

CONTRIBUTION TO WEATHER SCIENCE IN ANCIENT INDIA.
VI—PRINCIPLES OF FORECASTING RAINFALL IN ANCIENT INDIA
(SHORT AND MEDIUM RANGE)

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The Vedic and post-Vedic scholars were very keen observers of Nature and her varied manifestations. The observations of the sky conditions and some atmospheric parameters like wind, temperature, moisture content, etc. as well as behaviour of men, animals, plants, etc. on earth some hours or even one or more days prior to the occurrence of rain enabled the post-Vedic scholars to formulate thumb rules for short and medium range forecasting of rainfall at a place. These rules are surveyed in this paper.

INTRODUCTION

In an earlier paper¹, we presented the thumb rules for forecasting rainfall on the long range. The techniques used were mostly based on correlations between the sky conditions and weather elements on selected days, characterised by the position of the sun or the moon or the planets with respect to the stars, and the rainfall during the rainy season. As we have already shown these techniques were by no means *ad hoc* but based on some concepts which our ancients developed in their own way after some effort. The Vedic as well as the post-Vedic scholars were earnest seekers of truth and in their quest for understanding Nature they always proceeded from the known to the unknown. Their principal aim was always to detect the presence of a grand unity and harmony in the manifestations of Nature and this led them to look for similarities in *ādhidāivika*, *ādhibhautika*, and *ādhyāt-mika* spheres. It is most unfortunate that the non-recognition of this fact has led to different interpretations of Vedic texts, and certain concepts or physical phenomena described in a symbolic language by the Vedic seers have been interpreted as mere myths or fiction even by some reputed research scholars. We hope to substantiate our above mentioned statements in our next series of papers on interpretation of Vedic culture.

It is in the above light that we have to view the development of thumb rules for long range forecasting. It cannot, however, be denied that there were some misdirected talents and we shall touch on them in a subsequent paper. When they

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wanted to frame thumb rules for short and medium range, they were on surer grounds because they knew that the conditions on earth and in the atmosphere just prior to the occurrence of rainfall were far more important than the position of the moon or the sun with respect to the stars in the sky. They made, therefore, careful observations of the various elements prior to the occurrence of rainfall and came out with great confidence with hundreds of thumb rules which swelled in number as time passed and as the region of observation varied. After a comparative lull in the activity in this field during the period 1000-1500 A.D. in North India, some scholars took up the thread after 1600 A.D. and not only assembled all the past knowledge on the subject but also added the information that was current during their periods in their respective regions. One such important work is *Vanamālā* written by Jīvanātha, a Maithili scholar, around 1700 A.D. *Bhadrabāhu Samhitā*, written by a Jain sanyasin would, however, appear to belong to a period earlier than 1500 A.D. *Guru Samhitā* is a third work of this type. The date and author of this composition are not clear. Subsequently, works in regional languages incorporating all past and current knowledge also appeared on the scene. The works of Dak in Maithili, Ghaghar and Bhaddari in Hindi and Rajasthani, *Vṛeti Prabodha* in Gujarathi and Sanskrit, *Khana Vacan* in Bengali and *Siddhānta Darpana* in Oriya are too well known. It will be good if the passages of only scientific interest are all collected from various sources and presented in original in a single book which can be used by future research workers.

Every meteorologist is well aware that local short and medium range forecasting calls for considerable skill and observing power on the part of the forecaster. Every parameter is very carefully followed and by experience the forecaster develops some skill in correctly forecasting the occurrence of rainfall well in advance. Conditions which repel rainfall which would otherwise occur especially during the rainy season are also recognisable by the forecasters. It is to the credit of the post-Vedic scholars to have identified several conditions pertaining to earth's surface and the atmosphere which enabled them to frame rules for forecasting rainfall on short and medium range which may be broadly categorised as follows :

1. Rules based on observations of wind, clouds, temperature, lightning, thunder, moisture in the atmosphere, *etc.*
2. Rules based on behaviour of men, animals, birds, snakes, worms, insects, trees, plants, *etc.*
3. Rules based on sky conditions like halo round the sun and the moon, colour of the sky, visual impression of morning and evening sun, moon, and stars, *etc.*

It will be impossible in a short paper like this to present all the rules that have come to our notice as the number will run to several hundreds.²⁻⁵ We, therefore,

propose to present only a small number of them which bring out the observing power of our ancients. Most of these can be easily appreciated by a specialist in the field. These generally apply to Northwest India comprising Punjab, Haryana, North Rajasthan and West U.P. during the monsoon season. We shall present our general comments on these in the next paper.

THUMB RULES FOR SHORT AND MEDIUM RANGE FORECASTING OF RAINFALL

(a) *Rules based on observation of winds, clouds, lightning, etc.*

1. Winds are of three types. *Bhāvaka* which produce clouds, *Sthāpaka* which are associated with the seasons, and *Jñāpaka* which foretell rainfall.

2. Wind from the east and north bring rain quickly, wind from the south delays the rain. Wind from the northeast brings good rain and is auspicious. Wind from the northwest may bring rain but insects thrive when it blows. Wind from southeast prevents rain and occasionally brings wild fire also. Wind from southwest is hot. Sometimes wind from southwest, south, and southeast are accompanied by lightning, thunder, and development of tall clouds.

3. When the wind from north is stopped and the wind from east blows, it starts raining and it will rain for five days. When the wind from east is stopped and the wind from south blows, it will rain for three days. If the wind from west is stopped and it blows from southwest, the wind strength increases but rain decreases.

4. During the rainy season if the wind is indifferent as regards direction and is sometimes strong and sometimes weak and sometimes changes direction from east to west alternately, it should be inferred that there is going to be rain very soon.

5. If the winds from the east are so strong that mangoes fall from the trees, it should be understood that monsoon has set in.

6. If the wind blowing from the east suddenly changes direction and blows from the west and clouds have the appearance of collision, there will be heavy rain very soon.

7. If there are thunder clouds in the night and lightning with a reddish colour appears during the day and winds start blowing from the east, there will be rain in a short time.

8. If the wind originally blowing from the north suddenly starts blowing from the east, there will be heavy rain after five days.

9. If wind is from east or from north, there is lightning, and the sparrow hawk sounds its characteristic note with vigour, it should be understood that there will be rain in a day or two.

10. If there is thunder and lightning and if at that time there is wind from the south, the clouds will not bring rain and it indicates bad times ahead. This is the opinion of Gwal an expert on forecasting.

11. If clouds move from east to west and also from west to east, it indicates oncoming rain which may last for ten days.

12. According to Gwal when there is wind from the west and the waters in tanks and ponds are clear, the indication is that there will be no rain for ten days.

13. If wind blows from the southwest, southeast or south it will prevent even a raining cloud from raining.

14. If the winds are from the north and the clouds are seen in the north, there will be rain very soon.

15. As long as the clouds have the colour resembling that of the neck of a crow (grey) and there are no development signs and the sun has the intensity of moon there will be no rainfall till the situation changes (In other words, if the sky is covered with cirrostratus clouds and there are no signs of development of lower clouds there will be no rain).

16. If while it is raining the wind starts blowing from west and the rainbow is seen, the rains will stop.

17. If in the month of Bhādrapadā the wind is from the west there will be no rain. If by chance it rains it will rain for many days.

[This indicates break monsoon condition when there is no rain, and when there is rain it shows either the monsoon is getting revived or a system which normally recurves, changes direction, and starts moving westwards.]

18. If wind blows from southeast in the month of Śrāvaṇa and blows from southwest in the month of Bhādrapadā there will be no rain and the temperature will rise.

19. If in the beginning of rainy season the wind is from the south and there are clouds in that direction together with lightning, it is an auspicious indication of early onset of monsoon that year.

20. When wind is calm and grey, and crimson or yellow coloured dense clouds are seen moving slowly, they will bring rain very soon.

21. If clouds move from west to northwest or southwest there will be no rain.

22. If lightning is seen in the east, there will be rain, if it is seen in the southeast, the rain will be repelled. If it is seen in the south, it will give scanty rain. If it is seen in the southwest it brings disease. If it arises in the west it brings rain. If it is golden yellow in colour and is seen in the north it brings rain quickly.

23. Intense lightning seen in dense clouds brings rains. Lightning which spreads upto the earth's surface and is very bright will bring good rains even if thunder is not heard. .

24. Dense rainbearing clouds whether accompanied by lightning or not give rain.

25. If thunder is heard in the morning in Śrāvaṇa month and fishes jump above the water and play, there will be rain on the same day.

26. If there is lightning in the east and wind blows from east and northwest and the *Cātaka* bird sounds its characteristic note, the rains will pour in that place.

27. If the sky is covered with clouds in the night, thunder is heard in the morning and it is unbearably hot, the rains will soon occur and will last for a few days.

28. If clouds resembling the colour of the feathers of *Tittiri* bird appear in the morning or in the evening or in the night, there will be good rain soon.

29. When there is dew on grass in the early morning and there is fall of temperature because of cool breeze it is to be inferred that monsoon has come to a close.

(b) *Rules based on behaviour of men, animals, etc.*

30. If water in the pot becomes warm, creepers show a skyward orientation, birds bathe in water, jackals run hither and thither, the sky is overcast for seven days and glow worms approach water surface, there will be rain soon.

31. If ants take their eggs to a higher place and they appear as though their heads are cut there will be rain soon.

32. If serpents climb up trees or indulge in mating and if cows look at the moon there will be rain soon.

33. If cow dung is full of worms and it is very hot and *Cātaka* birds look upto the sun, there will be rain soon.

34. If the transparency in the hill region is poor, if leather becomes moist, butter-milk turns sour, iron gets rust covered, there will be rain soon.

35. If the taste of water changes, fishes try to jump to the banks, frogs produce their note loudly, there will be rain soon.

36. If cats scratch the ground with their nails and if dogs climb up the roof top and look at the sky there will be rain soon.

37. If the buds of small plants wither away, if buds of *Arka* plant appear, and if holes appear on the trunks of banyan trees there will be rain soon.

38. If during the rainy season certain unseasonal flowers appear there will be drought.

39. If the beard and moustaches of men become moist and soft, men suffer excessive sultriness and become lazy and sleepy and if men having rheumatic and bile complaint feel giddy there will be rain soon.

(c) *Rules based on sky conditions, etc.*

40. If at the time of dawn or dusk there is lightning in all directions there will soon be clouds and then rain.

41. If at the time of dawn the sky has the colour of lapis lazuli or the tendrils of lotus flower and if the wind is calm and the sun shines, there will be rain soon.

42. If during the rainy season sun is prickly and his light has the appearance of ghee there will be rain on the same day.

43. If at the time of rising and setting the sun or moon is colourless or has the colour of honey and if there is strong wind there will be heavy rain soon.

44. If some streaks of light appear to emanate from the sun's disc at the time of sunrise or sunset and if there are clouds, there will be heavy rain that day.

45. If the halo round the moon resembles the eye of the chameleon and if the sky has clouds resembling the feathers of *Tittiri* bird, there will be rain soon.

46. If in the night stars shine, in the next morning the sun is deep red when he rises, and rainbow is seen even in the absence of rain it may be inferred that there will be rains very soon.

47. If there is halo round the sun and it is of dark blue clouds and if lightning is seen in the day time in the northeast direction there will be heavy rain that day.

48. If at the time of sunrise and sunset red halo is seen round the sun and if rainbow also is seen there will be heavy rain that day.

49. If two small and two big halo zones around the sun and moon are seen there will be good rain in that region for many days.

50. If two halo zones of five colours are seen round the sun or moon, there will be heavy rain for three days.

51. If there is one halo zone around the moon and two around the sun, there will be rain there on the third day.

52. The streak of light emanating from the sun's disc and extending into the sky is called *Amogha*. If its end is sharply cut it is called *Danda*, and if there are three such streaks it is called *Trisūli*. If the *Amogha* is thick and extends right up to the other end of the sky and is white there will be rain.

53. If the *Amogha rekhā* extends into the northern direction and is quite long, there will be good rain in the rainy season and will be very cold during the winter season.

54. If the *Amogha rekhā* arising from the west in the evening appears cut, there will be rain that night or one day later.

55. If mock sun/moon is seen in the north, it indicates that there will be rain soon. If it is seen in the south, it indicates that there will be strong wind. If it is seen in both the directions, it indicates again that there will be very heavy rain soon.

56. If the stars twinkle too much continuously for seven days, there will be rain soon.

57. If at the time of sunrise rain drops fall, there will be rain that day.

58. If at the time of sunset rain drops fall, there will be rain within the next five days.

59. When the planet Mars passes through the asterisms Ādrā, Bharanī, Rohiṇī, Uttarāśāḍha, Uttaraphalgunī, Uttarabhādrapadā and Maghā, there will be no rain.

60. As long as the clouds have the shape of serpents, as long as the sun is feeble like moon, as long as the wind is from the southwest, there will be no rain.

The above rules are fairly typical of the large number of the same available in various texts. There is nothing very spectacular or peculiar about them. They are easily understandable and do not require any detailed comments. We shall in our next paper make a scientific assessment of the forecasting rules, both for long and short range, presented in this and in the previous paper.

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