conductivity of the water would not vary the appearance of this branching effect. As a matter of fact, if while this branching was seen to be going on, sulphuric acid was introduced into the water, making it thereby a better conductor, a branching figure at once became much larger, proving that as the resistance of the conductor diminishes the branching grows larger in area.

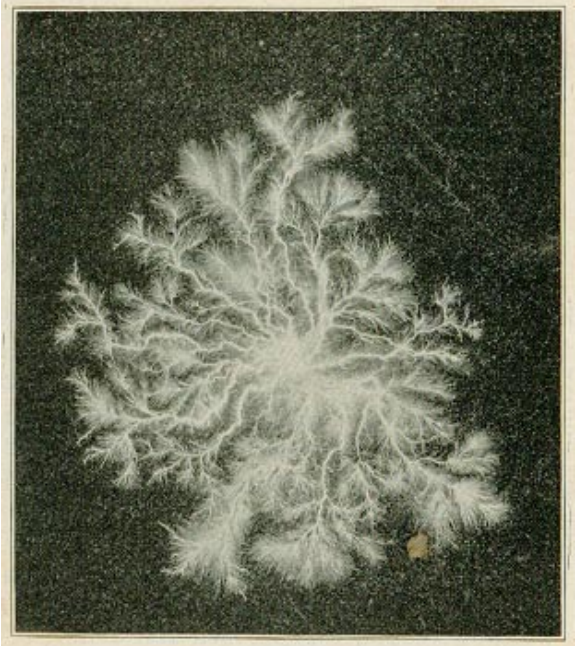

Fig. 9.

[Fig. 10 is missing.]

These figures are selected from over 200 experiments, all of which give abundant evidence that in these electrographs, I have been studying the laws of the distribution of the electric current.

By placing a sensitized film between two shellacked surfaces, which are the best known non-conductors, I obtained Fig. 11, which so far as I know, is the first time that the electric wave-length has ever been photographed. A lower potential shows the longer wave-length of Fig. 12. I have but commenced these studies, and expect more results soon.

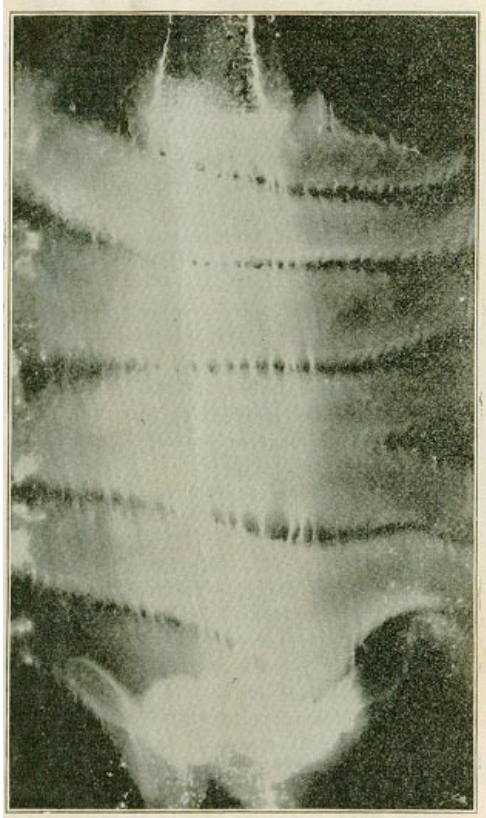

Fig. 11.

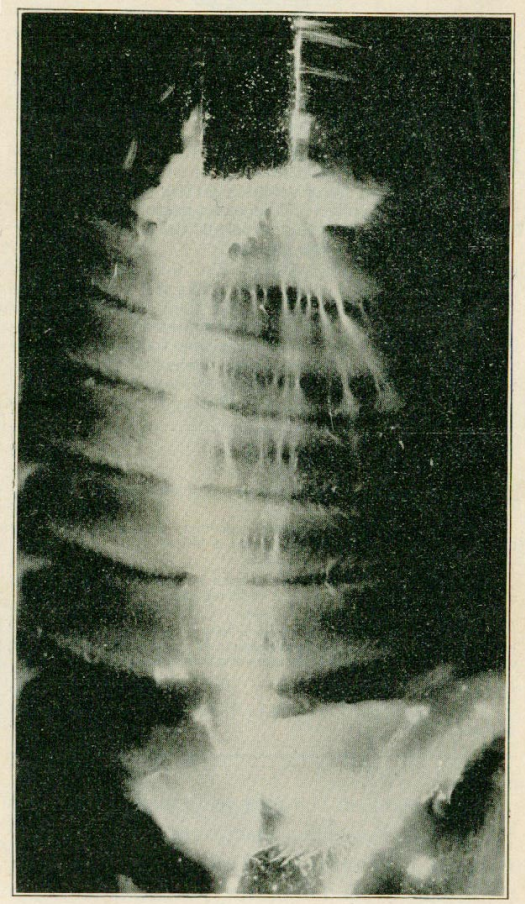

Fig. 12.

When a gelatin rod is filled with sensitive silver salt and a current passed through it the precipitation of silver is least in the centre of the rod and greatest in the surface, and it increased from the centre outwardly, according to a law which I have not yet actually determined. These experiments prove that the current is not uniformly diffused throughout the mass of the conductor; that the current does not travel wholly on the surface; that it does not travel wholly in the medium outside of the conductor, but unequally invades the mass of the conductor, according to the law above stated.

These experiments have led to important meteorological results which will form the subject of another article.