

CONTRIBUTION TO 'WEATHER SCIENCE IN ANCIENT INDIA'

III—A CONCEPTUAL MODEL OF THE RAINFALL PROCESS (VEDIC PERIOD)

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The Vedic *R̥ṣis* did formulate a conceptual model of the rainfall process which was subsequently further developed and used by post-Vedic *R̥ṣis* for forecasting rainfall both on long range as well as on short range. Details of the same are presented.

INTRODUCTION

At a very early stage of his civilised life, man recognised the importance of rainfall for his living. It is, therefore, natural that the Aryans, who settled in Panjab and adjoining area were very much concerned with the rainfall pattern of that region for domestic consumption as well as for planning their agricultural operations. The first monsoon showers brought in by the humid easterlies with the accompaniment of winds, thunder, and lightning were eagerly awaited by them as is evidenced by the picturesque descriptions in the Vedas.^{1,2} In course of time they began to develop their own concepts of the phenomenon in the light of their observations and these are scattered here and there in various statements not only in the Vedas, but in the *Brāhmaṇas* and *Upaniṣads* as well. It is our aim to string these ideas together and present a cogent picture of the concepts of the Vedic *R̥ṣis* on the rainfall phenomenon.

CONCEPTS OF RAINFALL PROCESS

That the heat of the sun lifts the water on earth to the atmosphere, which after sometime comes down as rain was recognised by the *R̥ṣis* at a very early stage. They conceived the rainfall process as a *yajña*, taking place in the middle region (*antarikṣa*) and the rain drops were supposed to impregnate the earth as a result of which life comes upon earth. The rain God *Parjanya* (rain bearing cloud), who is closely linked with *Indra* in his main function of producing rain is described as a bull, who roars and impregnates the plants by depositing his *virya* (semen)^{3,4}

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The 164th *sūkta* of 1st *maṇḍala* of *Ṛgveda* contains some concepts on rainfall process. The *kāriṛiṣṭi* described in the *Taittirīya Saṃhitā* of *Yajurveda* has many interesting statements containing the concepts of Vedic *Ṛṣis* on the rainfall process. We shall first take up three *ṛks* of the *sūkta* mentioned above which are relevant for our purpose. We have presented for convenience an english translation below each *ṛk*.

1. '*Saptārdha garbhāḥ bhuvanasya reto Viṣṇostisṭhanti pradisa vidharamani ;
Te dhītibhirmanasa te vipaścitah paribhuvah pari bhavanti viśvatah*'.⁵

The rays of the sun hold for six months* the waters capable of fertilising the earth pervading the sky and wait for performing their duty (drenching the earth with showers).

2. '*Kṛṣṇam niyānam harayassuparnāḥ apoh vasāna divamutpatanti ;
Ta āvavṛtrantsadanādṛtasyādīd-ghṛtena pṛthivī vyudyate*'.⁶

The rays of the sun following the dark (southern) path take waters and move upwards (northwards). They turn back from the source of *ṛta* and drench the earth with waters.

3. '*Samānametadudakamuccaityava cāhabhīḥ ;
Bhūmim parjanya jinvanti divam jinvantyaṅnayah*'?

The waters go upward and come downward in the same measure during periods (of the respective seasons). *Agni* takes the waters to heavens and *parjanya* brings them down as rain.

One of the important aspects of rainfall which struck the Vedic seers was its occurrence during a restricted period of about two months in the same part of the year every time. To explain this seasonal occurrence, they imagined that the sun's rays absorb the water from below and a certain period is required for the rays to get fully charged with water, at the end of which they deliver the rains to the earth. This period is mentioned as about half a year or six months. The reason for the choice of six months is not immediately obvious. However, the second *ṛk* gives some clue. The second *ṛk* goes into the source of this water. The Aryans living in extreme northwest India and quite familiar with the land mass located in the north were also aware that on the southern side there was a vast oceanic region providing ample scope for absorption of water by sun's rays whenever he moves to the south. They always imagined a replica on earth of what they conceived in space. The northern side corresponds to heaven (*bhāuma svarga*) and the southern side to the earth. They imagined *agni* in the *ṛta* form to be located in the south

*One scholar has interpreted *Saptārdha* as six months and half of seventh month.

and always moving towards north. On the analogy of snow present in the northern latitude, they imagined *soma* to be present in the north, and always moving to the south. This is exactly what is taking place in the vertical direction, that is, *soma* coming down and *agni* moving up. There is a constant confrontation between the two and the seasons are produced as a result of either of the two asserting over the other. The dark path that is referred to here is the southward position of the sun. The *ṛtasadana* is the abode of *ṛta*, that is Himalayas, near which the sun attains his northward position. That is the position whence the sun turns back his rays and retraces his path. With this background, if we examine the second *ṛk*, it probably suggests that warm humid air moving northwards gets deflected near the foot of the Himalayas and pours down as rain and drenches the earth.

The third *ṛk* is fairly easy to understand since it only stresses that the heat produced on the earth due to the sun's radiation is responsible for lifting the water from the earth and storing it in the form of water vapour in the atmosphere (*diva* should really mean atmosphere and not heaven). The same comes down later as rain and drenches the earth.

The above model of the rainfall process was further improved during the *Yajurveda* period. The description of the *kāṛīṛiṣṭi* in the *Taittirīya Saṃhitā* of the *Yajurveda*⁸ contains some interesting information. We quote below the relevant portions as translated by A.B. Keith, with our modifications :

1. Thou art connected with the *Maruts*, thou art the force of *Maruts* ; 'cleave the stream of the waters.'
2. Hail (*svaha*) *Jinvarāvṛt*, rain produced by east wind ;
 Hail *Ugrarāvṛt*, rain raining with winds ;
 Hail *Bhaumarāvṛt*, rain, thundering raining ;
 Hail *Tveṣārāvṛt*, rain, thundering without lightning, lightning, raining ;
 Hail *Purtirāvṛt*, rain, raining overnight ;
 Hail *Śrutarāvṛt*, rain, famed as raining much ;
 Hail *Virādāvṛt*, rain, raining while the sun shines ;
 Hail *Bhūparāvṛt*, rain, thundering, lightning, raining ;
3. 'O *Vasavya* Gods, *Agni*, *Soma*, *Sūrya* ; O *Śarmanya* Gods, *Mitra*, *Varuna*, *Aryaman* ; O *Sapiti* Gods, *Apām napāt*, *Akūheman* ;
 Give the water, cleave the holder of the waters ; from the sky, from *parjanya*, from the atmosphere, from the earth, then do ye help us with rain.'

4. 'Thou art connected with the *Maruts*, thou art the force of the *Maruts*' (with these words) he puts on a black garment with a black fringe ; that is the hue of rain ; verily becoming of like hue he causes *parjanya* to rain. 'Stay, O *Maruts* the speeding falcon' (with these words) he pushes back the west wind ; verily he produces the east wind to win the rains. He makes offering to the names of the wind ; the wind rules the rain ; verily he has recourse to the wind with its own share ; verily it makes *parjanya* rain for him. Eight offerings he makes, the quarters are four, the intermediate quarters are four ; verily from the quarters he makes the rain to move. He unites (them) on a black antelope skin ; verily he makes the offering ; he unites within the *vedi* for accomplishment. When the *yatis* were being eaten, their heads fell away ; they became *kharjūras* ; their sap rose upwards, they became *karīras* ; the *karīras* are connected with *soma* ; the offering connected with *soma* makes rain to move from the sky ; in that there are *karīras* (in the sacrifice) ; by means of an offering which is connected with *soma* he wins the rain from the sky. With honey, he unites (them) ; honey is the sap of the waters and the plants ; verily it rains from the waters and the plants ; verily also he brings down rain from the waters and the plants.'
5. 'Agni causes the rain to arise, the *Maruts* lead it out when produced ; when yonder the sun turns back with his rays, then he rains ; becoming a hider of his abode as it were, he rains ; these deities are the lords of rain ; then he has recourse to with their own share ; they make *parjanya* rain for him, even if he is not minded to rain yet he rains.'
6. 'Flood the earth' (with these words) he offers *varṣahva* plants. This of plants is that which wins rain and thereby he causes rain to fall.

It is seen from the above passages that the Aryans had categorised the rainfall of their region into eight types, *Jinvarāvṛti*, etc. The recognition of the appearance of the moist easterlies bringing the monsoon and the simultaneous disappearance of the westerlies is quite evident. The absorption of moisture from the oceans and the movement of moist winds northwards to give rain in their region at the time of the sun retracing his path after reaching the extreme northern position were also recognized by them. However, the most interesting thing in these passages is the elaboration of the role of *soma* in rainfall. The *soma* that comes down aids the fall of rain from the clouds. During the *kārīriṣṭi*, *karīra* fruits are offered in the fire which probably produce dense smoke which goes up and mixes with the clouds above. It was the belief of the Aryans that this smoke having the property of *soma* wins the rain from the clouds.⁹ In other words, some sort of seeding of the clouds from ground is capable of producing rains because in nature, according to

them, the *soma* particles from above feed the clouds and extract the rain (*cyāvayati*). The *soma* feed from above produces lightning in the atmosphere which is referred to as *Indra* drinking *soma*.

The *soma* feed causing rains to fall is also told in *Chāndogyopaniṣad*¹⁰ in the following passage :

(We give only an english translation of the passage)

‘O *Gautama*, *Parjanya* is the *Agni*. To him wind is the fuel, the clouds constitute the smoke ; the lightning is his radiance ; the thunder is his cinder ; the roaring and thundering sounds are the sparks. In this *Agni* the *devas* offer the king *soma* ; from that offering the rains take place.’

THE MODEL

We shall now present the model of the rainfall process as was known to the Vedic seers.

1. The rainfall on the earth is a fertilisation process as a result of which vegetation and life comes up on the earth.
2. The heat of the sun lifts the waters from the ocean and the winds carry them northwards.
3. The moist winds reach the foot of the Himalayas when the sun reaches the extreme northward position.
4. The west winds are pushed back by the winds which after getting deflected at the foot of the hills arrive as moist easterlies (*purovāta*) bringing monsoon rains to northwest India. ‘The wind rules the rain.’
5. A period of about six months elapses between the absorption of water from the oceans in the south and delivery of rainfall in northwest India.
6. Eight types of monsoon rainfall can be identified based on winds, rainfall, thunder, and lightning. These are named *Jinvarāvṛt*, etc.
7. There is a feed of *soma* on the atmosphere in nature which helps in making the clouds rain.
8. When certain fuel material like *karīra* fruits are offered in the fire, they have the properties of *soma* and the smoke going up aids in squeezing the rains from the clouds.

The above conceptual model was the starting point for the post-Vedic *Rṣis* who improved it further and used the same for forecasting rainfall. We shall deal with this improved model in a subsequent paper.

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REFERENCES

¹*Rgveda*, 5.83.

²*Atharvaveda*, 4.15.

³*Rgveda*, 5.83.1.

⁴*Atharvaveda*, 4.15.11.

⁵*Rgveda*, 1.164.36.

⁶*Rgveda*, 1.164.47.

⁷*Rgveda*, 1.164.51.

⁸Keith, A. B., *The Veda of the Black Yajus School Entitled Taittiriya Samhita*, Part I, Motilal Banarsidass, Delhi, 1967, pp. 180-183.

⁹'*Agnervai dhūmo jayate; dhumādabhram; abhrādvṛṣṭīh*', *Satapatha Brāhmaṇa*, 5.3.5.17.

¹⁰*Chāndogyopaniṣad*, 5.5.