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PHOTOGRAPHS OF BROOKS' COMET (OCT. 17, 1893).

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On the morning of the 17th of October W. R. Brooks, of Geneva, N. Y., discovered a small comet in the constellation Virgo, some ten degrees west of the star Epsilon. The comet was very low on the eastern horizon, and though not visible to the naked eye, it was quite bright as a telescopic object. It had a small nucleus and a short tail, but presented no features essentially different from the average telescopic comet.

The writer, having been engaged since the absence of the September moon in photographing the Milky Way, was prepared to photograph this new comet if possible.

On the morning following its announcement the position of the comet was carefully measured with the twelve-inch equatorial for the benefit of the early computers of its orbit. There was nothing, as seen in this telescope, to suggest any special results in photographing it, especially as the comet could only be seen for about half an hour and was badly obscured by the dense atmosphere near the horizon. However, on the morning of the 19th it was decided to try a plate, and an exposure of half an hour was given—from the time the comet could first be seen above the horizon until dawn cut it out.

The resulting photograph was highly satisfactory, as it showed features not seen in the twelve-inch. The comet presented a straight tail, nearly four degrees long, with two minor rays springing out from each side of the head for a short distance and making a considerable angle with the main tail.

The next morning was cloudy, but on the morning of the 21st another exposure of half an hour was given. Nothing new was shown on this picture, but the features were all more strongly marked, especially the ray from the northern side of the head, which now appeared as a short, broad tail. The main tail was straight and presented a rather graceful appearance.

On the morning of the 22d the twelve-inch showed that some disturbance had occurred, as the tail near the head was distorted. The customary exposure of half an hour was given with the Willard lens. To say the least the resulting picture was astonishing.
Photographs of Brooks’ Comet.

It presented the comet's tail as no comet's tail was ever seen before. The graceful symmetry was destroyed; the tail was shattered. It was bent, distorted and deflected, while the larger part of it was broken up into knots and masses of nebulosity, the whole appearance giving the idea of a torch flickering and streaming irregularly in the wind. The short northern tail was swept entirely away and the comet itself was much brighter.

The very appearance at once suggested an explanation which is probably the true one. If the comet's tail in its flight through space had suddenly encountered a resisting medium which had passed through the tail near the middle, we should have precisely the appearance presented by the comet. It is not necessary that the medium should be a solid body; if it possessed only the feeblest of ethereal lightness it would deflect, distort and shatter the tail. What makes this explanation all the more probable is that the disturbance was produced from the side of the tail that was advancing through space. But there is no known body or bodies in that part of the heavens. If, therefore, the explanation is the true one, this comet points out the existence of a hitherto unknown body or substance in the neighborhood of the sun—a swarm of meteors, a mass of exceedingly attenuated cosmical matter. It cannot be of much density, or it would have shown on the plate. Such matter is not an unreasonable supposition since it has long been suspected that some unknown influence of this kind exists near the Sun and disturbs the motion of the perihelion of Mercury.

I am speaking of this comet as if it were near the sun. This is an assumption that may be wholly erroneous. It is apparently near the sun, but in reality may be a vast distance beyond, although that is hardly probable. However, this does not affect the explanation of the phenomenon; it only locates the disturbing influence in a more improbable region.

With these thoughts paramount it was with considerable anxiety that the developments of the next morning were awaited. It was cloudy, but the clouds were breaking and flying in the face of almost a hurricane. The comet was finally got into the guiding telescope and another exposure began. The flying clouds occasionally permitted the image of the comet to fall on the plate. The little observatory rocked in the wind and the dome threatened every moment to fly away in the direction of San Francisco. A broken half hour's exposure was thus secured, and the resulting picture amply confirmed the disturbance of the previous morning. The tail was broken and seemed to hang in irregular
cloud masses, deflected out of line with the stem of the tail near the head. A portion of the end of the tail was completely detached and was drifting off as an independent comet. This fragment was some four or five degrees from the head and a degree from the nearest part of the tail. Unless this portion dissipates into space it will be an independent comet traveling in quite a different path from the original. Its exact position was right ascension, 12 hours, 20 minutes; north declination, 20 degrees; October 22d, 16 hours 40 minutes, Mount Hamilton mean time. The next morning was cloudy and the full moon now blots out the comet and its phenomena.

The orbit of this object is not yet known, so that it is not possible to say whether it will become a naked-eye comet or not. If it has not yet passed perihelion it will certainly become visible to the naked eye, as it is now but little below that and is getting into a better position for observing. If the comet gets brighter and again presents freaks of the kind described it will be evident that the suggested explanation is at fault and that the comet is possessed of phenomena totally unheard of before. If it does not repeat these changes then the explanation of an encounter with a resisting medium is the only one that will hold, and it will consequently prove of the highest importance to astronomy.

It will be seen, I think, that the theory is at least a good working one, and I trust the reader will see how the subtle photographic plate may reveal to us wonders of a very startling nature where the unaided eye looks upon a blank space only.

It is altogether probable that no other photographs have been made of this comet yet, as it is such an unpromising subject, and that this history of it is recorded only on the Lick observatory photographs.

Mount Hamilton, Oct. 25.

SHOOTING STARS.

How to Observe them and what they Teach us.

W. F. DENNING.

IV. The Observation of Meteor Showers—Differences Among Them.

The observation of a rich meteor shower, to be complete, must be undertaken by two observers acting in concert. While one of