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PECULIAR ROTARY MOTIONS FOUND IN LIGHTNING AND OTHER ELECTRICAL CURRENTS.*

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Photographing lightning and making good pictures, representing the forked and irregular light as it shoots across the sky, or from cloud to earth, has become quite common, and is easily done in a dark night; having first focussed the lens for distant objects, one has only to point it in the direction he expects the flash to appear, expose the plate and wait for the lightning. If the night is dark, one can obtain several flashes of lightning on the same plate, as they often occur near together. The only difficulty is to have the flash come within the field of the lens.

Photographing the current itself so as to get detail in the track, showing how the electrical currents travel, is quite another thing; this we have been able to do, and present some results.

From these we see that the electrical current may travel without dividing; or it may divide and sub-divide, twist and meander in its passage from cloud to earth, its image on the negative presenting such a variety in form, that many names have been given descriptive of its general appearance, without any reference to the real motion of the current itself.

Three of these motions I have observed, viz.: The twisted, the curled, and the straightforward. Being unable to find anything descriptive of this in print, a short account may not be uninteresting.

The twisted motion resembles a loosely twisted rope; it twists both ways, usually from left to right, as the twining vine winds around its support. There are exceptions to this rule in the electrical, as well as the vegetable kingdom, for we find it twisting not only both ways (*i.e.*, from left to right and right to left), but it reverses its motion in the same course.

The curled motion resembles a twisted ribbon or shaving as it curls from the carpenter's plane, and in some respects is most remarkable.

The straight presents straight lines in its track, and is evidently travelling with great force.

Before describing the figures, or saying more about these currents, it may be well to quote the report of the committee of the Royal Meteorological Society, London, England, on lightning. The report published this year is as follows:—

"1. Stream lightning, or a plain, broad, rather smooth streak of light. Only two or three specimens of this form have been received. The committee are disposed to consider this a distinct type of a single stream-like character without distinct irregularities or branches, and not merely the result of bad focussing, because other objects, such as trees, are extremely sharp.

"2. Sinuous lightning, when the flash keeps in some one general direction, but the line is sinuous, bending from side to side in a very irregular manner. This is by far the commonest type. It is very noticeable that the thickness of the line varies during the course of discharge. Sometimes the thinnest part of the white streak is the highest, and the flash appears to get thicker as it approaches the earth; at other times a flash in the air begins thin, broadens out in the middle, and fines away again at the farther extremity. The committee can offer no explanation of this at present, but they would call attention to the fact that in some photographs of electric sparks, taken from an induction coil, those of high tension are thinner than those of low tension.

"3. Ramified lightning, in which a part of the flash appears to branch off from the main streak, like the fibres from the root of a tree. Of course, there is no evidence as to whether these fibres branch off from, or run into, the main flash.

"4. Meandering lightning. Sometimes the flash appears to meander about in the air without any definite course, and forms small, irregular loops. The thickness of the same flash may vary considerably in different parts of the course, as mentioned above, and a flash may go pretty straight in one portion of its path, but meander considerably in another.

"5. Beaded or chapleted lightning. Sometimes a series of bright beads appear in the general white streaks of lightning on the photographic plate. Occasionally these brighter spots appear to coincide with beads in a meandering type, but often the beads appear without any evident looping of the flash. But as a flash is moving in space, while two directions only can be shown on the plane of the paper, there is every reason to believe that the brighter spots on the positive picture may be points where the flash was zig-zagging, either directly toward or away from the observer, and thereby giving a somewhat longer exposure to those spots.

"6. Ribbon lightning. Nearly one-sixth of the photographs received by the society show flashes exhibiting more or less of a ribbon-like form. One edge of the ribbon is usually much whiter and firmer than the other. Occasionally in the same picture some flashes appear normal and others rib-

* Read before the New York Electric Club, November 15th, 1888.