



Disaster Prediction and Abnormal Animal Behaviour: A Study of the *Brhatsamhitā*

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ABSTRACT

Brhatsamhitā by Varāhamihira is a precious gem in the ore of oriental wisdom. The astrological and astronomical ideas of early India are reflected minutely in this ancient text. This text contributes some ideas relating disaster and disaster predictions using natural phenomena. Not only that the text prescribes animal behaviour as a precursor of disaster. Today the concept of predicting disaster by understanding the geophysical stimuli with the help of modern technological support becomes famous among the scientists. But the calamities cannot be forecasted accurately with common precursors. Since a few decades it has been noted that scientists have been keeping their reliance on abnormal animal behaviour for predicting disaster. Here the importance of *Brhatsamhitā* lies as the text contributes chapters like *Hasticesṭita*, *Mṛgacesṭita*, *Gaveṇita*, *Śākunottara* which refer the disaster prediction system using the abnormal behaviour of animals. This paper underscores the importance of abnormal animal behaviour among various astronomical and natural precursors embedded in the text to predict disaster in comparison to the modern concept of disaster prediction.

Introduction

Reappraising past for the better understanding of present has been becoming one of the popular academic work-outs since a few decades. Today, think-tanks are interpreting traditional as well as indigenous ideas



into modern idioms with a goal to eliminate sincere problems. (Chamola, 2007). Indian civilization has always prioritized the great value of knowledge (*jnana*). All types of rational and speculative quests have always uninterruptedly carried the baton of knowledge tradition in Indian sub-continent (Kapoor & Sibhng, 2005). Indian knowledge tradition is a tapestry of age-old wisdoms neatly woven by vibrant threads of Vedas, epics, Purānas, creative literature, political texts, epigraphic texts, philosophical heritage and scientific wisdoms. These early texts help reconstruct/ deconstruct the past and bridge early thoughts with modern ones. Astronomy and astrology, two important discourses of Indian Knowledge system possess an inevitable role for the evaluation of history of Indian science. In spite of ignorance of so called ‘rationalists’ and euro-centric scholars for indigenous knowledge, the contribution of ancient texts is beyond doubt till date. (Bhat, 1982). *Bṛhatsamhitā* (henceforth BS), a magnificent text on Indian astrology and astronomy composed by Varāhamihira is such kind of gem in the ore of oriental wisdom. The text may be considered as a veritable encyclopaedia of Indian life in Gupta period. present text is a product of Varāhamihira’s mature mind and accumulated experience (Sastri, 1969). Varāhamihira’s well-known scholiast Utpala compares him with the very incarnation of the sun who descended in this world in the Kali age in order to rescue the science of astrology sinking into the deep ocean of ignorance. Varāhamihira is assigned to the date 6th century CE or the last phase of Gupta period with the help of textual, astronomical and epigraphic evidences (Bhat, 1982).

Varāhamihira has always tried to describe physical phenomena through scientific and mathematical observations. BS underscores the concept of disasters after minute observation and logical explanation of meteorological events, animal behaviour and so on. The present paper will underline the prediction of disasters from the parlance of abnormal animal behaviour embedded in the text. It will try to understand the textual references in comparison to reports published in reputed print and electronic media on the issue. Here, it must be confessed that the present paper does not claim to establish any new theory/observation in a scientific way. It is an attempt to establish some rational outcomes regarding the disaster prediction by abnormal animal behaviour reflected in the text bypassing hyperboles coated with supernatural psychology.

Understanding abnormal animal behaviour

From the dawn of civilization men have been trying to ward off the calamities by predicting them properly. With only a few minutes’ notice of a disaster many lives can be saved and loss of property and economy can be averted. Now-a-days, scientists are trying to predict disasters with help of advanced technological support from the streams of earth science, meteorology etc. Today disaster may be



predicted well in advance with the help of geo-physical precursors using the technical supports like seismograph, GPS technology, AI tools etc (Neeti Bhargava *et al*, 2009).

Besides these common precursors, the prediction of disasters especially earthquakes, tsunami, drought, flood and so on through abnormal behaviour of animals is treated as one of the popular exercised methods in recent world. The prediction of disaster, especially earthquake, is suggested by earth scientists in three different time frames viz. long, intermediate and short-term. The long-term prediction system has very limited use for public safety and may not be accurate each time. Intermediate prediction consists of prediction for few weeks to few years and also of no value in public welfare. But short-term prediction system provides specific information of the time and location of a calamity within days, weeks, or months and therefore would be more useful for any kind of public safety and evacuation (Neeti Bhargava *et al*, 2009). A few researchers are already demanding that they have conducted short-term prediction process and predicted calamities successfully using abnormal animal behaviour as precursor. Although the concept is quite controversial yet many countries are using this method for forecasting disasters. History of natural disasters provides inferences in support of this system. As this kind of precursor is unable to establish itself in the base of pure science, this precursor can be studied as a part of omenology.

Omen and abnormal animal behaviour

Bhogiraj Dwivedi in his book *Study of Omens* defines *omen* as-

The unexpected throbbing of the body limbs, fall of meteors and the unusual chirping of the birds or animals seem to prognosticate the future happenings and hence they come in the category of omens (Dwivedi, 2000).

In early Indian scholastic tradition it was known as *śakuna* or *śākuna*. *Śakunas* were considered to be the harbingers of good and evil things. *Śabdakalpadruma* defines it as *śaknotīti śubhāśubham vijñātumaneneti śakunam*. Definition of *śakuna/ śākuna* provided by *Medinīkośa* is *śubhaśamsinimittam* (Mani, 1989). The early texts like *Rgveda*, *Atharvaveda*, *Bṛhatsamhitā* (chap. 86), *Gargasamhitā*, *Rasarājasundara*, *Durgāsaptasatī*, *Rājataranṅinī* refer the practice of *śaukanaśāstra* (Dwivedi, 2000). It is evident from the definitions of different encyclopaedic works that animal behaviour is one of the primary areas to be studied in omenology. Through the study of abnormal animal behaviour in BS the present researcher intends to establish some valid arguments in support of the traditional method. But before that, modern instances of disaster prediction using abnormal animal behaviour needs to be focused.



Example of prediction of disasters with the abnormal behaviour of animals in modern world

Before looking into BS prescriptions, the references of the disaster prediction with the help of animals' activities may be studied here.

- Jim Bergman, a California based retired geologist claims that missing advertisements of pets are increasingly noticed in newspapers before the tidal flow in the city of California (PBS Nature, 2008).
- Among the Chinese earthquakes, the 1976 Haicheng earthquake was the only one in winter (February), when snakes usually hibernate. Many observations both on the 'amateur' and official level reported a highly unusual amount of snake sightings even in the weeks prior to the earthquake (Swanson, n.d.).
- Combating Tsunami is one of the biggest challenges to the countries with low coastline in recent years. In 2004, when Tsunami struck the south Asian countries, many human lives were affected but no dead animal was reported. Ecologists and wildlife trackers report that elephants, flamingos, elephant, wild bears and other animals fled their usual habitats before the tsunami hit (Snay, 2005). Ravi Corea, president of Srilanka Wildlife conservation society reports that he did not see any animal carcasses in Yala national park. The Indian Cuddalore beach also witnessed human death toll but at the same time cattle were safe. Calimere sanctuary, famous for flamingos is also reported the safety of birds (Snay, 2005).
- In December 26, 2004 Sumatra was triggered by the Tsunami by magnitude 9 temblor off north Sumatra Island. A dozen of countries in Indian Ocean reported the casualties of 1, 50,000 people approximately (Mott, 2005).
- When the hurricane Charley struck Florida, a scientist named Mote Marine claimed that before the hurricane the sharks ventured into the deep waters. In Japan, fishes which are seen near the shoreline are nowhere to be seen prior to a tsunami (CDC-Public Health Matter Blogs, 2016).
- The great success of disaster prediction came in first half of 80s. A group of toads were seen abandoning ponds five days ago before earthquake struck Italy in 2009.
- The Olive Ridley Turtles travel to Rushikulya rookery in Ganjam district of Odisha every year for their annual mass nesting season. However, marine-life experts were baffled when only 3000 nests were laid this year as compared to every other year when the count went up to 5 lakhs. A few Indian scientists claim that might have sense the severity of up-coming cyclone Fani. This cyclone is the worst one the state has experienced in the last 20 years (Dharni, 2019)



The *Brhatsamhitā* guidelines on the topic

Ancient Indian policy makers and *samhitākāras* had the power to feel the pulse of nature for their nourishment within the nature. It was always man's tendency to search the cause and effects of every natural event (Vyas and Tripathi, 2015). The minute observation of natural resources, mathematical and astrological calculations and of course with age-old experience helped ancient men to predict disaster. The first-hand experience of scientist, nature activist and common people of recent times should have to be placed under microscope for comparing the age-old theory with new experiences with a goal to find out a satisfactory explanation. Most of the chapters in the text are categorized with the names of animals e.g. *Śivāruta* (chap. 90), *Mṛgaceṣṭita* (chap. 91), *Gaveṅgita* (chap. 92), *Aśvaceṣṭita* (chap. 93), *Hasticeṣṭita/ Hastīṅgita* (chap. 94), *Vāyasaviruta* etc.

At first In *Virutadhyāya* (chap. 88) the author distinguishes animals into three categories viz. diurnal, nocturnal, both diurnal and nocturnal along with their list e.g. **diurnal Animals:** *śyāmā* (female cuckoo), hawk, falcon, *vañjula* bird etc; **nocturnal Animals:** *lomāsikā* (jackal), *piṅgala* (crane), *chippika* (a bird), flying fox, owl etc. and **diurnal as well as nocturnal animals:** The horse, man, snake, jackal, porcupine, cuckoo etc. (BS 88.1-2).

The abnormal activities of the creatures and their results are focused categorically.

Birds

It is often said that the small animals like ants, toads, lizards, birds etc. are the good predictors of any kind of disaster. The instances of disaster prediction using the behaviour of birds are prescribed are as follows.

- If at the time of dawn there be awkward cries of birds facing the sun, it indicates the destruction of country. If these with their face glowing in the sun send forth their cries, standing to the south of a city, the latter will be captured by the enemies.

dīptamṛgāṇḍajavirutā prāk sandhyā deśanāśamākhyāti /
dakṣiṇadiksthair virutā grahaṇāya purasya diptāsyaiḥ // (BS 30.5)

- If at the juncture birds are crying out and there be the rod, dust, cross bar and the like, or if the sun appears in an unnatural form every day, the country, king and crops would be destroyed.



diptavihaṅgaśivāmṛgaghṣṭā daṇḍarajaḥ parighvādiyutā ca /
pratyahaṃ arkavikārayutā vā deśanareśasubhikṣavadhāya // (BS 30.30)

- The birds can produce the effect of the disaster on the 8th day, if not the same day (*tasminn eva dine' sṭme' tha vihagā saptāhapākā mṛgāḥ* / BS 30. 31).

Before the Nepal earthquake a group of inhabitants claim that birds were not in the sky before the earthquake. At the time of Tsunami in 2004, flamingos and any other kinds of birds were not seen. According to K. David, wildlife trekker and Gehan de Silve Wijeyeratne, eco-tourist guide there was no loss to animal world (PBS, 2008).

Crows

In Indian culture, superstition has been nurtured centring crow. The sound of crows or the vision of a bathing crow is considered as inauspicious. But it is also true that among the birds crows can sense upcoming calamities. The writer of BS sets the following parameters for disaster prediction using their activity.

- If a crow builds its nest in a condemned, thorny or dry tree in the month of *vaiśākha* there will be danger of famine in that country.

vaiśākhe nirupahate vṛkṣe nīḍasubhikṣasivadātā / ninditakaṇṭakīśuṣkeṣvasubhikṣabhayāni tad deśe // (BS 95.2)

- If a crow builds its nest on reeds, holy grain, bushes, creepers, corns, temples, houses or in pits, the country will be denuded being afflicted with robbers, drought and disease.

śaradarvagulmavallīdhānyaprāsādagehanimneṣu /
śūnyo bhavati sa deśaś caurānāvriṣṭirogārttaḥ // (BS 95.5)

- If the fledging of the crow is of *coraka* colour, there will be trouble from robbers; if of variegated colour there will be death; if white there will be danger from fire; of crippled (deficient of limbs), fear of famine.

caurakavarṇais caurās citrair mṛtyuḥ sites ca bahṇibhayam /
vikalayr durbhikṣabhayaṃ kākānāṃ nirdīśec chisubhiḥ // (BS 95.7)



- If the crows congregate without any cause in the middle of a village and caw aloud, there will be danger of famine; if they fly in a circular group, the village will be besieged; if they appear in several groups, there will be disaster (BS 95.8)
- When the crow's beak is filled with sand, wet clay, flower or the like, there will be grain of wealth; when it takes away vessels or treasures from a place where many people dwell, there will be danger in store (BS 95.13)

Modern world also witnesses abnormalities among these crows before disaster. There is a famous proverb that noisy crow invites the disaster. Before the Kobe Earthquake in 1995 crows (102; 13%) fled to a bamboo cluster at midnight, cawed loudly and restlessly and moved out to the suburbs away from the epicentre (Ikeya, 2004).

Frogs and snakes

It is prescribed that the effect of increase of pet viz. insects, rats, flies and snakes will be felt undoubtedly within three months.

kītākhmakṣikoragabāhulyaṁ mṛgavihaṅgavirutaṁ ca /
loṣṭasya cāpsu taraṇaṁ tribhireva vipacayate māsaḥ // (BS 97.7)

The earthquake with 7.3 magnitudes in Haicheng on 4th February, 1975 was predicted with the abnormal behaviour of animals in mid of the December, 1974. The snakes hibernated and came to earth. The rats appeared in the streets. In the quake 2041 died and 27538 people injured but the estimated casualties have exceeded 150000 if no earthquake evacuation was made after prediction. But in 1976, Tanshan city in spite of disaster forecast could not build the proper mitigation system. It resulted in death of 240000 people in the city [Centers for Disease Control and Prevention (CDC henceforth), 2012].

Dogs

The dogs are gifted with olfactory sense which helps them to avert upcoming maladies. Investigating teams used specially trained dogs to locate the explosives etc. The omens constructed from behaviour of dogs in BS are:

- If a dog barks standing in the south-east corner and facing the sun, there will be danger from thieves and fire; if at mid-day, outbreak of fire and morality(or death from fire); if in the afternoon, a sanguinary feud.



sūryonmukhaḥ svānadiksthitas ca caurālatrāsakaro' cireṇa /
madhyāhnakāle' nalamṛtyuśamsī sāsonitaḥ syāt kalaho' parāhṇe // (BS 89.3)

- If dogs produce repeatedly the sound 'kham kham' in a loud voice, as if they were beaten with clubs, or run in a circular group towards a traveller, they indicate the futility of his journey.

khaṃ kheti coccais ca muhurmuhur ye ruvanti daṇḍair iva tāḍyamānāḥ /

śvāno' bhidhāvanti ca maṇḍalena te sūnyataṃ mṛtyubhayaṃ ca kuryuḥ// (BS 89.16)

Stanley

Coren, a scientist claims that dogs can predict the disasters. The result of Coren's research has resemblance with BS guidelines. The Japan and china earthquakes of 1995 and 1974 respectively bear the evidences in this regard. A few days before 1995 Kobe earthquake in Japan some dogs were barking "frantically" and goats and other animals were showing obvious signs of fear (Coren, 2012).

Elephants

The BS prescribes that an elephant foretells danger if the elephant has a stumbling gait, if its ears stop beating suddenly, if it appears very disappointed, if its ears stop beating suddenly, if its eyes are full of tears or closed, if it is always sleepy, if it behaves in a refractory manner, if it eats something unwholesome, or if it passes blood (ichor) and dung too frequently.

skhalitagatir akasmāt trastakarṇo' tidīnaḥ śvasiti mṛdu sudīrghaṃ nyastahastaḥ pṛthivyām /

drutamukulitadr̥stīḥ svapnaśīlo vilomo bhayakṛdhitabhakṣī naikaśo' sakṛ śakṛc ca // (BS 94.12)

The same attitude is seen in a documentary film by *Nature* (an USA based organization for the welfare of environment) before the Tsunami struck the Asian counties. Not a single elephant is found dead in Tsunami (PBS, 2008).

Horse

BS prescribes that if a horse carrying a saddle and a rider gets upon another horse, or if the royal horse that is quite fit meets with some disaster, the result will not be favourable.

ārohaṇam anyavajinaṃ paryānādiyutasya vājinaḥ /

upabāhyaturaṅgamasya vā kalpasyai vā vipannaśobhanā // (BS 91.6)



Cows

The prescription for predicting disaster using behaviour of cow is- if a cow lows without any reason, there will be calamity; if at night, it announces danger.

akāraṇe kośati ced anarthao bhayāya rātrau vṛaṣbhaḥ sivāya /
bhṛsaṃ niruddhā yadi makṣikābhis tadā śuvṛṣṭim saramātmārjair vā // (BS 92.12)

Of domestic animals, reports of hens not laying eggs, cows not giving milk, or bees abandoning hives days, hours and before hurricanes, earthquakes and tsunamis (Tiwari and Tiwari, 2011)

Jackals

If the cry is like 'yāhī', there will be danger from fire: if like 'ṭaṭa', the news of like of somebody's death will be received; if like 'dhig dhig', there will be great calamity; if it is flaming in the mouth, the country will be ruined.

yāhītyagnibhayaṃ śāsti ṭaṭeti mṛtavedikā /
dhig dhigduṣkṛtimācaṣṭe saḥvālā deśanaśinī // (BS 90.6)

Deer

Deer possesses a strong sense which makes it aware of upcoming hazards; may it be the natural change or the invasion of enemy. The process of their up growing, struggle for existence give them an extra prediction power which can be used as disaster precursor. According to Varāhamihira

- A deer dreadfully howling aloud repeatedly indicates the destruction of village. The same facing the sun, standing to the south of an army and crying aloud, foretells the annihilation of the army.
- When the wild animals standing in a Burning part of the border of a town or village and crying indicate danger during same day; those going away in the border in the same circumstance, danger that is over; and those coming towards it, danger that is impending. If they move around it, the town or village will be deserted.

bhairavamuccair virudan mṛga' sakṛt grāmaghātamācaṣṭe /
ravidipto dakṣiṇato mahāśvanaḥ sainyaḥātakaraḥ //(BS 91.1)



- If the cry of wild animal is re-echoed by others the town is about to perish (*te grāmyasattvair anuvāśyamānā bhayāya rodhāya bhavanti vanyaiḥ*/ BS 91.2).
- When a wild animal stands at a town gate, the town will be besieged; when the animals enter it, it will be destroyed; when it brings forth a young one, there will be death; when it dies, danger; when it enters a house, its owner will be imprisoned. (BS 91.3)

Others animals

- If the village bird wander in the forest or jungle birds move about freely in towns or villages or day birds like crows fly at night or night birds like owls fly at daytime, or if the birds or beasts form groups or circles at dawn or dusk, or if they howl in groups facing the sun, there would be danger ahead (BS 96.68).
- Cocks crowing in the evening, cuckoos warbling in the beginning of dewy season, and vultures and the like (i.e. carnivorous birds) flying in a circle from the right to left in the sky, forbode dangers. If a group of such birds sit on houses, sacred trees, arches and gates the place would be devastated (BS 46.70).

Arguments in support of disaster prediction using abnormal animal behaviour

The oppositions complain often that animal can do anything at any time; there is no logic for their abnormal behaviour. Hence, they should not be believed at once. The ‘United Nation Geological Survey’ (UNSG) opines that animals’ behaviour and disaster forecasting should not be correlated. The organization started the research on animals in late 70’s but their endeavour was resulted in zero. Oppositions rather dismiss these theories as anecdotal records attributing it to a **psychological focusing effect** that people report after disaster occurred (CDC, 2012). But at the same time, it is also true that a group of animals or a single animal whether it dog or elephant or bird show abnormalities when they feel something unpleasant in the atmosphere. An animal can hear or sense things that a human cannot. The reasons behind such predictive strength of animals may be as follows.

1. Animals can perceive geo-physical stimuli for being closer to nature which a man cannot.
2. The elephants, hippos run before the Tsunami hit as they feel infrasound vibrations that travels through the ground at twice the speed of the waves of the tsunami that is caused by some earthquake (Snay, 2005)



3. Aquatic animals can also feel the electromagnetic current caused by the chemical change in ground water before the disaster is about to strike.
4. Dog's olfactory senses are 10000 to 100000 times stronger than human possess. This may make them able to sense storm or any kind of disaster (CDC, 2012).

Many scientists from western world try to establish the theory of disaster prediction using abnormal animal behaviour. NATURE, the USA based organization prepares wonderful documentary on the subject. The film begins in Sri Lanka spotlighting on the low rate of animal casualties in tsunami in 2004. James Berkland, a retired American geologist, used to laugh at the idea of animals' being able to do more than modern scientific technology but he changed his mind when he started taking notice of a very specific part of the newspaper. He discovered that advertisements for missing cats and dogs were increased in volume a few days before earthquakes struck. For the past thirty-five years he has been accurately predicting earthquakes using this information. His confidence in the animals is so high that he called a newspaper to predict publicly an earthquake that would happen during the World Series and he was right. These inferences prove the accuracy of disaster forecasting with animal behaviour. Not only animals, the tribal races from Indian oceanic islands are able to predict disasters with their age-old experience and indigenous knowledge. (Lee and Y, 2005).

Conclusion

The concept of disaster prediction has also deep connection with disaster management system. The disaster prediction comes under the purview of recovery phase of four-fold disaster management system as it warns for the upcoming hazards. Besides noting animal behaviour as a precursor, the text tries to understand disasters with numerous meteorological/astrological and natural events. One may undervalue the disaster prediction system of the texts for its adherence to astrology but it has to be admitted that astrology is applied form of astronomy.

The predictions Vārahmihira did were not developed frantically; rather those are the real-life experience of author. Without having the first-hand experience it was quite impossible for an author to prescribe those natural events so accurately. The predictions were also praiseworthy as those were forecast without any scientific and technical supports.

The predictions/prescriptions made Varāhamihira also indicates his consciousness for ecology. It is true that concepts of observation of nature or environmental consciousness were not needed to a great extent



like modern society to save the polluted earth. The concept of disaster prediction was needed for the sake of agrarian economy. The Second Urbanization in Gaṅgā Basin was emerged 6th century BCE onwards depending primarily on agriculture. From that period, agriculture had always controlled the economy of North India (Dasgupta, 2005). At the time of Varahāmiḥira (6th century CE) in Gupta period same trend was there in North India. Thus, for a society dependant on the agrarian economy, exercise of disaster prediction system was a real need.

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