

Ethnobiological Studies from *Manusmruti*: XII Facts on Dissolution (*Pralaya*) and Geological Time Scale

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INTRODUCTION

The super cyclonic hit to the coastal districts of Orissa, witnessing the thrill of the events by the authors, as an experience of nightmare on the 17th October, 1999 in their home town itself, as if the death was scrawling to engulf, has given enough scope to imagine what *Pralaya* (dissolution) would have been! The recorded uprooting of innumerable plants, death of thousands of men, women, children and animals, with the unrecorded spoilage of huge biodiversity, certainly have exceeded the recorded data so far entails another, rather more than half a century to be recovered.

Intermittent spoilage of human ecology due to any natural cause like storm, cyclone, tornado, hurricane, constant heavy rain followed by flood, earth quake volcanic eruption and also invading of the seawater into land surface then by inundating the coastal areas unexpectedly, all these are termed as *Pralaya*, an outstanding interpretation in Sanskrit terminology. According to the time, place and intensity of its occurrence, the event may be further denoted differently conjoining prefixes with *Pralaya*, such as *Khanda Pralaya* (effects on a particular part of the earth), *Yuga Pralaya* – occurs in the end of a *Yuga* – an earthly time period (Mohapatro et al., 2001a), *Mahaapralaya* which occurs at the end of a *Mahaayuga* i.e. 432×10^4 years, the sum of four *Yugas* (*Kretaa*, *Tretaa*, *Dvaapara* and *Kali*) and *Mahaamahaa Pralaya* (complete dissolution at the end of a *Kalpa* – 432×10^7 years described later). But the self destructive events of human society due to atomic explosion during second world war at Hiroshima and Nagasaki may be called as *Pralaya* and we have no right to blame accuse the nature in this context.

Pralaya: From Mythology to Geology

The earliest possible depiction of *Pralaya* is found in *Satapatha Braahmana* and *Matsya*

Puraana, in which the occurrence of a great flood (as a means of *Pralaya*) and protection of animals and seeds by Manu in a boat, is being mentioned (Padhy et al., 1996).

Looking from another angle, the attempt for conservation of biodiversity by the great sage is to be recognized (Padhy, 2000). But this event is not reflected any where in *Manusmruti*, rather described in different form in Bible, Zindavesta and other religious epics and folklore tales in different parts of the world. Recently we have analysed scientifically the event of "*Samudra Manthana*" (Churning of cosmic Ocean) depicted in *Kurma Puraana*, a chronological process of ecological events for reestablishment of human ecology after dissolution (Padhy et al., 2001). This shows that the ancient Indians were not only conscious of *Pralaya*, rather were watchful too for the recovery of the ecosystem.

Relating mythology to geology based upon description in *Mahaabhaarata* and *Bhaagabata* that five thousand years ago at the end of *Dvaapara Yuga*, the western parts of India were submerged as a means of *Yuga Pralaya* and the recent attempt to explore the submerged *Dwaarikaa* Kingdom of Lord Sri Krishna, is the best example of such correlation. The western world too is interested in such exploration as evident from their attempts to discover the Noah's ark, used during dissolution to conserve the biodiversity as described in Bible (Marr, 1998). All such depictions of *Pralaya* in scriptures were not of imagination, rather supported by scientific proofs (Krishnan, 1982) and other archaeological evidences about such events in Babylonian, Turkey and several other parts of the globe.

The geological identification of great ice ages (when major portions of the earth was under glaciation during the Cambrian period of Azoic era around 700 million years back; another during the late Palaeozoic times about 260 million years back and the latest occurred in the Pliocene

period more than half a million years ago, are the concrete evidences to support the Hindu *Pralaya* view (Mohan, 1996).

In *Manusmṛiti* the occurrence of *Pralaya* is described as a normal event in course of time and a nature's play.

Manvantaraanya sankhyaani sargah samhaara ebacha,

Kreedanni baitat kurute parameshthee punah punah (80/1).

Meaning: The *Manvantaras*, the creations and destruction of the world, are numberless; sporting, as it were *Brahmaa* repeats this again and again (Buhler, 1886).

It is evident from the above *Sṣloka* that dissolution is of frequent occurrence in nature as realized by ancient Indians. A new concept *Manvantara* is introduced (*vide* 80/1) in this context, needs an explanation.

Manvantara: A Geological Time Unit

Yat praagdvaadassa Sahasramuditam diavikam yugam,

Tadekasaaptatigunam manvantaramihochyate (79/1).

Meaning: The before mentioned age of the Gods, (or) twelve thousand (of their years), being multiplied by seventy-one (constitutes what) is here named the period of Manu (*Manvantara*) (Buhler, 1886).

The time concept of ancient India was reported in detail earlier (Mohapatra et al., 2001), yet it needs a re-discussion in this context to avoid any confusion.

One year (360 days) on the earth is equivalent to one day of the Gods and accordingly 360 earthly years is one year of the later.

The cycle of time passes on the earth in the name of *Yuga* such as: *Kṛetaa* (1728×10^3 earthly years), *Tetraa* (1269×10^3), *Dvaapara* (864×10^3) and *Kali* (432×10^3) constitute a *Chaturyuga* or *Mahaayuga* i.e. 4320×10^3 years which is equivalent to 12000 years of gods (divine years).

As per above cited *Sṣloka* 79/I, 12000 years of gods multiplied by 71, forms a *Manvantara*, a period ruled by a Manu, equivalent to 30672×10^4 earthly years.

Upto now we are aware of one Manu, the reveler of the present *Manusmṛiti*. But as per *Sṣloka* 62.63/1, seven glorious Manus named (1)

Svayambhu (2) *Svarachisa* (3) *Autṭama* (4) *Taamasa* (5) *Raivata* (6) *Chaakshusha* and (7) the present ruler *Vaivassvata* have ruled over the earth, produced and protected the movable and immovable creations (not strictly alone biological) during the time period *Manvantara* allotted to them. Logically but, such a long period of *Manvantara* (30672×10^4 years) compared to the short life span of a human being (if Manu is a man) certainly do not attribute the word Manu to a person, a sage, a ruler or any other mythological personality. Rather it is convincing that *Manvantara* signifies a geological time unit of ancient Indians and the idea is reinforced by the explanation of other elite (Das, 1960) that the chronology of cosmological, geological and biological evaluation had taken place during the specific time period of past six *Manvantaras* and presently the seventh one, is continuing (Table 1). The analysis of the Sanskrit names of the seven Manus have also some co-ordinated significance amenable to the creation evolved during the then time period.

Age of the Present Creation

It is stated that (*vide* *Sṣlokas* 52, 54, 57, 73 and 74 of *Adhḍhaaya* 1) *Brahmaa* continued his creation for one *Kalpa* (a time span of 432×10^7 earthly years equivalent to 12 hours of *Brahmaa*) and takes rest for another *Kalpa*, his night time when the creation is squeezed up. So incessantly he revivifies and destroys this creation in every *Kalpa* thus completes his 24 hours of day period. With this calculation, *Brahmaa* has a life span of 100 *Brahmaa* years (BH) accounts to 31104×10^{10} earthly years (EY) and his alternative expansion and contraction of the creation is correlated with the pulsating universe theory of modern physics (Mohapatra et al., 2001). So this creation in which we are the beings has started in the present *Kalpa*, a concept also supported by western scientists (Capra, 1975).

In order to have a deep insight to the age of the present creation we have taken help of another epic '*Surya Samhitaa*', devoted to describe the time concept of the universe. In this compendium the *Kalpa* period is divided into 14 *Manvantaras* (each 30672×10^4 years) plus 15 *Sandhyaas* (each 1728×10^3 years). The connecting link period between two *Manvantaras* is

Table 1: The chronology of evolution in the past seven Manvantaras of the present Kalpa

S. No.	Name of Manu / Manvatara each 30672 × 10 ⁴ yrs. except the 7th One	Etymological significance of the Manvantara*	Possible creative events occurred in the respective Manvantara (Das, 1960)
1.	Svayambhu	Svayam + Bhu: Svayam : self and Bhu : realisation of his own presence - expression of the self i.e. Self Revelation / Sl. 5.6/1 (Mohapatra et al., 2001)	Creation of the universe due to self- exposure
2.	Svarachisa	Sva + Rachisa: Sva : self and Rachisa : derived from the word, <i>Rachanaa</i> (Creation - identification) i.e. Self Identification .	Identification of planetary world and the earth in it.
3.	Autama	Autta + Tama; Autta : high and Tama : a superlative adjective of the former; objects rendered / contributed, move above their base line - elevate / raise to higher place / rank up to the bests / top most, i.e. Self contribution .	Separation (contribution-elevation) of Moon from Earth.
4.	Taamasa	Significantly synonymous to <i>Taamasa</i> Guna (Dash and Padhy, 1998), a constituent of <i>Prakruti</i> (cosmic substance); power of nature that restrains or obstructs; restraining or binding potency of nature; function to resist motion e.g. responsible for the downward pull of earth; tendency of water to descent, cause of mass, weight and inertia, feeling invisible air (Bernard, 1989) i.e. Self Restraining and binding .	Solidification of the earth from gase- ous state.
5.	Raibata	Rai + Bata; Rai : <i>Aiswarya</i> (the paradise potential) - State of happiness, <i>Bata</i> means <i>Baan</i> , the processor; otherwise creation of climatic, edaphic (identification of mines) and biotic autotrophic potentialities i.e. Self producing potentiality .	Appearance of Autotrophs, the plant world (primary users of geological re- sources through biogeochemical cy- cles).
6.	Chaakshusha	Derived from <i>Chaakshu</i> (eye); Eye witness is known as <i>Chaakshusha Pramaana</i> in judiciary; creation is blessed with sight potentiality i.e. Self Visioning Potentiality .	Creation of Animal World-Heterotrophs (Possessed eye sight or power of cog- nisation).
7.	Vaivasvata	(Designated as <i>Mahaa Tejasvee</i> : Most potential): The son (<i>Putra</i>) of <i>Vivasvan</i> (<i>Surya</i> : sun god) is known as <i>Vaivasvata</i> which implies to 'Man'. The word <i>Putra</i> is applicable to human male off-springs. Man being supreme of living beings, the top consumer of energy rendered by the sun God in the global ecosystem i.e. Self Realising Potentiality .	Evolution of the man (i.e. organism with rationality).

*Manvantara: 1, 2 explains the universal conditions; 3, 4 - physical changes of the earth and 5, 6, 7 - development of biodiversity.

known as *Sandhyaa* (twilight) during which the world remains in submerged state (*Jala-Plaavana*), a great *Pralaya* (cataclysm) period. Out of the 15 *Sandhyaa* periods, 13 are intermediate between 14 *Manvantara* and one each at the beginning and before the end of the *Kalpa* (Figure 1). Thus the occurrence of *Pralaya* is a very systematic phenomenon repeated in regular intervals at the end of a *Yuga*, *Mahaayuga*, *Manvantara* or in a complete squeezing form in every alternative *Kalpa*. It may so happen that at the end of the life span of *Brahmaa* (31104×10^{10} years) there may be universal dis-

solution: entire universe, every galaxy, nebula, star – each and everything may perish (Mohan, 1996).

Surya Samhitaa says that the present *Brahmaa* has enjoyed 50 years of his life span and continuing the present creation on the first day of his 51st age year. The creation period in this *Kalpa* is presented in table 2. Out of 14 *Manvantaras* of this *Kalpa*, six *Manvantaras* and their respective *Sandhyaa* periods have passed away, now we are being ruled by *Manu Vaivassvata* the 7th one. Out of 71 *Chaturyugas* of *Vaivassvata Manvantara*, 27 have already

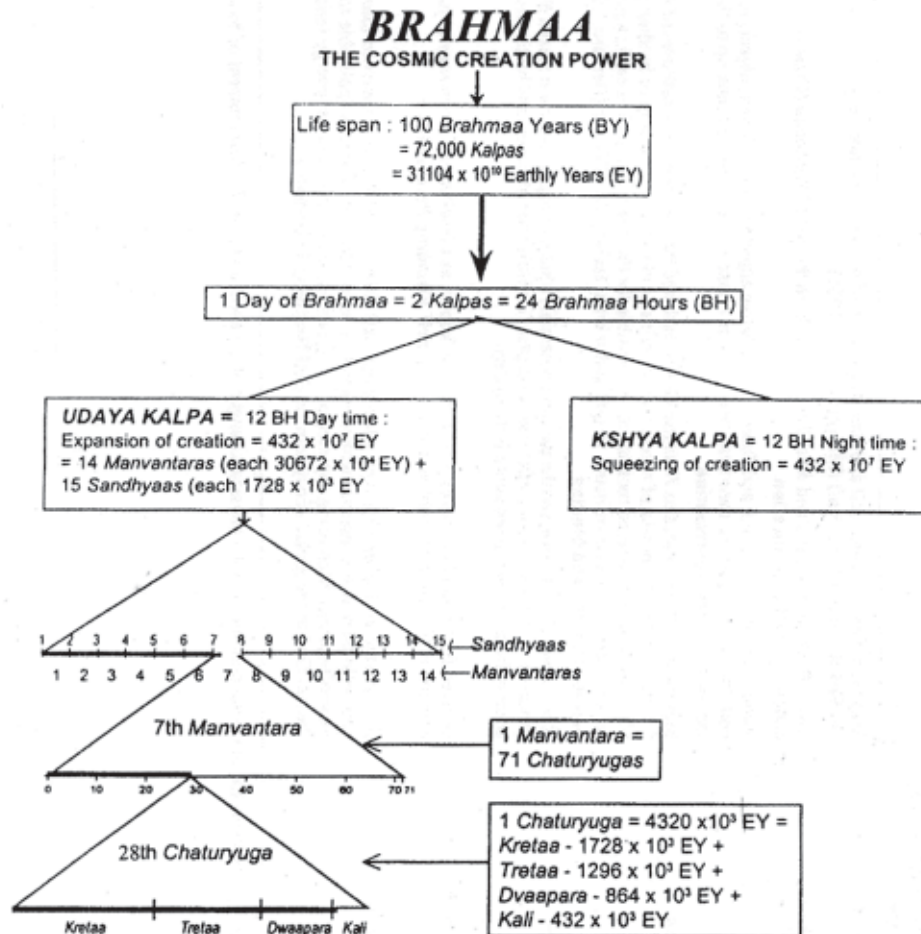


Fig. 1. The expansion of time from creation power (*Brahmaa*) to creation (Human beings). The bold line represents the time passed out of the present Creation (*Kalpa*)

Table 2: Age of the present creation (Kalpa*) of Brahmaa up to 2000 A.D. (refer text for more details)

Name of Period	@ Years	Total Years
* Initial Sandhya	1728×10^3	1728000
* Six Manvantaras	306720×10^3	1840320000
* Six Sandhyaas following each one Manvantara	1728×10^3	10368000
* Continuing Manvantara named after Vaivassvata		
Manu - the 7th one (out of 71 Chaturyugas)		
i) 27 Chaturyugas already covered	4320×10^3	116640000
ii) Continuing 28th Chaturyuga: Already covered		
Kretaa yuga,	1728×10^3	1728000
Tretaa yuga	1296×10^3	1296000
Dvaapara yuga	864×10^3	864000
Continuing Kali yuga : Already covered the following		
a) King Yudhistira of Mahaabhaarata to Saakya Sambat		2526
b) Goutama Buddha to Birth of Jesus Christ		574
c) From Christ to date 2000 AD		2000
Grand Total		1972949100

* The name of the present Kalpa is Sweta Baraaha Kalpa

passed away and the creation is passing through the Kali Yuga of the 28th Chaturyuga. The sum total of years since the beginning of this Kalpa is 1972949100 years till 2000 AD. Ironically the 100 year of human life as prescribed by Manusmruti for a Kaliyuga man (83/I), is only equivalent to 0.001 sec. of Brahmaa, the creation power.

Geological Time Scale: Vedic Calculation vis-à-vis Modern Science

There are scientific efforts to ascertain the age of the earth by indirect methods based on facts like: I. Sedimentation clock (average annual rate of sedimentation and the thickness of all strata deposited during the whole geological history-age of the earth 510 million years); II. Salinity clock (the rate of accumulation of sodium in ocean water – 100 million years); III. Evolutionary changes of animals (based on fossil records – 1000 million years) and IV. Rate of cooling of the earth (assuming the initial temperature to be 3900° - 400 million years). However Charles Darwin also estimated the age of the earth to be 57 million years on the basis of the concept of separation of the moon from the body of the earth (Mohapatra, 1992).

The discovery of radioactive carbon by Ruben and Kamen in 1940 opened new chapters of science such as tracer techniques to explore the biochemical modes of life and methods to measure the age of the rocks based on the half life of the concern elements (Kamen, 1949).

The use of radioactive elements like uranium (U^{238}), Rubidium (Rb^{87}) and Potassium (K^{40}) to calculate the age of the earth is known as direct method, which has been estimated to be 4500 million years. A comparative account of the indirect, direct and the vedic methods as ascertained the age of the earth is presented in figure 2.

Manusmruti says (5/I) before the onset of creation (in the present Kalpa) there was some pre-existence (the past Kalpa) in stubborn condition, the creation in squeezed form. In this context the present creation has already covered a period of 1972949100 years of the existing Kalpa plus the pre-existent Kalpa period 4320,000,000 years, together constitutes a sum total of 6292,949,100 years. As a matter of coincidence modern physics has assumed that the earth is about 4500 million years old, and that in our region of the universe the elements probably came into being some time between 4900 to 6000 million years ago (Brown, 1957).

A comparison of recorded cataclysms like age of glaciation and great flood and their periodic occurrence conforms the accuracy of the Hindu Pralaya concept about the universe. It is certainly surprising that how the two school of thoughts, the vedic view and the modern concept are so much co-ordinating. If we infer that the present scientific age is more advanced and sophisticated with mechanized instruments, certainly we ridicule to ourselves that how people in the ancient past could reach the same level of

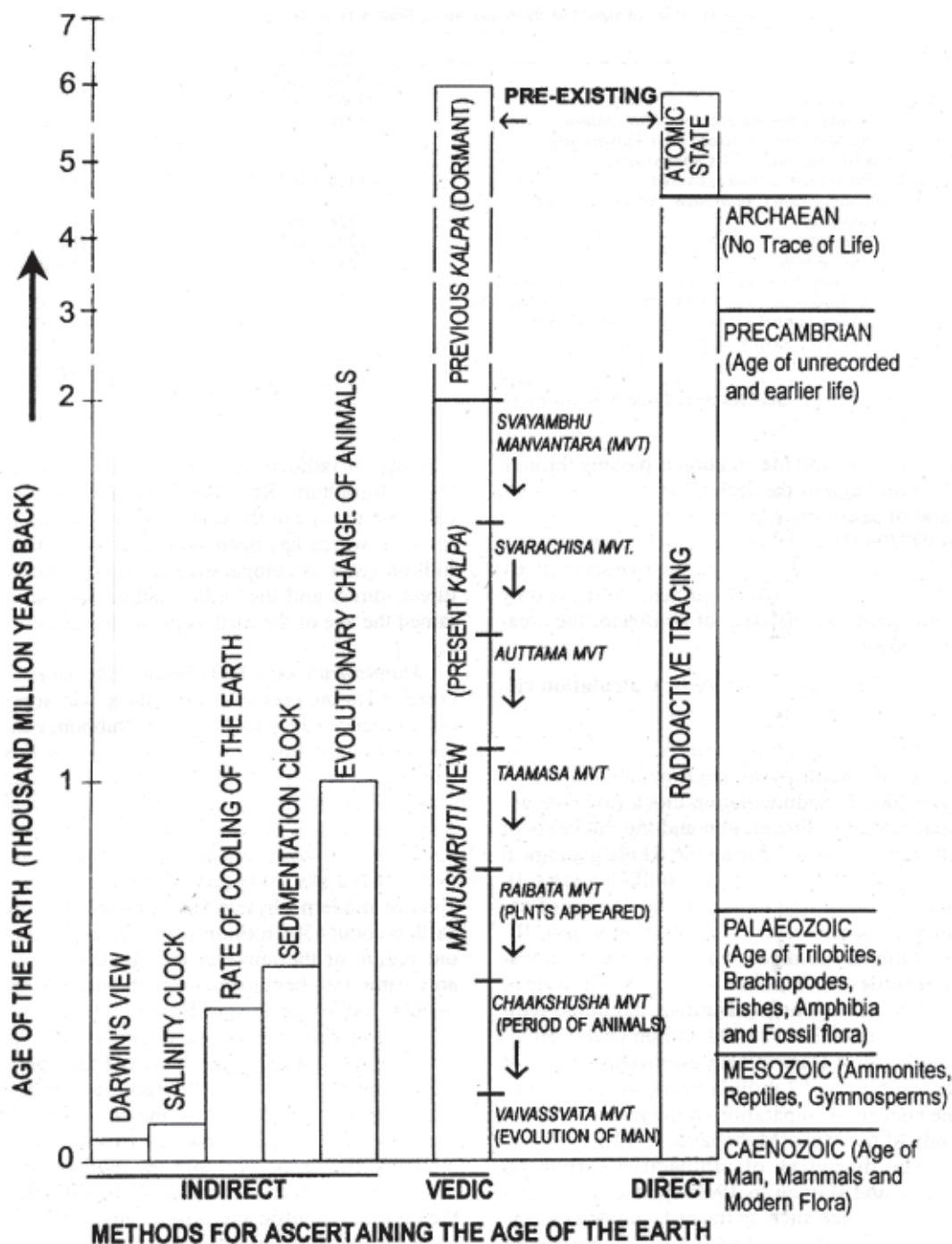


Fig. 2. A comparison of age of the earth as ascertained by various methods and account of Life forms evolved in different period

thoughts without the aid of any modern technology!!

KEY WORDS Dissolution (*Pralaya*). *Mahaayuga*. *Manvantara*. *Kalpa*. *Sandhyaa*. Geological time unit.

ABSTRACT *Manusmruti*, the sacred book of human ethics, also depicts on the Age of the universe and the periodic cataclysms occurred in the past as conceived by ancient Indians. The theories proposed by them even if of mythological, yet are significant and have corroboration with modern scientific views. A creation period is only twelve hours of the creation power (*Brahmaa*) is equivalent to 432×10^7 earthly years and ironically a life span of 100 years of a human being is just equivalent to 0.001 second at the former level.

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