

Ethnobiological Analysis From Myth To Science : IV. *Kaliyuga* – The Descending Human Ethical Environment

K.K. Panigrahy, G.K. Panigrahy, S.K. Dash and S.N. Padhy

INTRODUCTION

There have been efforts to bring out the hidden science behind the few aspects of Hindu mythology (Padhy et al., 1996, 1999, 2001). In our previous paper the ten divine incarnations of *Bhagawaan* Vishnu such as *Matsya*, *Kurma*, *Varaaha*, *Nrusingha*, *Vaamana*, *Parssuraam*, *Raama*, *Balarama*, *Buddha* and *Kalki* are reflected from zoological and anthropocentric evolutionary point of view (Panigrahy et al., 2002). Out of the above ten, in the series nine incarnations of Vishnu are said to be over by now and the terminating one, as *Kalki Bhagawaan* is expected to arrive. As a general principle under the circumstance when the basic principle is disturbed in the cosmic ecology, the cosmic Intelligence (God) embodies Thyself (incarnates) to protect and conserve the principle in order to maintain homeostasis.

The appearance of *Kalki Bhagawaan* during the period of *Kaliyuga* (referred to the present scientific age) which has started since about five thousand years (Mohapatro et al., 2001) and the expected environmental conditions that will lead to the depletion of basic principles (*Dharma*), predicted by Maharsi Vyaasadev in *Kalki Puraana*. Any prediction either scientific, social or cultural, may be positive or negative, has significance to create awareness and consciousness to prepare the human mind accepting it in future. The aim of the present work is to bring out the various predictions proposed in *Kalki Puraana* pertaining to the futurological perspective of human society.

MYTHOLOGICAL LOOK BACK: A PRELUDE TO THE CONTEXT

In a mythological event once Maharsi Vyaasa, the great compiler of the Vedas, and the composer of *Mahaabhaarata*, *Bhaagabata*, *Brahmassutra* and the eighteen *Puraanas* in Sanskrit language, was taking bath in the river *Kshipra* (at *Ujjayinee* of *Maddhya Pradesh*, India) chanting the words:

Kali Dhanya ! Kali Dhanya !! Kali Dhanya !!!
(let there be glory of *Kali Yuga*) (Tewary, 1996). The Maharshi was also considered as a divine incarnation of wisdom appeared at the end of *Dwaapara Yuga* during the time when all the above scriptures were scribed. The period of *Kali Yuga* entered to the earth at the end of *Dwaapara* and Vyaasa's existence was in the transitional time between the two *Yugas* i. e. *Dwaapara* and *Kali*.

The other saints, those who have witnessed the chanting of Vyaasadev were exclaimed and raised an inquisitive question on the glory of *Kali Yuga* – the time period to which the great *Yogi* has himself described to be the worst period in human society, in his own scriptures. In reply the great saint explained, "I foresee that the world environment and the human living principles will pass through a worst time, which is coming in the form of *Kali Yuga*; yet it will be a glorious period in human history. The time in *Kali Yuga* be such that man will be degraded to the lowest level of ethical status; there will be uncertainty in peace and love, and the selfishness will be prevailed at the peak of human character. However, under such adverse conditions, a self realising personality will have quick evolution towards transmigration (may be scientific and/or spiritual) compared to that of other *Yugas* like *Kretaa*, *Tretaa* and *Dwaapara*.

The narration of the above story has an inner clue to explain that the human environment will be at its peak of instability, both at physical and ethical levels; yet the human mind will reach to the level of super consciousness reaching to the zenith of scientific development competing with the time and space. The feelings and foresight of Vyaasadev are depicted in *Kalki Puraana* and are also reflected in *Mahaabhaarata* and *Bhaagabata*. Similar such predictions by Nosterdamus from the modern world are also outstanding and also seriously taken into account.

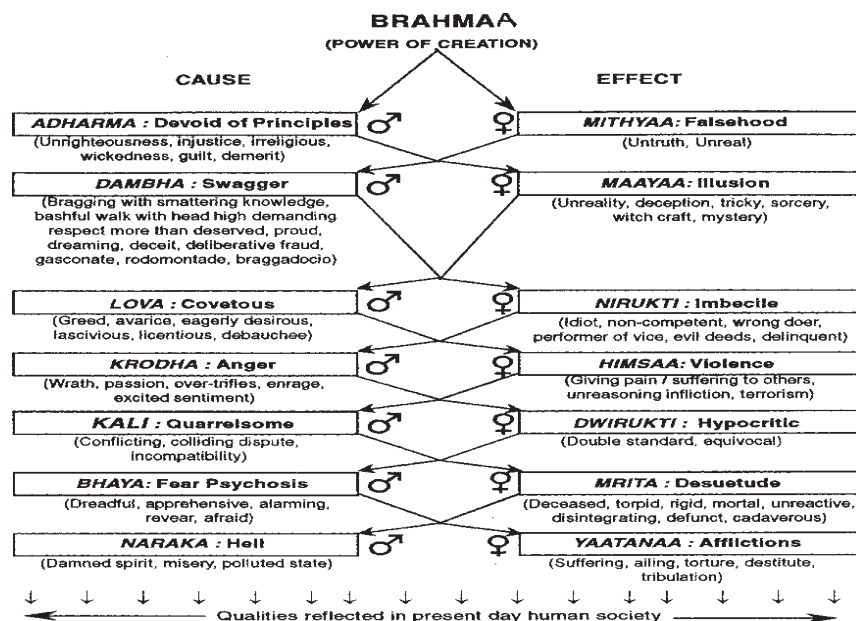


Fig. 1. Family Dichotomy of Kali (Yuga): Reflecting the evolution of human negative characters with the interaction of cause and effect.

KALI YUGA

a) A Hypothetical Entity

In our previous paper (Panigrahy et al., 2002) the *Kalki* incarnation of *Bhagawaan* Vishnu, which is expected to come during the constraint ethical and ecological homeostasis of the present age is interpreted in dual form. The incarnation represents the cause, i. e. the scientifically developed man of *Kali Yuga*, and the effect, i.e., appearance of *Kalki Bhagawaan* representing the self destructive motive through human activity.

At the end of *Dwaapara Yuga*, *Kali (Yuga)* has entered into the humanity and as a personality of human embodiment made a face to face confrontation with king *Parikshita* (the last ruler and descendant of *Paandabas*) is well depicted in *Mahaabhaarata* and *Bhaagabata*. In *Kalki Puraana*, the time period *Kali Yuga* is also characterized as a **model human being** who is the ruler of this period.

b) Origin and the Family Tree

The birth of *Kali Yuga* as narrated in *Kalki Puraana* says that, towards the end of *Pralaya* (dissolution) period, *Brahmaa* (the creator) created a personality out of the accumulation of sin (*Paapa*) and named him as *Adharma* (devoid of constr-

uctive principle). The personality and its name on analysis signifies a state of affair without formative principle. Further, a female counter partner was created by *Brahmaa* named *Mithyaa* (falsehood). *Adharma* and *Mithyaa* being brother and sister got married and subsequently, produced a male and a female child named *Dambha* (swagger arrogance) and *Maayaa* (illusion). Subsequently, the members of the second generation being brother and sister got married and reproduced. Consequently, in successive generations the male and female offspring so produced as brother and sister got married themselves and in the sequence *Kali Yuga* is one of the products in the fifth generation. The whole family dichotomy of *Kali Yuga*, his fore-fathers and descendants, is depicted in figure 1.

Analysis of the figure, brings forth the following interesting points, which signifies the socio-scientific basis of the myth –

1. The name of the different members signify different negative characters of human beings.
2. In every case the brother and sister have got married – the most wretched possible ethical depletion.

3. The male members so produced represent a cause and the female ones its effects. In every sequence the marriage of brother and sister, i. e., the association of cause and effect results to the product of another set of cause and effect.
4. On further analysis it can be seen that, (1st generation) if someone is 'devoid of principle' (*Adharma*), he is based on 'false-hood' (*Mithyaa*) and (2nd generation) the pride (*Dambha*: swagger) for possession of wealth, health, power and vigour creates the illusion that a person can overcome anything around him, i. e., *Maayaa* (illusion). Similarly, (3rd generation) a greedy person (*Lova*) can perform any unrighteous deed (*Nikruti*) in order to satisfy his need. Subsequently (4th generation) any dissatisfaction, the cause of anger (*Krodha*) culminated in violence (*Hinsa*).
5. In this sequence *Kali* (quarrelsome) is the offspring in the fifth generation with his sister *Dwirukti* i. e. hypocrite (discriminative inner feeling and outer expression). In fact, the marriage of *Kali Yuga* with his own sister signifies the prevalence of dual personalities of the present age man. Hypocrisy leads to confusion and fear-psychosis (*Bhaya* – son of *Kali* – 6th generation). Fear psychosis being the cause, generates the effects, as if a state of apparent mortality which signifies as lack of integrity in a person (*Mrita* - daughter of *Kali* - 6th generation).
6. The grand children (7th generation offspring) of *Kali Yuga* named as *Naraka* (Hell - male) and *Yaatanaa* (sufferings – female) signify the present day environmental pollution and ethical depletion and sufferings of human society. Ultimately, the present generation, to whomever it may concern, occurred since five thousand years (period of *Kali Yuga* already passed through) is a product of this *Kali Yuga* family tree, are its great great grand children.

c) Physical Features

The morphological features of *Kali Yuga*, as described in *Kalki Puraana*, says;

*Sa hinsaayaam bhaginyaangam
janayaamaasa tam Kalim,*

*Baamahastam dhrutopastham
tailaabhyaanganjana prabham (18/I).*

*Kaakodaram karaalaasyam lolajihwam
bhayaanakam,
Pootigandham dyutamadya stree subama
krutuassrayam (19/I).*

Meaning:

He used to handle his sex organ in his left hand; black coloured; body anointed with oil; stomach like a crow; face furious with intermittent exposing of trembling tongue; emitting of bad body odour (18/I).

He is expected to dwell in places of gambling, wine bar, harlot house and at places of gold (financial) transaction (19/I).

Analysis of the body features of *Kali (Yuga)*, the ruler of this period is reflected on the socio-ecological environment of the world in toto. The handling of the sex organ is an indication of ever provocative to commit sexual adultery. Probably, the present day human society has crossed all ethical boundaries concerned to sex as reflected in literature, media, theatre – cine or live, photography i. e., pornographic publications etc.

The black coloured and oil anointed body signifies a dark age as if the human ethics is camouflaged. The stomach of *Kali*, is compared with that of the crow, a filthy eater to any extent possible. In this context, we reflect our previous contribution pertains to *Manusmruti* that human beings (*Manushya*) are vegetarian in contrast to *Raakshaasa* and *Pissaacha* – the non-vegetarians, may be elite (Dash and Padhy, 1997, 1998). The furious face structure of a person signifies his wickedness and violent attitude. Moreover, the obnoxious body odour is the reflection of global pollution as a whole i. e. water, air, soil and what not.

Kali (Yuga) is expected to dwell in four places as mentioned earlier i. e., at the avenues of gambling activities, wine bars, areas with harlot activities and in places of gold transactions (i. e. unusual accumulation of wealth). If analysed from underneath ethical view point, the above mentioned are the spots where the human ethics touches the ground level and the activities are the roots of all miscreations. In this context, installations of such centres in public places with magnanimity in all developed and developing countries

throughout the world speaks of the effect of *Kali Yuga* itself.

SOCIO-ECOLOGICAL STATUS OF KALI YUGA

a) Basic Ecology

The ecological conditions related to rain and agriculture are presented in maxim 33 and 35 of Chapter One. It is mentioned that nature's hydrological cycle will be irregular, leading to unusual precipitation (*Chitra vrushti karaa meghaa*). Moreover, the fertility of the earth will decline (*Manda ssashyacha medini*), which will lead to low production (*Alpa ssashyaa vasumatee*). The emergence of such situation in the nature along with drastic alteration of environmental temperature and fluctuation of seasonal changes, are the major geo-meteorological events throughout the globe, causes concerned today.

b) General Trend of the Society

People will be effected by mental (*Aadi*) and physical (*Vyaadhi*) diseases and the life span will cut short or uncertain, that will lead to agony (*Glaani*) in every sphere. Human life will be miserable and every one will be in sorrowful mood (*Doohkha*) being scared (*Bhaya*). To destroy the innocent public, groups of terrorists (*Loka naassakaah*) will be activated in different pockets.

c) Human Character

i) *In General*: Common man will be aggressive (*Daambhika*); involved in irrational argument (*Kutarkapriya*), lascivious (*Pramatta*: drunken, intoxicated, mad and insane); fond of heinous friendship (*Neecha-sanssarga priya*); conflicting and quarrelsome (*Bibaadi* and *Kalaha priya*); womaniser (*Para stree aassakti*); enamoured, desirous, lustful (*Kaamuka*), offensive, guilty and culprit (*Dooraachaaree*) and irritate (*Kshubdha*). The spectrum of these characters can be well visualised in the present day society associated with multidimensional irrationality. We came across the adjectives; *Kaala bidhvansee* (procrastinating) and *Kshana bidhvansee* (devastating) for human beings of *Kali Yuga* which are quite befitting for the present day man. The modern man, being equipped with all scientific achievements, is

so much mechanised and dependent on auto regulatory systems, that it may so happen in future, as the human society will suffer from over surplus of time that would lead to unwarranted physical and mental outcome. Moreover, the devastating characters of human beings needs no further explanation for witnessing the destruction of the World Trade Centre in USA on 12th September, 2001.

- ii) *The Elite*: The so-called culturally alleviated persons in the society (may be including the teaching community) will be without any depth of proper knowledge (*Veda-biheena*: *Veda* - Knowledge + *Biheena* - without); lack of integrity (*Deena-bhaavaaparna*); emphasising importance on unqualified (*Ssoodra paricharyaa*); other way wasting energy in teaching to improper subjects; hankering on others income (*Paraarna-lolupaa*).
- iii) *Females*: Shall cross all ethical boundaries to be openly interacting with males, other than their kinship (*Swachchanda-acharana-priyaa*); disinterested, callous and careless towards their husbands (*Sva-punsaam-tyakta-maanasaah*) and involved in independent activities without believing in prescribed rituals outstanding either for married or for widows.
- iv) *Self Boasting*: This particular aspect is presented very aptly in *Kalki Puraana*, which is very common in the present day society as follows:
 - a) Rich people will be worshipped (*Dhaninah poojyaa*) and regarded as pious ones (*Dhanaadhyancha saadhutva*).
 - b) Exhibiting magnanimity in token of reciprocation for some one's help received earlier (*Badaanyataa pratidaane*).
 - c) Extension of forgiveness to some one against whose unlawful work, action can not be taken (*Pratidaane kshamaa-ssaktou*).
 - d) Expressing anguish to a weak personality (*Biraktih karunakshame*).
 - e) Exhibiting irrelevant speech (outsoken) to express himself as an enlightened one (*Baachaala-tvancha paanditye*).
 - f) Involvement in religious activities with

the motif to be praised (*yassah-arthe dharma-sevanam*).

- g) Moreover, people with (sacred) thread without any originality will be treated as *Braahmana* (*Sootra-maatrena Bipratvam*); dressed in saffron robe, holding the holy stick (*danada*) will be treated as enlighten visiting saints (*Paribraajaka*); illiterate will accept sacred gifts (sacrifice) (*Pratigraha-rataah ssoodra*) and specific *Varnassankaras* like *Chandaala* will not be reluctant to act as traditional priests (*Chandaala gruhayaajakaah*). On the contrary, the original *Braahmanas* will be crazed upon others food (*Paraarna lolupa bipraah*).

There will be more emphasis on physical decoration (*Kessa Vessa Bibhushanaah*) of human beings, despite the prevalence of all cruelty as depicted above. Of course, there is nothing harm in maintaining the physical upkeep. But simultaneously, this will cause illusion and divert some one to look into his inner self, which is the basic philosophy of the Indian way of life style.

d) Privileged Occupations

Interestingly, seven occupations are emphasized, which are very prevalent in the modern society so characteristically apprehended and prescribed.

- i) *Dharma-Vikraya*: The so called religion will be sold in the market in the form of books, cassettes, conversations etc., without observing it.
- ii) *Veda-Vikraya*: Knowledge will be marketed which is against the commitment of teaching profession (*Guru* cult of India). The sprouting of universities, tutorial systems and advertisements to achieve degrees against payment in the present scenario throughout the world, is much befitting in this regard. Moreover, ancient Indian teaching was open to the inquisitive ones i.e. to the real knowledge seekers only.
- iii) *Rasa-Vikraya*: This pertains to the selling of essence, juice, fermented products.
- iv) *Maansa -Vikraya*: Animal slaughtering as a declared profession.
- v) *Parasva-harana*: Forceful capturing the belongings of others.

- vi) *Udara-paricharyaa-rata*: People will be busy with earning of their bread only (self centred without any contribution to the society through their profession) and

- vii) *Sudhajeivi*: People, live on interest amount acquired through money lending business, are cherished and respected (*Poojaneeya*) in the society. The banking business in multi-dimensional forms, either private or corporate or governmental i.e. public sectors, is aimed towards such profession.

Of course, such occupations were prevalent in ancient India as reported earlier (Padhy et al., 2001); but are ever viewed to be of lower profile, which are well cherished in *Kali Yuga*.

e) Religion

The pollution in the field of religion will be at its top. Instead of practising religion there will be more preaching as if the religious flag will fly high (*Dharmadhvajinah*) without any ethical background. The so called holistic personalities (*Saadhu*) will often be proved as cheat (*Banchakaah*); saints will reach the immorality of having secret family life (*Sanyaaseeno-gruha-assaktaa*) and house holders who are expected to shoulder responsibility of the society, will be irrational (*Gruhastaatvavivekinah*). Moreover, distant water (i.e. water of distant tributaries), will be considered holistic, which often will attract people to be assembled there for performing holy dip (*Doore-neerecha-teerthataa*) with a view to get rid of sin. Most unfortunately, the teaching community, responsible for enlightening, will be insulted, intimidated and abused (*Guru-nindaa*).

f) Specialised Social Relationship

Under this title, marriage affairs in *Kali Yuga* are discussed where priority of importance is laid on the choice of the prospective partners (*Dwayo-sweekaara-mudbaahah*). Of course, in ancient India such marriage, named as *Gaandharva*, was accepted in the society, which had its rationality. In the present day marriage, the role of the parents has become so much insignificant which matters great concern. One step ahead, inter-caste marriage was highly discouraged in ancient India (Dash and Padhy, 1998) as that leads to the production of *Varnassankaras* (*Varnassankara-kaarakaah*) causes imbalance in social configuration.

Moreover, the family structure will be depleted and children will disobey and antagonistic to their parents (*Taata-maatru-bihinsakaah*) and on the other side there will be better social relationship with the in-laws (*Ssaala-bandhabaa*). This indirectly shows that the family will be dominated by females and in-laws will gain more social priority comparing to the kith and kin of males.

g) General Administration and Fate of Common Man

The general administration throughout the world is expressed in a nutshell, that the politicians (diplomats) will spoil the subjects i.e. the common people (*Priyaa bhakshaa nrupaa lokaa*) leading to a state of administrative disharmony and incompatibility. This inflicts the sufferings of common people with all sorts of imposition of tax (*Kara-peedaa prapeeditaah*). This ensures a pitiable, rather a pitiful consequence with the common people narrated as :

*Skandhe bhaarah kare putram krutvaa
kshubdhaah prajaa janaah,*

*Giri durgam banam ghora aassrayisyasti
durbhaagaah (36/I).*

Meaning:

The unfortunate subjects being aggrieved, shouldering their bag and baggage, holding their children, will run to caves, mountains and deep forests mere for the shelters. Probably the modern society in the whole world scenario, has witnessed such unfortunate events in the last century many a times during the wars, partition of countries and internal crisis. The above depiction in *Kalki Puraana*, was the foresight of our ancient sage and seer scientists, those who have visualised the refugee problems throughout the globe.

CONCLUSION

It is explained in *Geeta* :

*Yadaa yadaa hi dharmasya glaanir bhabati
bhaarata,*

*Abhyutthaanam adharmasya tadaatmaanam
srujaamyaham (7/IV)*

Meaning : Whenever there is decay of *Dharma* and rise of *Adharma*, then I embody Myself, O'Bharata !

When there is depletion of the principle pertained to ethical, scientific, social, ecological and biological purviews concerned to any system,

there will be the occurrence of super natural cosmic power to safeguard the ecological principle. This concept may be metaphysical; may appears to be unreasonable; but, the human society has realised this since time immemorial. Such facts are systematically analysed in our previous papers accomplishing the doctrine of incarnations and its evolutionary significance (Panigrahy et al., 2002). Analysis of *Kali Yuga* and the appearance of *Kalki Bhagawaan*, is more apprehensive since it is conceived that the event has not occurred yet, and we may not be aware of the dark and uncertain future of the human society as per *Kalki Puraana*; but, however, such apprehensions certainly can be established by analyzing the ensuing problems.

The aspects of *Kali Yuga*, are interpreted in two forms: as

1. the *Kali* mankind: who is the self ruler along with his depleted environment –ethical and physical;
2. the *Kalki Bhagawaan*: the scientifically artefact human mind which has pierced into the nucleus of the atom, reached upto the cosmic level measuring the distance in light years; analysed and splashed the most mysterious and complicated molecule of the universe i.e. the DNA (De-oxyribo nucleic acid).

We focus here that the *Kali Yuga* man will have a down trodden ethical sphere; but his scientific achievements and the results there of, will reach its peak; providing all sorts of physical comforts and developments. *Kali Yuga* man's attitude is for an aptitude of unexpected and unlimited attainments out of a limited resources and restricted endeavour. But, however, just as the allosteric enzymes get inhibited by their own products; similarly the scientific achievements which are aimed towards a positive trend, becomes ultimately responsible for pollution, contamination, biological and chemical warfare leading to depletion of bio-diversity, being associated with the self destroying attitude of the human beings.

It may so happen that there may not be the appearance of God as *Kalki Bhagawaan* and man will take the same recourse, destroying himself. The Sanskrit word '*Bhagawaan*' etymologically is a combination of two terms '*Bhaga*' and

'Baan'; the former stands for 'yoni' : the power or the centre of creation, which is popularly attributed to the female pro-creating centre of the living world and the latter (*Baan*) represents one, who possesses it. Since God has the innumerable capacity to create and hence 'Thou' is named as '*Bhagawaan*'.

The events of *Kali Yuga* and the facts presented in this system are comparable with the behaviour of a sub-cellular organelle 'Lysosome', which secretes metabolically active enzyme at the time of need; that subsequently changes behaviour and becomes responsible for the cellular death (Lysis) and itself as well. The Lysosomes are termed as suicidal bag inside the cell, just as the *Kali Yuga* subjects. From ethical point of view, the *Kali Yuga* man and the *Kalki Bhagawaan* are comparable with the perpetual fight between *Mana* (mental) and *Viveka* (rational) status of human beings since the onset of creation.

As 'Vyaasadeva' uttered '*Kali Dhanya, Kali Dhanya*', probably pointed to the glorious scientific attainments of *Kali Yuga* human beings, is expected to be channelised with rationality and one step in the evolutionary sequence may be towards divinity. Man, the framer of his own destiny, will decide to accept either the principle of *Kali Yuga* and destroy himself or regard Vyaasa's version '*Kali Dhanya*'. In the concluding lines, we remark that the age of *Kali Yuga* as per the legendary epic, *Manusmriti* is 432,000 years and uptill now from Mahaabhaarata (end of *Dwaapara Yuga*) till date, only 5002 years have passed (Mohapatra et al., 2001). Hence, it is yet to witness the end point.

ACKNOWLEDGEMENT

Thanks are due to the authorities of Khallikote College (Autonomous) for facilities and to the U.G.C. for awarding Teacher Fellowship to Smt. K.K. Panigrahy.

Authors' Addresses: K.K. Panigrahy and S.N. Padhy*, P.G. Department of Botany, Khallikote College (Autonomous), Berhampur 760 001, Orissa, India.

G.K. Panigrahy, P.G. Department of Zoology, Berhampur University, Berhampur 760 007, Orissa, India.

S.K. Dash, College of Pharmaceutical Sciences (Mohuda), Berhampur 760 002, Orissa, India.

***Address for Correspondence :** S. N. Padhy, Head, Faculty of Botany, Govt. Science College (Lead), Chatrapur 761020, Orissa, India.

KEY WORDS *Kali Yuga*. Present Scientific Age. *Kalki Puraana*. Futurological Perspective. Human Ecology.

ABSTRACT According to the philosophy of incarnations as per Hindu Mythology, the human race is awaiting for the appearance of God in the form of *Kalki Bhagawaan* to balance the cosmic ecology from ethical, physical and biological depletion. The contents of the paper are based on analysis of *Kalki Puraana*, which focuses that the incarnation represents in dual forms i.e. the scientifically developed man of the present age (*Kali Yuga*) - the cause of the system and the self destructive motive of human activity - as its effect, represents the *Kalki Bhagawaan*.

REFERENCES

- Dash, S.K. and Padhy, S.N.: Ethnobiological studies from *Manusmriti*: III. Pioneer attempt for biological classification. *J. Hum. Ecol.* **8(4)**: 269-74 (1997).
- Dash, S.K. and Padhy, S.N.: Ethnobiological studies from *Manusmriti*: VI. Human beings essentially are vegetarian. *J. Hum. Ecol.*, **9(3)**: 287-288 (1998).
- Mohapatra, R., Dash, S.K. and Padhy, S.N. : Ethnobiological studies from *Manusmriti*: XII. Facts on dissolution (*Pralaya*) and Geological time scale. *J. Hum. Ecol.*, **12(6)**: 433-439 (2001).
- Padhy, S.N. Dash, S.K. and Mohapatra, R.: Human environment as introspected by the sages and seers in vedic age: A contemplative scientific review from *Manusmriti*. In: V. Bhasin, V.K. Srivastava and M.K. Bhasin (Eds.): *Human Ecology in the New Millennium*. Kamla-Raj Enterprises, Delhi, pp. 177-200 (2001).
- Padhy, S.N., Mohapatra, R.P., Dash, S.K. and Mohanty, R.B.: An explanation for a myth in *Matsyapuraana*. *Ancient Science of Life*, **XVI**: 139-141 (1996).
- Padhy, S.N., Dash, S.K., Panigrahy, K.K. and Padhy, R.P.: Ethnobiological studies from myth to science :1. *Panchamukhee Hanumaan*, an empirical representation of ancient animal classification. *J. Hum. Ecol.*, **10 (5-6)**: 389-393 (1999).
- Padhy, S.N., Dash, S.K., Mohapatra, R.P. and Panigrahy, K.K.: Ethnobiological Analysis from myth to Science: II. *Samudra Manthana*, a symbolic chronological process for re-establishment of the human ecology. *J. Hum. Ecol.*, **12(4)**: 293-300 (2001).
- Panigrahy, K.K., Panigrahy, G.K., Dash, S.K. and Padhy, S.N.: Ethnobiological analysis from myth to Science: III. The doctrine of incarnation and its evolutionary significance. *J. Hum. Ecol.* In Press (2002).
- Tewary, J.P.: *Ssrurvantu Amrutasya Putraah*, P.K. Thakur, Editor and Publisher, Patna (1996).