

CONTRIBUTION TO WEATHER SCIENCE IN ANCIENT INDIA.

VII—A SCIENTIFIC ASSESSMENT OF THE RULES OF RAINFALL  
FORECASTING PRACTISED IN ANCIENT INDIA

A. S. RAMANATHAN\*

Kuppuswami Sastri Research Institute  
Madras 600 004

(Received 30 July 1985)

It is shown that the verification of the rainfall forecasting rules for the long range, practised by our ancients, is not possible in the usual way. Therefore, the evolution of the concepts on which the forecasting rules were based is attempted in this paper. A general appreciation of the efforts of the post-Vedic scholars to forecast rainfall is presented. At the same time, the mis-directed talents of some of them are also touched upon.

INTRODUCTION

In two previous papers<sup>1</sup>, some rules for long, medium, and short range forecasting of rainfall used by our ancients were presented. It was pointed out in Paper V, that a scientific analysis of the rules for the long range is a difficult task as many of these do not conform to scientific standards. For instance, it would be very difficult for a meteorologist to be convinced about the role of *soma* in rainfall. Much more difficult it is to understand how the moon plays the role of *soma* in rainfall. The question of reconciling with the role of planets and stars in rainfall does not arise at all. In these circumstances, how can we go about verifying the rules in the usual way? All that we can do is to understand in a scientific way how these ideas evolved. Though, here and there in the previous papers, we have indicated how these ideas evolved, we shall deal with them from another angle in this paper and highlight those concepts which have a direct bearing on the evolution of forecasting rules for the long range.

THE BASIC CONCEPTS AND THEIR EVOLUTION

It was firmly believed by our ancients that all the natural phenomena which occur on the earth, like fire, wind, precipitation (rain or snow), floods, drought, thunder, lightning, clouds, earthquake, advance and retreat of glaciers, avalanche activity, abnormal cold and hot conditions, *etc.* are controlled by divine forces.

---

\*Ex-Research Fellow, Indian National Science Academy, New Delhi-2.  
Present address : Plot 8, Pushpaka Nagar, Srirangam, Trichy 620006

They, therefore, propitiated, in their own way, the gods responsible for them with prayers and offerings. In course of time, they also collected a good amount of observations on them. These observations as well as the observations on the vast sky with its milky way and a rich variety of stars and planets in addition to the sun and the moon, provided a lot of food for their imagination which later culminated in their ideas, concepts, theories, *etc.* regarding the origin and structure of the universe. One of their important concepts, perhaps the basic one, was that there should be a grand unity in the structure and functioning of the universe at all levels (*viz.* *Ādhidaivik*, *Ādhibhautik*, and *Ādhyātmiik*). They discovered the *yajña* process as a fundamental principle governing all creations and explained it as *agni-soma* interaction. While in the heavens the most important outcome of the *yajña* process is the birth of the solar system, it is the rainfall (rather the thunderstorm) in the atmosphere and on the earth, and also the formation and solidification of the earth itself from a vast ocean of waters in the first instance and then the appearance of life on the same. Several passages in the *Rgveda* and the *Brāhmaṇas* deal with these basic *yajñas* either in a direct or an indirect way.

Among the created objects of the universe, the understanding of the nature and functions of the moon has been a major problem for our ancients. The phases of the moon, the north-south shifts of her path with respect to the apparent path of the sun in the sky during each month, the pleasant and soothing effect of moonlit nights on living beings which, in turn, influenced their procreative activity, the condensation of water vapour particles during many clear moonlit nights, which was interpreted by them as nectar flowing out of moon and reaching the earth, *etc.* made them attach great importance to her in the scheme of God's creations. In order to explain her nature, they used the principle of grand unity in the universe and sought to explain her role in terms of known functions of a corresponding object of creation on the earth. The snow accumulations in the Himalayan and adjacent ranges and its periodic depletion provided a clue to the formulation of their ideas. The *agni-soma* interaction, according to them, takes place on the earth and its atmosphere and this results in the occurrence of the various *ṛtus*, which are mainly responsible for life on earth. The north-south movement of the sun causes the periodical accumulation and depletion of snow in the hill ranges in the northern latitudes and this, as we have already seen, was interpreted by them as the confrontation between *agni* and *soma*. During the hot season *agni* overpowers *soma* and during the winter *soma* overpowers *agni*.

Coming to the moon, her periodic waxing and waning was compared with the periodic depletion and accumulation of the snow on the earth in response to the north-south movement of the sun, though the period here is different. Again, the moon's movement towards the sun during her waning periods and her moving away during her waxing period were interpreted by them as moon being eaten as food

by the *Devas*<sup>2</sup> and her getting replenished from above. It is in this context that the moon gets the position of *soma* and is sometimes referred to as *soma piṇḍa*. In other words, working on the analogy of the condensation of water vapour particles on the earth during clear nights, as well as the occurrence of the moon's phases, our ancients imagined that the *soma* of the *parameṣṭhi* region in its descent below the solar region finds a reservoir in the moon and through this reservoir *soma* is fed to the Gods of the *antarikṣa* region as well as the plant kingdom on the earth. This depletion of the *soma* is made good from above with the involvement of the sun.<sup>3</sup> Incidentally, it may be mentioned that the course and shape of the river Ganga in north India was identified by them with the shape and course of the milky way and they imagined that the Ganga water is of heavenly origin and has a greater content of *soma* (which is, according to them, a finer form of water) compared to other rivers. While we shall not go into details, the point we want to stress here is that our ancients believed in some sort of unity in the structure and functioning of the universe and in their earnestness, they stretched their imagination so much that sometimes it culminated in very unnatural and highly artificial concepts and theories.

When once the moon was considered as a concentrated form of *soma* (*soma piṇḍa*) her role in rainfall automatically followed. Corresponding to the role of western disturbances in the conception process of rainfall which again follows because rainfall is a *yajña* process involving *agni-soma* interaction, the moon's role will be to favour conception during certain periods of the lunar cycle. To be in harmony with the idea that conception takes place during the winter period when the snow accumulation increases, the moon was supposed to play a favourable role when she is also in the waxing stage. During the summer months, when snow accumulation gets depleted, the moon's waning stage happens to coincide with the delivery of rainfall or abortion if the rain foetus is not fully developed. Again the moon's position with respect to the stars determines whether the latter add to her *soma* content or deplete it, and accordingly, events in the rainfall cycle are supported or opposed. In fact, their observations that rainfall takes place during certain months of the year only and during this period the sun passes through the same stars every year (neglecting precession effects, of course) led them to involve the stars without difficulty in the rainfall process. The following rule<sup>4</sup> clearly illustrates our point :

*Pauṣe Mūlad Bharanyantam candracāreṇa garbhātī*  
*Ādrādibhe Viśākhānte sūryacāreṇa varṣatī.*

In the month of Pauṣa, conception takes place when the moon moves through Mūla to Bharanī and rainfall takes place when the sun moves through Ādrā to Viśākhā.\*

---

\*Note: Invariably the moon passes through the asterism Mūla on the new moon day in the month of Pauṣa. The sun passes through Ādrā in the month of Āṣāḍha.

Thus a whole series of long range forecasting rules can be developed based on the relative position of the moon with respect to the sun and stars. The role of planets in rainfall is more unnaturally forced after categorising them under the following heads : (i) *saumya*, (ii) *āgneya*, and (iii) *vāyavya* planets, and corresponding rules developed. It will be a futile exercise to dilate on them.

A few words about the *soma* of the upper heavens may not be out of place. The *soma* of the *paramēṣṭhi* region was considered to be a component of the primordial fluid, which came into existence first and from which creation started.<sup>5</sup> Actually, the primordial fluid is said to have three states, *viz.*, *āpa*, *vāyu* and *soma*, and has *agni* embedded in it. The *āpa* was actually named *ambhaḥ* and when it reaches the earth it was called *marāḥ*.<sup>6</sup> The *vāyu* was called *pavamāna vāyu*. It is the combination of the *vāyu* and *āpa* that goes to make the water (*marāḥ*) that we see on the earth. *Soma* was also imagined to be a finer form of water though its functions, as we have seen earlier, are different. It is for this reason that the moon is also called *apām puṣpam*. The descent of *āpa* and *soma* to the earth was considered necessary to account for the appearance of water for the first time on earth and origin of life on earth, respectively. It is interesting to note that some recent researches have shown that the meteorites contain some substances which may account for life on earth.

The above is in short the logic behind the evolution of forecasting rules for the long range based on the moon's influence. The next question is when the rules are developed on the basis of past observations and also on the assumption of the moon's influence, how far will they be successful in actual practice. No elaborate reasoning is required to infer that many of these forecasts may not come true. In fact, our ancients were clever enough to introduce many saving clauses to explain away the failures. Recent attempts to find out the influence of the moon on rainfall has not proved anything definite. In any case, it is obvious that the forecasting rules for long range based on the moon's influence as formulated by our ancients will not stand any rigorous test for their validity.

However, it should be said in fairness to our ancients that their knowledge of the characteristics of the rainfall of their region was very sound and they had very carefully observed the weather and climatic pattern throughout the year. With this detailed knowledge they could correlate the rains of the monsoon with the events of winter season and in quite a few cases they should have been successful. Too much rain during the month of Caitra was considered to spoil a good monsoon. High temperature during the pre-monsoon period was imagined to be a good sign for the monsoon rains. These were extremely useful thumb rules for forecasting monsoon rainfall and were practised by modern meteorologists during the early stages of development of Indian meteorology. The climatic pattern of the weather during the growth period, Phālguna-Jyaiṣṭha, was well known to them and any depar-

ture from it was considered to affect the normal performance of the monsoon. Considering the fact that long range forecasting of monsoon performance is still far away from realisation, it can be safely concluded that our ancients had done quite well in the formulation of the rules for the same.

However, there was also the dark side of the picture. Some of the experts were overenthusiastic and based their forecasts on the observations of one day. For example, they divided a chosen day like *Akṣaya Tṛtīyā* day into four parts. The weather in each of these parts was supposed to forecast the performance of the monsoon in each month of the coming four-month period.

The following examples serve as illustrations :

- i. Divide the *Māgha Pūrṇimā* day into four equal parts and assign each month of the rainy season to each one of the parts. If there are clouds or rain in one of these parts, there will be no rain in the corresponding month of the rainy season.
- ii. Consider the ten days commencing from the first day of the bright half of Caitra. Divide this period into four parts of two and half days each and assign each part to each of the four months of the rainy season. If there is rain in any of these two and a half day period, it is to be inferred that there will be no rain in the corresponding month of the rainy season.
- iii. Consider the last eight hours of *Akṣaya Tṛtīyā* day. Divide it into parts of two hours each and assign each of them to each of the four months of the rainy season. If there is wind from the east in the first, wind from the north in the second, wind from the west in the third, and wind from the south in the last two hour periods, there will be good rain in Āṣāḍha, Śrāvaṇa, Bhādrapada and Āśvina months of the subsequent season.

The above examples are quite suggestive of the overenthusiasm on the part of some of the post-Vedic scholars, who in course of time completely lost rationalism and logic in the formulation of thumb rules. These were the people who introduced pure astrology in weather science and put an end to all further development.

To summarise, we would like to offer the following views on the long range forecasting rules of our ancients :

- (i) Considering the development of the subject all over the world at that time, our ancients had done remarkably well in developing the techniques of forecasting rainfall.
- (ii) Their capacity to observe details had been remarkable.

- (iii) In the beginning, the subject started in a logical manner, but later it fell into the hands of a few less competent people, who blocked further development by giving wrong orientation to the subject.

#### SHORT AND MEDIUM RANGE FORECASTING

In the case of short and medium range forecasting our ancients were nearer to modern forecasting techniques. Even a casual survey of the rules presented in an earlier paper<sup>7</sup> would reveal to any specialist the practical approach of our ancients to the problem. They knew well the parameters that mattered for them, and used them after acquiring sufficient knowledge on them by case studies. Every observation including behaviour of men, animals and trees mattered for them and they made full use of them in their formulation of the rules. It will not be an exaggeration if one concludes from a perusal of their rules that they were as conversant with local weather as any modern meteorologist, who has recourse to a number of sophisticated observational aids.

In this connection a few other points are, however, worth noting. The wind from the southeast was considered by them as unfavourable for rain. On the other hand, it was considered to cause fire sometimes. Fittingly enough, they called this direction as *āgneya*. It is very likely that there were some forests in the southeast direction of their settlement and the region was often prone to forest fires especially during the pre-monsoon season. Similarly, wind from the southwest was considered to bring distress always and was also said to be hot. The desert region should have been in the southwest direction and had always been an unpopular direction in the eyes of both Vedic and post-Vedic scholars. It is for this reason it was named *nirṛti*, which is the name of an evil Goddess presiding over that direction, who always brings destruction (hot winds, dust storms, etc.) The wind from the northwest normally does not bring rain and is somewhat quite strong and that is why this direction was named *vāyavya*. It is obvious, therefore, that the nomenclature of the directions are purely local in character though unfortunately the fact was not recognised by those who moved to places outside northwest India and continued to use the same names and attributed the same qualities to them.

The association of impending weather with the halo round the sun and the moon and the diffraction rings round the discs of the sun and the moon as well as streaks of light emanating from the sun's visible disc has not been studied at all by modern meteorologists. In fact, we do not attach any importance to them at all for short range forecasting.

In conclusion, it may be said that the attempts of our ancients towards development of thumb rules for short and medium range forecasting have been more or less in the right direction and compare fairly well with the thumb rules used by the modern forecaster in the early stages of development of the subject.

## REFERENCES

- <sup>1</sup>Ramanathan, A. S., Contribution to Weather Science in Ancient India. V—Principles of Forecasting Rainfall in Ancient India (Long Range), *Indian Journal of History of Science*, **22**, 175-190, 1987; Contribution to Weather Science in Ancient India. VI—Principles of Forecasting Rainfall in Ancient India (Short and Medium Range Forecasting), *Indian Journal of History of Science*, **22**, 191-197, 1987.
- <sup>2</sup>*Eṣa Vai somo rājā devānamannam yaccandramāḥ*, *Śatapatha Brāhmaṇa*, 1.6.4.4.
- <sup>3</sup>*Līṅga Purāṇa*, Ch. 56, śl. 5-7.
- <sup>4</sup>Ojha, Madhu Sudan, *Kādambinī*, Pradyumna Sarma Ojha, Jaipur, Vikram Samvat 1999, p. 25.
- <sup>5</sup>*Śatapatha Brāhmaṇa*, 11.1.6. ; *Ṛgveda*, 9.16.5.
- <sup>6</sup>Ref. No. 4, p. 7.
- <sup>7</sup>see Ref. No. 1.