

S. De* and A. K. Sahai

Indian Institute of Tropical Meteorology, Dr. Homi Bhabha Road,
Pashan, Pune – 411008, Maharashtra, INDIA

* Corresponding author e-mail: sde@tropmet.res.in

Introduction

The first documented meteorological research in India was made by the British in the 18th century. Who, then, was the first native Indian to publish a paper in meteorology? **A paper entitled, ‘A note on whirlwind at Pundooah’ by Chunder Sikur Chatterjee documented in the ‘Proceedings of Asiatic Society of Bengal’ on 1865 was probably the first paper published by a native Indian.** The paper was in the form of note reporting a tornado at Pundooah, Dist. Hugli, West Bengal to the Surveyor General office of India. Possibly, it was the first historical meteorological record that accurately evaluated horizontal scale of a tornado and its suction spot. **The paper was the first of its kind where dynamics was defined from observation.** Sometimes nature helps human beings by leaving clues in the form of damages to unravel the truth of science.

Objectives

The objective of the article is to evaluate an old paper in the light of the state of art knowledge with two perspective of reproduction – one is historical and the other is scientific.

1. **As of now, there is no database regarding the first documented paper in meteorology published by a native Indian which may indicate that meteorology, as a subject, is how much deep rooted in India.**
2. **As far as science is concerned, the paper described the accurate horizontal size of tornado first time in the meteorological record from the description of tornado devastation.**

Data & Methodology

A paper entitled, ‘A note on whirlwind at Pundooah’ by Chunder Sikur Chatterjee was documented in the Proceedings of Asiatic Society of Bengal (PASB) in 1865 (pages 124 and 125, accompanied by a sketch), hereafter referred to as Chatterjee (1865). The note reporting a tornado at Pundooah (now known as Pandua, District – Hugli, in West Bengal, Figure 1) was first submitted to the then Surveyor General office of India.

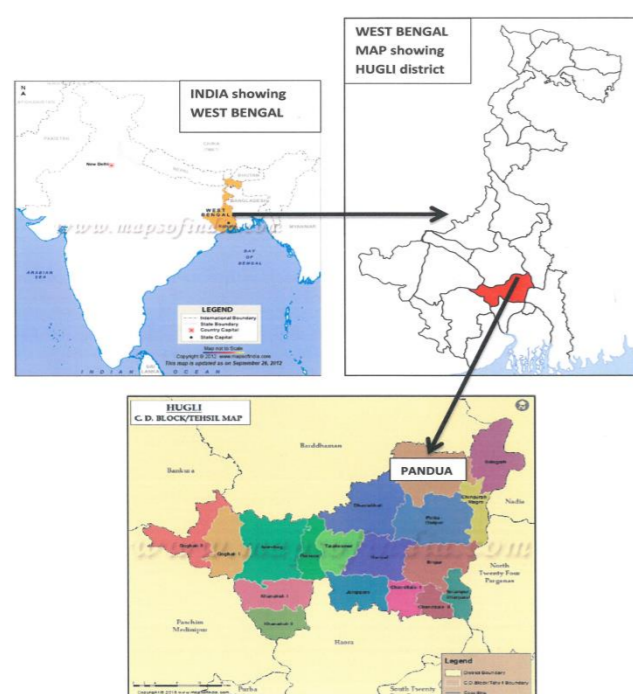


Figure 1 : Location of Pandua, District- Hugli, West Bengal

Results & Discussion

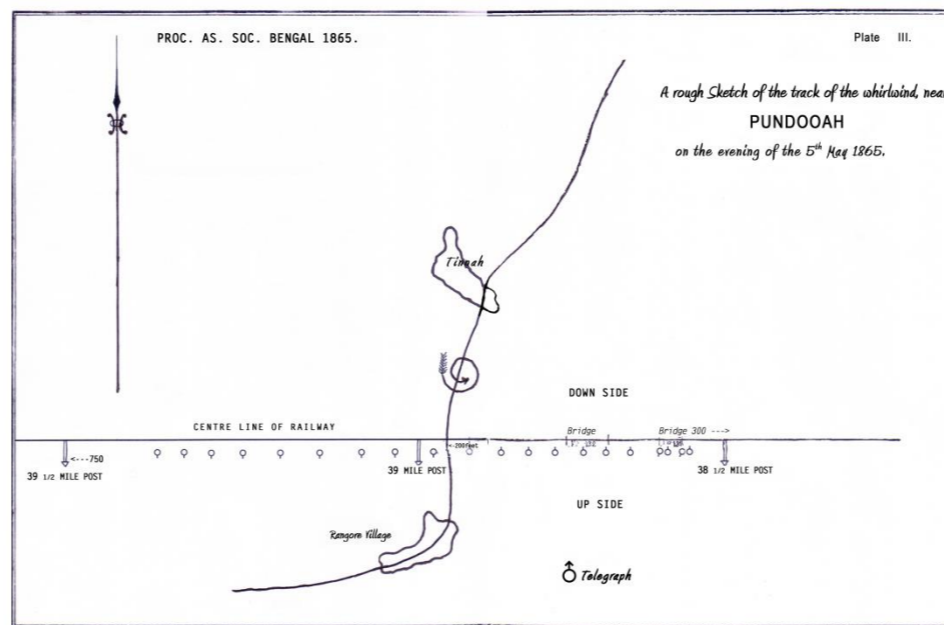


Figure 2 : The sketch of the tornado which crossed a railway track at Pandua. The figure was reconstructed following the original figure from Chatterjee (1865).

Apparently, the report was the usual tornado report like others would report in a similar way in Europe and America during the 18th, 19th and early 20th centuries. Except, the report was supported by a sketch which meticulously depicted the path of a tornado invoking the track and dynamics such as the direction of rotation and the horizontal scale of tornado vortex which were determined from observation of the trail of destruction (Figure 2). The spatial and temporal scales of the tornado actually matched with the papers published more than hundred years later by Orlansky (1975) and Fujita (1981). To the authors’ knowledge, no such tornado sketch, even in Europe and America, had been depicted except in some form of artistic or emblematic representation in the form of a fresco, tapestry or mosaic during the European Renaissance (1400-1600) and later period.

It was a rare tornado generated over land on the evening 6 o’clock of 5th May 1865 moving from southwest to northeast. During the passage of the storm, it crossed a railway track where there were mileposts half mile apart, telegraph posts each at 200ft intervals and three railway bridges of each 300ft long (Figure 2). These were the yardsticks to determine the scale of tornado. As Chatterjee was from the Surveyor’s General Office, he used these measuring units meticulously and very intelligently to accurately estimate the horizontal scale of whirlwind. Following the description of damage by Chatterjee (1865), eleven telegraph posts were thrown away in the northern direction at the right side of the storm centre whereas the nine posts were fallen in the southern side at the left of storm centre shown in Figure 2, indicating an anticlockwise circulation. The direction of the falling of the telegraph posts was shown by drawing a line on the circumference of the round mark representing the post. Most of the lines on round mark were pointed towards north at the right of the storm centre while the same were directed to south at the left side of tornado and that can be noticed after minute observation of Figure 2. It was understood from the delineation of the storm that it had two parts – one was the tornado vortex of the size of about 200ft and other was its outer periphery of diameter of approximately 1 mile in size revealed from the distance between the two posts and the total

number of fallen posts, respectively. The horizontal scale of tornado vortex described by Chatterjee is a perfectly matched with the suction vortex, or suction spot defined by Fujita (1981). The outer scale of one mile is well within the range shown by Orlansky (1975) and Fujita (1981). The temporal duration of the storm was 30 minutes, which was within the time span delineated by Orlansky (1975). Hence, in all probability, Chatterjee (1865) may be the first paper which evaluated the horizontal scale of tornado and its suction spot accurately.

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Summary/Conclusion

Meteorological research started in India under the British rule by the Surveyor General office of India during the 18th and 19th centuries. There was limited reporting of extreme meteorological events either by eyewitness or by noting down the phenomena in the logbook of ships. There is a legacy of meteorological research in India, albeit most of the investigators were the British people during the era of British colonialism. Hence, it is inevitable to raise a question – who was the first native Indian to publish a meteorological research in a documented journal? The answer lays in the retrospective study.

Considering all the possibilities and available old documents, the paper by Chatterjee (1865) was the first paper in meteorology by a native Indian published in the Indian journal PASB of 1865. **It was a rare opportunity for Chatterjee to observe a whirlwind passing through such a location that had conveniently placed measured markers and items that enabled to deliver clear definition of the sub-tornado vortex and tornado cyclone. It was the brilliance of Chatterjee and assistance from nature that made it possible to evaluate the scale of tornado including its sub-structure, verified by papers published more than a hundred years later.**

Thank you

Acknowledgements & References

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