ODISHA REVIEW

VOL. LXVIII **JANUARY - 2012**

The *Odisha Review* aims at disseminating knowledge and information concerning Odisha's socio-economic development, art and culture. Views, records, statistics and information published in the *Odisha Review* are not necessarily those of the Government of Odisha.

Published by Information & Public Relations Department, Government of Odisha, Bhubaneswar - 751001 and Printed at Odisha Government Press, Cuttack - 753010.

For subscription and trade inquiry, please contact : **Manager, Publications, Information & Public Relations Department, Loksampark Bhawan, Bhubaneswar - 751001.**

Five Rupees / Copy

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Editor's Note

Sixty long years of existence !

Certainly an indication not only of consolidation and growth but also endurance and grandeur. Such long years, meaningful of life or being has its own significance in the life of anyone, be an individual, institution or nation. Today the way we consume information is changing and so also is the Science. To me Science is the systematic knowledge and its pursuit leads to innumerable inventions and discoveries beneficial to each one of us.

As the UNESCO-Kalinga Prize completes its 60th year, an ambitious plan has been made to celebrate the event in Bhubaneswar. So be it, as the Prize deserves to be celebrated at international level because it is meant for promotion of Science among the common people. All the things which draw the attention now, are the things meant for the common masses.

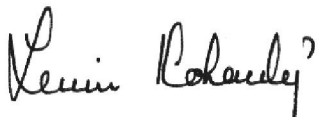
As I write this note I am still thinking, how great the man must be who had thought about such an award six decades ago. As one thinks regarding the many scientific developments that have been achieved over the last one century, one concludes that owing to the effort of few visionaries the whole world is enjoying the benefits of science.

As we all know because of the unparalleled Odia pride of legendary leader Biju Patnaik he had a tendency to glorify Odisha throughout the world. He

did it in many ways and one such a way is the UNESCO Kalinga Prize. Earlier known as Kalinga Prize, the award was instituted in 1952. Since 2009 the prize has been renamed as UNESCO-Kalinga Prize and has become biennial instead of annual since then.

I would like to thank the Organizers for this historic event. This is an event which will make every Odia anywhere in the world feel proud. On behalf of all the Odias the Odisha Review would like to thank the eminent Scientist Mr. Rene Raul Drucker for having contributed to the popularization of Science and for having been nominated for this prestigious award.

The Odisha Review team would like to wish everyone a very happy 2012 with a thought to imbibe the spirit of the legendary leader who made every Odia proud.



Lord Jagannath : The Lord of the Universe

The Indians, particularly the people of Orissa, owe a lot to Lord Jagannath. He is the Lord of the Universe, about whom the Vedas are silent. Sometimes people are puzzled about the mystery that surrounds the Lord. He is a great 0. You add 0, with 0,the result is 0. You deduct 0 from 0, the result is 0. You multiply 0 with 0, the result is also 0. Zero is nothingness. It is also the fullness; it represents the completion of a process. The Lord is omnipotent, omnipresent and omniscient. He is all pervading and is the Lord of the Universe. The Holy Trinity, Lord Jagannatha, Lord Balabhadra and Goddess Subhadra represent three races; black, white and yellow being the colour of the races. They are of three qualities *(Gunas) : Sattwa, Tamas* and *Raja.* Jagannath Cult transcends all barriers of caste, community and religion. It preaches the cult of equality, fraternity and brotherhood. Therefore, the annual Car Festival of Lord Jagannath is gaining popularity in the country and abroad.

People of almost all religious faiths find their own ideas and concepts in the Jagannatha Cult. Lord Jagannatha has drawn devotees from all faiths and creeds. Saints and prophets have bowed to Lord Jagannatha. Nanaka, Adiguru Sankaracharya and Shri Chaitanya have visited Puri to get the mercy of Lord Jagannatha. Puri has also been visited by Ganapati Bhatta of

Maharashtra, a devotee of Lord Ganesha, who wanted to see Ganesha in Lord Jagannatha. The Lord fulfilled the desire of the saint, and on Devasnana Purnima every year, He appears in 'Ganapati Vesha'. The great saint Kabir had seen Lord Krishna in Lord Jagannatha and had addressed to Lord Jagannatha in the following words :

Kabse chhodi Mathurapuri ab hogaya Jharkhandka basi :

Since when have you left Mathura and have become the dweller of Jharkhanda (Orissa was described as Jharakhanda) ?

Lord Jagannatha is the Lord of the Universe. Salabega, a Mohmmedan, was very dear to the Lord and has written a number of *bhajanas* and *jananas* expressing his deep devotion to Lord Jagannatha. Dasia Bauri was born to a lowly family. The Lord had extended His great arm, 'Baliar Bhuja' to take a coconut offered by a low-born man. Hadi Dasa, a blacksmith was a great believer. It is heard that the Lord would go to Chhatiabata (In Badachana Police-Station of Jajpur district) to dwell there for a few days as He was highly pleased with the devotion of Hadi Dasa.

There are many such stories. It is believed that Lord Jagannatha goes to Badrika (Jammu and Kashmir) early in the morning to take his bath. He then proceeds to Dwaraka (Gujarat) for His early *vesha* or morning adornment ; at noon He proceeds to Puri for His lunch and in the night, after witnessing Devadasi dance and hearing *Gita Govinda*, which is dearest to Him, goes to sleep at Rameshwaram (Tamil Nadu). Saints and devotees of all faiths including Nanak Panthis, Ramananda Panthis, Shri Rama Krushna Mission and a host of others have established their Ashramas at Puri. Adiguru Sankaracharya has established four *dhamas* in different parts of the country. One at Badrika (Jammu and Kashmir) another at Dwaraka (Gujarat) a third at Sringeri (Kerala) and of course one at Puri. During the Car Festival, the Gajapati Raja does *Chhera Pahnra,* (Cleaning the chariots with a golden handle broom). Except him, Shankaracharya of Puri alone is permitted to visit the holy Trinity in their respective chariots.

What about Lord Jagannatha, Who is a mysterious God ? Why is He black ? Some people believe that Lord Jagannatha is a great void. In their opinion, as the colour of the sky is black and as Lord Jagannatha is a great void, He dwells in 'Mahasunya'. Therefore the colour of Lord Jagannatha is black. Another question comes to the mind that why Lord Jagannatha is immovable (*Madala*) ? The answer is that the *Jiva* performs *karmas* but Param Brahma does not. As Lord Jagannatha is Param Brahma, He has neither hands nor legs and He does not perform any *karma*. Therefore He is static. Why are the eyes of Lord Jagannatha round shaped ? As He is Mahasunyabasi and looks to the entire world through this 'O', His eyes are round - shaped.

What has He not done to keep the prestige of the Oriyas during the Kanchi war ? The two brothers, Lord Balabhadra and Lord Jagannatha, had to perform the role of ordinary soldiers. They had to mortgage a gold ring with Manika Gauduni, from whom they had to drink curd on their way to Kanchi. At last Gajapati Purusottama Deva won the battle.

It is said :

Dolescha Dolagovinda Chapescha Madhusudana, Rathetu Bamanam Drustwa Punarjanmam Na Bidyate.

If you behold Lord (Dolagovinda) in the wooden palanquin during Dola festival, in boat in the Narendra pond during Chandana Yatra (Madhusudana) and Lord Jagannatha (Bamanam) in the chariot, there will be no rebirth and you will be free from the cycle of birth and death.

ODISHA : A LAND OF QUINTESSENTIAL CHARM

ODISHA

Odisha, the most captivating region of India, is often referred as an attractive treasure house of cultures and customs, religions and traditions, languages and literature, art and architecture, scenic beauties and wildlife. Exquisite temples and historic monuments, abundant greenery, virgin beaches, serpentine rivers, mighty waterfalls, forest-clad blue hills of Eastern Ghats with rich wild life, makes Odisha an unforgettable destination of India where travellers feel the magic and always return for more. The land, while retaining its pristine glory, also offers the visitors the most modern amenities.

A visual feast of colours, varieties and surprises, a cultural journey into one of the oldest civilizations in the world and as a holiday destination, Odisha promises wonderful experience.

PEOPLE OF ODISHA

Odisha accounts for 3.47 per cent of the total population of country. The population density of the state is 269 as against the national average of 382 per sq.km. The sex ratio (Females per one thousand males) of the state encouragingly stands at 978 against the national ratio of 940. However, urban sex ratio of Odisha remains lower at 934 as against the rural sex ratio of 988. The total decadal growth is 13.97 per cent. It was at 16.25 in 2001 census.

Literacy : Literacy of Odisha has been increased from 63.08 in 2001 census to 73.45 in 2011 census. The female literacy rate stands at 64.36 whereas the male literacy rate is 82.40.

Language

Odia, one of the oldest languages in the country having Sanskritic origin, is the predominant language spoken in the State and its outlying tracts. It is spoken by about 84 per cent of the population of Odisha. Hindi, Urdu, Bengali and Telugu are widely understood and sometimes spoken. Odia is the official language of the State. English is spoken by the educated few.

Though Odisha possesses fewer cities than most other states of the country, almost all the languages recognised by the Constitution have their speakers among the people. Apart from the speakers of Hindi and Urdu, there are the speakers of other languages like Punjabi, Gujarati, Malayalam, Tamil and so on. Odisha may be described as a polyglot state, there being hardly any instance of linguistic intolerance.

GEOGRAPHY OF ODISHA

Odisha extends from 17-degree 49 N to 22-degree 34N latitude and from 81-degree 27-E to 87-degree 29' E longitudes on the eastern coast of India. It is bound by the States of West Bengal on the North East, Jharkhand on the North and Chhatisgarh on the West, Andhra Pradesh on the South and Bay of Bengal on the East.

Morphologically Odisha can be divided into five parts. The coastal plains, the middle mountainous country, the rolling upland, the river valleys and the subdued plateaus.

The coastal plains of Odisha stretch from the Subarnarekha in the North to Rushikulya in the South. They are narrow in the North, widest in the middle, narrowest in the lake Chilka coast and broad in the South.

The coastal plains are the gift of six major rivers, which bring silt from their catchments, has reclaimed this area from the depths of the Bay of Bengal. The rivers from North to South are the Subarnarekha, the Budha Balanga, the Baitarani, the Brahmani, the Mahanadi and the Rushikulya. The coastal plains can be termed as a land of 'six deltas' of the Subarnarekha and the Budha Balanga, the middle coastal plains the combined deltas of the Baitarani, the Brahmani and the Mahanadi and the South coastal plains (The Rushikulya plains).

The mountainous region of Odisha covers about three-fourths of the area of the State. This region is a part of Indian peninsula. Here deep and broad valleys are cut by the Baitarani, the Brahmani, the Mahanadi, the Rushikulya, the Vansadhara and the Nagavali rivers. They are fertile, well-drained and thickly populated. Morphologically this region can be divided into the following units (a) the Simulia and the Meghasan mountains, (b) the Baitarani and the Brahamani interfluous, (c) the water shed between the Brahmani and the Mahanadi, (d) the water shed of Rushikulya and the Vansadhara. The elevation ranges from 610 to 1, 068 meters.

The rolling uplands are lower in elevation than the plateaus. They vary from 153m. to 305m. They are the products of continued river action, are rich in soil nutrients, and are situated in the Koelsankh basin of the upper Brahmani in the IB, the Suktel and the Tel of the middle Mahanadi and the Sabari basins. The rolling uplands may be grouped as follows : the Rajgangpur uplands, the Jharsuguda uplands, the Bargarh uplands, the Bolangir-Titilagarh-Patnagarh uplands, the Bhawanipatna uplands, the Malkangiri uplands and the Rairangpur uplands.

River valleys are net product of the action of rivers. They are fertile and at times present an undulating topography. The major river valleys of Odisha are associated with the Brahmani, the Mahanadi and the Vansadhara rivers.

The subdued plateaus (305–610m.) reveal all the peculiarities of peninsular tablelands. They are almost flat and the monotony of orography is interrupted by the river valleys. These features are commonly met within the upper Baitarani and the Sabari basins of the Keonjhar and Koraput Districts, respectively. In these uplands sheet erosion is most common while gullying is confined to the river valleys. These plateaus can be divided into the Panposh-Keonjhar-Pallahara plateaus and the Nawrangpur-Jeypore plateaus.

FLORA & FAUNA

Forest

The State has a recorded forest area of about 58166.683 Sq.kms. According to the 'State of Forests Report 2009' published by the Forest

Survey of India, the actual Forest and tree cover is 53,290 sq.kms. Thus, while the recorded forest area constitutes about 37.34% of the total geographical area of the State, actual forest cover exists over only 31.38% of the geographical area. But there is tree cover over 2.85% of geographical area in the State. Hence forest and tree cover constitutes 34.23% of geographical area. The Forest Department has been constantly endeavouring to proect the forest areas and regenerate the degraded forests. According to 'State of the Forests report 2009' published by Forest Survey of India, there has been an increase in the forest cover in the State by 100 sq.kms in comparison to 'State of the Forests Report 2007'. This is attributed to both afforestation and protection of forest through the successful participatory Forest Management efforts.

Based on the relief, rainfall and vegetation types, the forests of Odisha are divided into the following types:

(i) Northern Tropical Semi-evergreen Forests : These occur in the lower hills and valleys above 600 m elevation in the forest divisions of Mayurbhanj, Dhenkanal, Athgarh, Puri, Nayagarh, Parlakhemidi, Koraput and Kalahandi. While the top storey trees are deciduous and remain leafless for a short time, the second storey is evergreen. The important tree species are: Arjun, Mango, Mankar Kendu (Diospyros embryopteris), Champak, Rai, Manda and Nageswar.

(ii) Tropical Moist Deciduous Forests also known as Monsoon Forests : These occur in the lower elevations in Mayurbhanj and Keonjhar districts and the districts bordering on Madhya Pradesh and Andhra Pradesh. The top canopy is formed by Sal (Shorea robusta) and its allies Asan, Piasal, Kurum, Kangra and Dhawra and Daba bamboo (Bamboosa arundinacea).

(iii) Tropical Dry Deciduous Forests : They occur in the drier central and western areas in parts of Balangir, Kalahandi, Sambalpur, Khariar, Deogarh and Gobindpur divisions. Teak instead of Sal, and Salia bamboo (Dendrocalamus strictus) instead of Daba bamboo predominate in these forests.

(iv) Tidal Mangrove Forests: These are limited in extent, scattered and confined to the sea-coast, especially in Bhitar Kanika (Balasore) and the Mahanadi delta. The characteristic tree species are Karika (Bruquiera), Sundari (Heritiera), Bani (Avicennia), Rai (Rhizophora), Guan (Exocaria), etc. As Hental (Phoenix paludosa) grows here abundantly in clusters, the mangrove forests are locally called 'Hental van' or Hental forests.

Forests are a major constituent of the state's natural resources in the form of timber, firewood and a large number of profitable forest products like sabai grass, lac, resin, catechu, tassar silk, honey, natural dyes, etc. The valuable timber species are Teak, Seasum or Rose wood, Piasal, Kassi, Kurum, Arjun, Gambhari, Giringa and such other varieties of polishable wood that are used for furniture, and Sal, Asan, Dhau, Bandhan, Kangra, etc. which are hard and utilised in various construction works. Kendu (Diospyros xylocarpus) leaves which are used for wrapping bidi constitute a profitable source of revenue as they are largely in demand all over the country. Bamboo is of extensive utility not only in the life of the common man but also as essential raw material for paper industry. It is used in the paper mills of the state and supplied outside, especially to West Bengal. Sabai grass is also used for making paper pulp, but mostly for rope making. Sericulture, undertaken in the forest areas, provides a good source of income to the people. Certain parts of the forest, for example the Gandhamardan hill in Balangir, abound in

medicinal plants and herbs. Nux vomica which grows widely in most forests and Rauwolfia serpentira, which grows in the jungles of the south are common examples.

Animals

Living in the deep, dense forests are a few tigers confined to their natural habitats. However a natural habitat is improvised for the species in the Project Tiger, Similipal, which was launched as a part of the national programme in 1973 with only 17 inmates to start with; today their number stands at 101 wildlife census 2005. The Project Tiger covers an area of 850 sq. km in the heart of the 2750 sq. km wide Similipal Reserve Forest. The Odishan tiger belongs to the race of panther (Panthera tigris tigris-Odia, Badabagha), the other reported species like leopard (last reported in 1960 from Dhenkanal) and cheetah are by now extinct. The Nandankanan Biological Park is famous for its white tigers.

A large number of carnivores inhabit the forests in almost all districts. They (with their local names given in brackets) are the common wolf (heta), sloth bear (bhalu), honey badger or ratel (gada bhalu), hyaena (gadhia or nekeda bagha), jackal, wild dog (balia kukura), leopard cat (baghata), jungle cat (bana bilei), civet cat (katasha), otter, teddy cat (saliapatini) and the common mongoose (hatia neula). The wolf of the species Canis lupus pallipesis is occasionally seen in the jungles of Deogarh, Angul and Koraput.

Historically, the pride of place among the wild animals of Odisha goes to the elephant. In the past Odisha used to have an elephant wing in its army and the historic royal dynasties took pride in calling themselves 'Gajapati' or the lord of elephants. Odisha's famed elephants are found in the jungles of Mayurbhanj, Keonjhar, Dhenkanal, Puri (near Balugan), Ganjam and Sambalpur districts. The Wild Life Sanctuary at Chandaka provides a natural forest abode to elephants. There are elephants in the Mahanadi Baisipali Sanctuary near Nayagarh and Ushakothi Sanctuary on the National Highway No.6 some 40 km from Sambalpur. The latter offers shelter to bisons (gayala) in particular and any visitor to the sanctuary is sure to meet a herd of them.

Other animals found widely in forest areas include: the wild bear (barha), spotted deer (chital), sambar, the barking deer (kutra), the black faced langur or Hanuman monkey, the pink-faced bandar (patimankada), several species of bats, the tailed hare and pangolin (bajra kapta), porcupine (jhinka), the giant squirrel and palm squirrel. Found in the restricted areas are the wild buffaloes (arana mainshi) traceable in Balimela and Sunabeda areas; four-horned antelope charisinga in the isolated corners of Cuttack, Puri, Dhenkanal, Sambalpur and Mayurbhanj districts and the black buck (krushnasara or baliharina) in Bhetanai near Aska in Ganjam district. The Irrawadi dolphin (bhuasuni machha) and the gangetic dolphin (sisumara) are found in the Chilika and the rivers respectively.

Birds

The bird kingdom of Odisha, vast, varied and colourful, offers a most attractive sight. Here is a list of some typical birds representing different orders of the bird families, with their local names given in brackets:

Grebe (hansarali), cormorant and darter (pani-kua and panikoili), grey heron and pond heron (badakanka and kantibaga), white-necked and black-necked stork (gendalia), flamingo (marala/era) and ibis (bajeni), brahminy duck (chakua-chakoi), bar-headed goose (kaja) and

whistling teal (sarali); king vulture (phula shaguna), tawny eagle (chhanchana), kestrel (baja), brahminy kite (sankha chila) and pariah kite (matia chila), peacock (mayura), partridge (titir) and quail (punduki chadhei), crane (sarasa) and waterhen (dahuka), jacana (pani dahuka), plover (tentei), sandpiper (cha-chadhei), snipe (kadua-khurnpi) and tern (machhakhia); rock-pigeon (deuli para), green pigeon (harada chadhei), spotted and ring doves (kantikiri, kapta); parrot (sua) and parakeet (madana); cuckoo (koili) and crow pheasant (kumhatia); owl and barn owl (lakshmi pecha); nightjar (bhuin chhapuli); horn-bill (dhanesh); kingfisher (machharanka); copper barbet (tukura basanta) and woodpecker (kathahana); drongos (kajalapati) and oriole (haladibasanta); jungle and common myna (bani, ghukalika, sari), bulbul (gobara chadhei), weaver bird (baya chadhei) and babbler bird (satabhaya), etc. in addition to the types commonly observed like crows and sparrows. Odisha has an almost inexhaustible treasury of folk songs and folk lore poetising most of the birds listed above. Birds constitute a befitting accompaniment to the rhythm of rural life along with the soul stirring song birds that put up the daily rounds of morning and evening choirs.

Reptiles

Among the reptiles the most endangered species today is the crocodile on account of the high price offered for its skin. Odisha has all the three species of crocodile, namely the Gharial, the estuarine crocodile (Baula) and the marsh crocodile and sanctuaries have been set up for their preservation and growth. The Gharials which are found only in the Mahanadi and its tributaries are reared in the sanctuary at Satkoshia on the river Mahanadi covering an area of 795.5 sq km. The other two types have their resort in Bhitar Kanika covering an area of 161.76 sq. km of water encompassed with mangrove forests. To each of these sanctuaries is attached a corresponding Crocodile Research and Conservation unit. There is also a small crocodile sanctuary at Ramirth inside the Similipal forest.

There are two important species of turtle commonly found in Odisha— the Green Turtle, a big marine species attaining a length of 1.2 metres and weighing between 135 to 180 kg each found in the Chilika and the Pacific or Olive Ridley Sea Turtle (Lepidochelys olivacea), a migratory species. The latter come in thousands from far off parts of the Pacific coasts during winter to lay their eggs at Gahiramatha and Satabhaya in Bhitar Kanika. The place where these turtles lay eggs has come to be known as 'Arribada' (a Spanish word meaning breeding ground).

As usual there are the snakes and frogs of different species as in any other part of the country.

MINERAL RESOURCES

Odisha, situated on the eastern seaboard of India is one of the gifted parts of the world, where a gamut of mineral resources exist in bounty. The state is endowed with large reserves of bauxite, chinaclay, chromite, coal, dolomite, fireclay, graphite, gemstones, iron ore, limestone, manganese ore, mineral sand, nickel ore, pyrophylite and quartz. Recent discovery of diamond in the Dharambandha area of Nuapada district by the State Directorate of Geology has added a coloured feather in the cap of the state. Other minerals of the state include copper ore, lead ore, titanium bearing vanadiferous magnetite, talc/soap stone and high magnesia igneous rocks. Recent boom of the mineral industry has turned

the state into a hotspot, with entrepreneurs from all over the world crowding for their share of fortune.

The rich mineral wealth of the state is attributed to its favourable geological set-up. Situated on the eastern fringe of the peninsular India, Odisha has about 72.5% of the area occupied by Precambrian metamorphic rocks (of Archaean and Proterozoic age) which host the majority of the minerals. The Gondwanas hosting the coal resources occur over about 8% of the land mass. The Tertiary and Quaternary formations, occupying rest of the area, provide avenues for aluminous/nickeliferrous laterite and heavy minerals (in beach sand).

The Archaean rocks in northern Odisha include the Supracrustal belts of metasedimentary rocks including Iron Ore Super Group having deposits of iron, manganese, gold and basemetals. These are also represented by the gneisses, granite, migmatite (Singhbhum, Bonai and Mayurbhanj Plutons) and mafic/ultramafic intrusives. These intrusives are associated with the chromite, titaniferrous vanadiferrous magnetite and PGM. The Bastar cratonic complex of Archaean age in the Western Odisha includes gneisses, granite, migmatite and Strontium-Tantalum-Niobium bearing pegmatites.

Proterozoic rocks in the Western Odisha exhibit platformal sedimentary formations and associated limestone deposits. In north-western Odisha they contain metasediments of low to medium metamorphic grade classified as the Gangpur Group, which host manganese, limestone and Lead-Zinc deposits. In central and southern Odisha, the Proterozoics are represented by the Eastern Ghats granulite belt comprising of khondalite, charnockite, migmatite, anorthosite and alkaline rocks accounting for the mineralisation of bauxite, manganese, graphite and gemstones.

The Mesozoic rocks of Gondwana Super Group host the major coal resources of the state.

Formations of Cenozoic age occupy the eastern coastal plains in form of alluvial sediments, ash beds and low level laterite, providing avenues for occurrence of beach sand minerals and building materials. The deltaic fans extending into offshore regions play hosts for oil and gas.

Odisha has a lion's share of the Country's mineral reserves. The chromite, nickel, bauxite, iron ore and coal resources of the state respectively stand at a staggering 83, 92, 55, 38 and 26 percent of India's total reserves. Some of these minerals also account for a visible spot in the world's mineral map. The state's mining revenue during 2009-10 amounted to Rs.2020.71 crore.

Several mineral based industries have already come up in the State. The major ones include Rourkela Steel Plant, Alumina Refinery and Smelter of Nalco at Damanjodi and Angul, Charge Chrome plants at Baminipal, Bhadrak, Choudwar and Theruvali by OMC, FACOR, ICCL and IMFA respectively, Mineral sand separation unit at Chatrapur by IRE. Many cement and sponge iron plants have been set up. Coal based thermal power plants have been set up at Talcher, Kanihan and Banaharpali. Captive thermal power plants have also been set up by NALCO, RSP, ICCL, INDAL etc. and many more are in the pipeline.

UNESCO Kalinga Prize : A Brief Note

The UNESCO Kalinga Prize for the popularisation of Science is an award administered by UNESCO for exceptional skill in presenting scientific ideas to lay people. It was created in 1951, following a donation from Hon'ble Shri Biju Patnaik, the then Chief Minister of Orissa and Founder President of the Kalinga Foundation Trust, Bhubaneswar.

The purpose of the Prize is to reward the efforts of a person who has had a distinguished career as a writer, editor, lecturer, radio/television programme director or film producer, which has enabled him/her to help interpret science, research and technology to the public. He/She is expected to be knowledgeable of the role of science, technology and general research in the improvement of the public welfare, the enrichment of the cultural heritage of nations and the solutions to the problem of humanity. Many past prize winners have been scientists, while others have been trained in journalism or have been educators or writers.

Each member state is entitled to nominate a single candidate, through its National Commission for UNESCO, on the recommendation of the national associations for the advancement of science or other science associations, or national associations of science writers or science journalists. Applications from individuals are not accepted.

The laureate is selected by the Director-General of UNESCO upon the recommendation of a five-member jury designated by him. The jury is designated by the Director-General on the basis of equitable geographical distribution.

The recipient receives US$ 20,000 and a UNESCO Albert Einstein Silver Medal. The recipient is also awarded the Kalinga Chair, introduced by the Government of India in 2001 to mark the 50th anniversary of the Kalinga Prize. As holder of the Kalinga Chair, the winner travels to India for a period of two to four weeks as a guest of the Government of India. The Chair also comprises a token honorarium of US$ 5,000. The award ceremony takes place during the celebration of the World Science Day in Budapest as the guest of UNESCO and India in the alternate years.

The prize money is being shared by Kalinga Foundation Trust, Government of India (Department of Science & Technology) and Government of Orissa. However, the administrative charges are being borne solely by the Government of India. The expenditure towards Kalinga Chair is fully borne by Department of Science & Technology, Government of India. The Kalinga Prize for the popularisation of Science is administered by the Science Analysis and Policies Division of UNESCO.

Source : http://www.niser.ac.in

Objectives of Kalinga Foundation Trust

In my dream of the 21st century for the state of Orissa, I would have young men and women who put the interest of the state before them. They will have pride in themselves, confidence in themselves. They will not be at anybody's mercy, except their ownselves. By their brain, intelligence and capacity they will recapture the history of Kalinga. I would like my Orissa of the 21st century to have excellent artisans, superb craftsmen and sculptors, great musicians and poets.

Shri Biju Patnaik
Founder President, Kalinga Foundation Trust

Kalinga Foundation Trust (KFT) was founded by the legendary Late Shri Biju Patnaik, Hon'ble former Chief Minister of Odisha and former Union Minister, Govt. of India. The innovative idea of extracting petrol from coal was the brain child of Shri Patnaik and he implemented this project through KFT by sending six bright meritorious young Indian students to Paris for research on the subject. The objectives of the society are Public Charitable & Literary viz: To diffuse useful knowledge in arts, science, scientific research, engineering, technology and promotion of literature, political education and allied subjects both inside and outside the Indian Union; To organise relief works in times of flood, famine, earthquake, cyclone, fire, tempest, epidemic and such other calamities; To promote, encourage foreign studies and researches by Indian students; To provide medical and welfare facilities and other amenities to children, disabled and infirm persons, the destitute and the orphans; To make arrangements for the poor and deserving persons for free medical treatment and to provide stipends scholarships, grants for enabling meritorious and deserving students to pursue higher studies in India or abroad etc. All the above objectives are being implemented by KFT for the last 60 years.

Objectives

- To popularize Science and Technology among the people in general and the student community in particular of our State so as to inculcate in them a Scientific temper and attitude.
- Encouragement to and funding of application oriented research in the field of Science & Technology.

- To propagate, develop and extend the use of renewable energy sources / devices in the State.
- To promote and popularize remote sensing technology and make it's effective use.
- To undertake research in frontier areas of Life Sciences, Materials Sciences, Bio-technology, Molecular and Environmental biology etc.
- To undertake fundamental research in Mathematics and its applications and to support inter-disciplinary research through interaction between Mathematicians and Physical / Biological/ Engineering/Social Scientists.
- To create awareness among the people in Astronomy, Astrophysics and Space Sciences.
- Science and Technology communication through awareness promotion, support to Institutions/Organizations to conduct Seminars/ Workshops/ Science competitions/ Science Exhibitions etc.
- To provide financial support to Scientists of the State to enable them to participate and interact in the higher forums of International Conferences by presentation of their research/ technical/scientific paper.
- To provide financial assistance to Technical Institutions for conducting of Entrepreneurship Development Training Programmes for the benefit of technically qualified unemployed youths of the State.

Source : http://www.niser.ac.in

Sun Temple, Konark : A UNESCO Heritage Site

History of Kalinga Prize

The Kalinga Prize was established in 1951 by UNESCO with a generous grant from Late Shri Biju Patnaik, Founder President of the Kalinga Foundation Trust. First awarded in 1952, the Kalinga Prize is presented annually by UNESCO to a person or persons, who have made outstanding contribution to the interpretation of science and technology to the general public. The Director General of UNESCO selects the prize winner out of nomination received from Member States on the recommendation of a Four Member International Jury. The Kalinga Prize is regarded as a prestigious international recognition for outstanding science popularisation work. It has so far been awarded to 63 brilliant promoters of science & technology since its inception. Some of the great scientists/personalities who have been awarded Kalinga Prize are Louis de Brogile (1952), Julian Huxley (1953), George Gamow (1956), Bertrand Russel (1957), Karl von Frisch (1958), Arthur C. Clarke (1961), Fred Hoyle (1967) and Sergei Kapitza (1979).

The purpose of the prize is to reward the efforts of a person who has had a distinguished career as writer, editor, lecturer, radio/television programme director or film producer, which has enabled him/her to help to interpret science, research and technology to the public. He/she is expected to have knowledge of the role of science, technology and general research in the improvement of public welfare.

Purpose

The purpose of the prize is to reward the efforts of a person who has had a distinguished career as writer, editor, lecturer, radio/television programme director or film producer, which has enabled him/her to help to interpret science, research and technology to the public. He/she is expected to have knowledge of the role of science, technology and general research in the improvement of public welfare, the enrichment of the cultural heritage of nations and the solutions to the problems of humanity. The objective of the Prize is in conformity with UNESCO's policies and is related to the programme of the Organization in the field of promoting public awareness in science.

Designation, amount and periodicity of the Prize

- The Prize shall be entitled "*UNESCO Kalinga Prize for the Popularization of Science*".
- The Prize shall be funded by contribution of the Kalinga Foundation Trust, the Government of the state of Odisha, India and the Government of India (Department of Science and Technology) and shall consist of a recurrent payment of

£14,000 sterling, which shall cover both the monetary value of the Prize, certificate, UNESCO Albert Einstein silver medal and the cost of the Prize. Any interest that may accrue will be added to the overall contribution. The contribution of each donor is as follows: the Kalinga Foundation Trust, £4,000, the Odisha Government £4,000 and the Government of India £6,000.The donors should submit their contributions to UNESCO, under coordination of the Kalinga Foundation Trust, not later than 31 December of the year preceding the prize award.

The Prize winner will be offered Kalinga Chair by Government of India (Department of Science and Technology) and will be invited to travel to India, for a two to four week period to interact with scientists and science communicators. He/she will be provided with appropriate facilities to familiarize him/herself with Indian life and culture, Indian research and educational institutions, and the development of India's industry and economy. The Chair also comprises a certificate and cash award of US$5,000. He/she will also be invited to visit Indian Universities and attend meetings of Indian scientific societies, particularly those of the Indian Science Congress Association. While in India, the recipient will be asked to deliver lectures in English and take part in meetings, with a view to giving an interpretation to India of recent progress in science and technology or the social, cultural and educational consequences of modern science. Thus, he/she should preferably be proficient in English.

- All funds and the interest accrued thereon shall be kept in a special interest-bearing account of the Prize.

- The full staff support and operating management costs of the Prize, including all costs related to the award ceremony and public information activities, estimated at £4,000 shall be fully covered by donors. To this end, the Director-General will determine a mandatory overhead cost amount to be applied and charged against the funds in the special account, which is to be established under the financial regulations for the Prize.

- The Prize shall normally be awarded biennially in the same year of the UNESCO General Conference.

Conditions/Qualifications of candidates

Candidates shall have made a significant contribution to the popularisation of science. Prizes may be conferred only upon individuals.

Designation/Selection of prize-winner

The Prize winner shall be selected by the Director-General of UNESCO on the basis of the assessments and recommendations made to him/her by a jury.

Jury

- The Jury shall consist of five independent members, of different nationalities and gender, appointed by the Director-General for a period of six-years, eligible for re-election, one of the jury members having been recommended by the Kalinga Foundation Trust. The members of the Jury from different countries of the world shall be designated on the basis of equitable geographical distribution. Representatives and alternatives of Members of the Executive Board cannot be appointed as jurors. Jurors involved in a real or potential conflict of interest shall recuse themselves from further deliberations or be asked by the Director-General to do so. The Director-General may replace members of the Jury for reason.

- The Jury shall elect its own chair Members and shall receive no remuneration for their work, but will receive reimbursement of any expenses linked with the evaluation process, up to a limit of

US$500. A quorum of three jurors who submit their evaluation results will be required for jury deliberations to proceed. The working languages for deliberations by the Jury shall be English and French.

- The Jury shall adopt its own working procedures in conformity with these Statutes and shall be assisted in the performance of its task by a member of the UNESCO Secretariat designated by the Director-General. Decisions shall be taken by consensus to the extent possible and otherwise by secret ballot until a simple majority is obtained. A member shall not take part in a vote concerning a nomination from his or her country.

- The Jury need not physically meet. The correspondence among them could be ensured by airmail, facsimile, or electronic mail.

- The Jury shall send an assessment on nominations and accompanying recommendations to the Director- General of UNESCO not later than 31 August of the year of the Prize.

Nomination of candidates

- When UNESCO has received the funding of the Prize, the Director- General of UNESCO shall officially invite the submission of nominations to the Secretariat of the Prize, by 15 May of the year of the Prize, from the governments of Member States, in consultation with their National Commissions and non-governmental organizations maintaining formal relations [associate or consultative] with the Organization and active in relevant fields covered by the prize.

- Nomination shall be submitted to the Director- General by the governments of Member States, in consultation with their National Commissions, and by non- governmental organizations maintaining formal relations with UNESCO.A self- nomination cannot be considered .Each Member State and non-governmental organization may designate one candidate.

- Each nomination shall be accompanied by a written recommendation, which shall include four copies of the following documents, in English or French:

(i) Description of the candidate's background and achievements;

(ii) Summary of the work or the results of the work on popularization of science, publications and other supporting materials, submitted for consideration; and

(iii) Definition of the candidate's contribution of a review of the way in which the work submitted has contributed to the popularisation of science.

Procedure for the awarding of the Prize

- The Prize shall be awarded by the Director-General at an official ceremony held for that purpose in the place where UNESCO celebrates World Science Day, on 10 November. UNESCO shall present to the prize-winner a cheque for the amount of the prize £10,000, a certificate and the UNESCO-Albert Einstein silver medal. UNESCO shall officially announce the name of the prize- winner.

- The prize may be conferred only upon individuals. A work that has been produced by two or three persons shall not be considered.

- The prize-winner, if possible shall give a lecture on a subject relevant to the work for which the prize has been awarded.

- The work produced by a person since deceased shall not be considered for an award. If, however, a prize-winner dies before he/she has received the prize, then the prize may be presented posthumously to relatives or an institution.

- Should a prize-winner decline the prize, the Executive Board shall decide on the destination of the amount of the prize.

Sunset clause-mandatory renewal of the Prize

- After a period of six years, the Director-General of UNESCO together with the donors will undertake a review of all aspects of the Prize and decide about its continuation or termination. The Director-General will inform the Executive Board of UNESCO about the results of this review.

- In case of termination of the Prize, the use of any unspent balance of funds shall be determined by the Director-General, in accordance with the Financial Regulations of the Prize.

Appeals

No appeal shall be allowed against the decision of UNESCO with regard to the award of the Prize. Proposals received for the award of the Prize may not be divulged.

Amendments to the Statutes of the Prize

Any amendment to the present statutes shall be submitted to the Executive Board for approval.

Source : www.kalingafoundationtrust.com

Birds enjoying in Chilika lake

UNESCO Kalinga Prize

The popularization of Science is one of UNESCO's oldest programmes. It falls under the supervision of the Division of Science Policy and Sustainable Development. The primary objective of UNESCO's popularization programme is to increase public understanding of science.

For the time being, UNESCO has 8 prizes in science.

1. The UNESCO Science Prize, for an outstanding contribution to the technological development of a developing country or region.
2. The L'Oreal - UNESCO Prize for women in Science.
3. The Carlos J.Finlay Prize for Microbiology.
4. The Javed Husain Prize for Young Scientists.
5. The Sultan Qaboos Prize for Environmental preservation,
6. The Great Man-Made River International Prize for Water Resources in Arid and Semi-Arid Areas,
7. The UNESCO / Institute Pasteur Medal for an outstanding contribution to the development of scientific knowledge that has a beneficial impact on human health.
8. **The Kalinga Prize for the Popularization of Science**.

The Kalinga Prize for the popularization of Science is an award given by UNESCO for exceptional skill in presenting scientific ideas to lay people. It was created in 1951, following a donation from Biju Patnaik, Founder President of the Kalinga Foundation Trust in India.

The recipient of this annual award must have demonstrated-during a brilliant career as writer, editor, lecturer, film producer, radio/ television programme director or presenter - talent in interpreting science and technology for the public. The recipient should have striven to emphasize the international importance of science and technology and the contribution they make to improving public welfare, enriching the cultural heritage of nations, and solving problems facing humanity. Many past prize winners have been scientists, while others have been trained in journalism or have been educators or writers.

Each member state is entitled to nominate a single candidate, through its National Commission for UNESCO, on the

recommendation of the national associations for the advancement of science or other science associations, or national associations of science writers or science journalists. Applications from individuals are not accepted.

The laureate is selected by the Director-General of UNESCO upon the recommendation of a four-member jury designated by him. Three members of the jury from different countries of the world are designated on the basis of equitable geographical distribution and the fourth on the recommendation of the Kalinga Foundation Trust.

The Kalinga Prize is awarded during the Celebration of the World Science Day (2003, 2005, etc.) and in New Delhi, India, in even years. Under the terms of the Prize, the recipient receives ten thousands pounds (10,000 GBP) sterling and a UNESCO Albert Einstein Silver Medal. The recipient is also awarded the Ruchi Ram Sahni Chair, introduced by the Government of India in 2001 to mark the 50th anniversary of the Kalinga Prize. As holder of the Ruchi Ram Sahni Chair, the winner travels to India for a period of two to four weeks as the guest of the Government of India. The Chair also comprises a token honorarium of US$ 2,000. In the years when the award ceremony took place during the celebration of the World Science Day, the recipient travels to the city where the science day is being celebrated (2003 in Budapest) as the guest of UNESCO. In the years when it is awarded in New Delhi, the recipient is invited, as the guest of the Kalinga Foundation Trust, to undertake a brief lecture tour in India. For this reason, it is preferable that the recipient be proficient in English.

Each National Commission for UNESCO proposes a candidate only on the recommendation of the national associations for the advancement of science or other science associations, or national associations of science writers or scientific journalists.

The Kalinga Prize for the popularization of Science is administered by the Science Analysis and Policies Division of UNESCO.

Odia Artists at work

List of UNESCO Kalinga Prize Laureates

Year	Name of Prize Laureates	Nobel Prize	Countries
1950's			
1952	Louis de Broglie	Nobel 1929	France
1953	Julian Huxley		United Kingdom
1954	Waldemar Kaempffert		USA
1955	Augusto Pi Suner		Venezuela
1956	George Gamow		USA
1957	Bertrand Russell	Nobel 1950	United Kingdom
1958	Karl von Frisch	Nobel 1973	F.R. Germany
1959	Jean Rostand		France
1960's			
1960	Ritchie Calder		United Kingdom
1961	Arthur C. Clarke		United Kingdom
1962	Gerald Piel		USA
1963	Jagjit Singh		India
1964	Warren Weaver		USA
1965	Eugene Rabinovitch		USA
1966	Paul Couderc		France
1967	Fred Hoyle		United Kingdom
1968	Gavin de Beer		United Kingdom
1969	Konrad Lorenz	Nobel 1973	Austria

1970's

1970	Margaret Mead		USA
1971	Pierre Augier		France
1972	Philip H. Abelson		USA
	Nigel Calder		United Kingdom
1973	Not awarded		
1974	José Reis		Brazil
	Luis Estrada		Mexico
1975	Not awarded		
1976	George Porter	Nobel 1967	United Kingdom
	Alexander Oparin		USSR
1977	Fernand Seguin		Canada
1978	Hoimar von Ditfurth		F.R. Germany
1979	Sergei Kapitza		USSR

1980's

1980	Arístides Bastidas		Venezuela
1981	David F. Attenborough		United Kingdom
	Dennis Flanagan		USA
1982	Oswaldo Frota-Pessoa		Brazil
1983	Abdullah Al Muti Sharafuddin		Bangladesh
1984	Yves Coppens		France
	Igor Petryanov		USSR
1985	Sir Peter Medawar	Nobel 1960	United Kingdom
1986	Nicolai G. Basov	Nobel 1964	USSR
	David Suzuki		Canada
1987	Marcel Roche		Venezuela
1988	Björn Kurtén		Finland
1989	Saad Ahmed Shabaan		A.R. of Egypt

1990's

1990	Misbah-Ud-Din Shami		Pakistan
1991	Radu Iftimovici		Romania
	Narender K. Sehgal		India

1992	Jorge Flores Valdés	Mexico
	Peter Okebukola	Nigeria
1993	Piero Angela	Italy
1994	Nikolai N. Drozdov	Russia
1995	Julieta Fierro Gossman	Mexico
1996	Jirí Grygar	Czech Republic
	Jayant V. Narlikar	India
1997	Dorairajan Balasubramanian	India
1998	Regina Paz Lopez	Philippines
	Ennio Candotti	Brazil
1999	Marian Addy	Ghana
	Emil Gabrielian	Armenia
2000's		
2000	Ernst W. Hamburger	Brazil
2001	Stefano Fantoni	Italy
2002	Marisela Salvatierra	Venezuela
2003	Pervez Hoodbhoy	Pakistan
2004	Jean Audouze	France
2005	Jeter Bertoletti	Brazil
2006-2008		No awards due to change of UNESCO rules
2009	Yash Pal	India
	Trinh Xuan Thuan	Vietnam
2011	**Dr. Rene Raul Drucker Colin**	**Mexico**

Since 2009 the Kalinga Prize was renamed as "UNESCO - Kalinga Prize" and has become biennial.

Source : http://en.wikipedia.org

Dr. Pranakrushna Parija

Samuel Das

To extol Dr. Pranakrushna Parija as a distinguished scientist and a great educationalist should not be at the expense of his stature as a man. Some men are born great and some acquire greatness. Born in a poor family in a village remote from enlightened community and in an environment not very promising, Pranakrushna's struggle for life's opportunities began early. He represents the upheaval task of one who, by the utmost use of natural gifts, disciplined mind, and by perseverance, rose, to eminance in the fields of his choice in science, education and humanitarian service.

Botany is not generally regarded as a fascinating subject by most people and was not a very popular one in the early decades of the present century, when Pranakrushna fixed his preference for it. The subject attracted in him absorbing interest, and as he explored deeply, it became increasingly interesting disclosing the varieties and complexities of plant life against the background of all kinds of life in this material world constituting an entirity in the unimaginable vastness of the universe. He spent about nine years in the Cambridge University (U.K.) and his labours yielded unequal fruitful results. His success in this branch of science, kindled the interest of many a promising student in Orissa to higher studies in this direction. Dr. Pranakrushna Parija has contributed a good deal in organising and improving facilities in higher studies in the subject in the universities in Orissa.

Dr. Parija always kept an open mind to scientific discoveries in other branches of science and it was amaging to note in him up-to-date information, not only in subjects like Botany, but also in other sciences. He said that his mind should be an open door to all truth, and that a successful teacher should be an assiduous student throughout his life. Thus when he was called upon to take over the responsibilities of the Director of Agriculture for a couple of years, he brought to bear his wide knowledge derived from various sources in ensuring effective administration in the department for the improvement of agricultural products.

In spheres of administrative responsibility when Dr. Parija took over he gave attention to related details. Later in his office as principal of the Ravenshaw College, he was invited to serve in many committees and to give counsel in many institutions in different parts of India. He felt very uneasy that he could not do his duty in looking into all details in his office. I was Secretary to the Government of Orissa from 1939 to 1944 in many subjects including Education. We provided a Bursar to relieve Dr. Parija of supervision in financial and routine matters. During 1943, the Parla-Godavaris Ministry took an important decision of establishing a University in Orissa, the first of its kind known as the Utkal University.

The Ruler states in Orissa had not integrated to the province at the time. The Secretariate was asked to give speedy implementation to the policy accepted with the consents of the Ruling Chiefs. The details of the required legislative measure had to be worked out together with the elaborate regulations and rules within the frame work of the agreement with the Ruling Chief and the requirements of the two rulers of Orissa which had not then merged into one. Dr. Parija who was the Vice-Chancellor elect was helpful in giving his counsel and his personal attention into details. The Utkal University was inaugurated in 1943 by the then Chancellor Sir Huthurn Leuis, Governor of Orissa.

Dr. Pranakrushna Parija with his wide experience as an educationalist and as a result of his intimate association in the Universities of Patna and elsewhere gave a proper direction in the working of the new University. There were as usual teaching troubles at the beginning due to inadequate facilities and insist on demands for speedy expansions. The position of a Vice-Chancellor is not a bed of roses, and Dr. Parija had to face inevitable problems and also thereby criticism. The staff also were not quite efficient nor above questionable dealings. As far as possible he maintained a dignified altitude. He pleaded for provision of more officers to deal with expanding departments, when the University shifted from Cuttack to Vani-Vihar in Bhubaneswar. The Senate also presented a scene of stormy controversies some times and Dr. Parija who presided over the meetings eased off the situation by his ready wit and subtle humour. He always maintained the prestige of the Chair in various meetings. In the Senate, the syndicate and the committees, he was a perfect gentleman, and a gentleman is always a gentleman. He could disagree with others without being disagreeable. As a great statesman (Disrali) has said "propriety of manners and consideration for others are the two main characteristic of a gentleman." These virtues indeed were richly manifest in Dr. Parija.

Politics has been one obsession with the students community in post-independent days and this has vitiated academic atmosphere. The rivalry between political parties and the tendency to exploit the youthful forces for their purpose has been a big contributing factor to the unrest. The farment of unrest has assured serious proportion in every sphere of our national life, among workers, labourers, the peasants, the youth, the students and the public servants. It is a common maxim in the political tendencies that when there are great movements for "demands" and "rights" without corresponding regard for the rights of others, or as a matter of fact, for responsibilities to the nation as a whole, confusion and anarchy sets in throughout such a situation is exploited by the strong-willed persons or groups in bringing in authoritarian Government, like dictatorship. Then the people become a bundle of duties with little personal rights. In democracy, worthy the name, the citizen has a balanced view of his rights as well as responsibilities. Political education of the people has been wanting leading to grave consequences in a nation where illiteracy among women is 90 per cent and general illiteracy is 70 per cent. The latest trend has shown that the majority of people are swayed more by their feelings than by reason. This does not augur well for this vast country as India. Dr. Parija with his analytical mind perceived the political trend. He entered the Orissa Legislative Assembly in 1951 as an independent member. He was sincere and outspoken in expressing his views - never compromising on matters involving ethical standard and moral principle. It is more important what we are within than what we express without. Our other expressions should correspond with what we are within. If it is otherwise, we tend to be insincere, hypocritical and prone to cherish double standards. Such a life breeds corruption and opportunism in public life, and such a character breeds cankerworm not only in body politic but also in national life. Dr. Parija kept away from such double standards with his innate

goodness. He was among a few of the lone stars that shed a passing light.

Dr. Parija's sense of dedication was not confined only to the outer world. He had his duty to the family as well. On return from England in 1920, he was appointed as Professor of Botany in the Ravenshaw College in the cadre of the Indian Educational Service. He married Sundermoni, a lady from the rural surroundings with only elementary education. She never entered the threshold of a High School, as there was only the Ravenshaw Girls' High School at Cuttack. Co-education was an anathema in those days. Dr. Parija gave his wife a modicum of education at home including the art of sewing and knitting imparted by a woman tutor. Thus Mrs. Parija was fitted to take her place not only at home, but also in society. She shared with other ladies of the advanced community in activities for the welfare of women and children. Dr. Parija gave his best to his children so as to enable them to have a befitting place in life. In these days when there is call for removal of illiteracy, mostly in rural communities, Dr. Parija's example will serve as a beacon light.

Dr. Parija had a measure of strong weather in his life. There were sad bereavements by the loss of his eldest daughter and the youngest son who was an I.A.S., on such occasions he was composed when I met him on the day following the day his son passed away, he was composed and in his normal mood. When we parted after half an hour's talk, he went inside and presented me a book. He thought I was interested in. Indeed, it was an interesting book for me, it vividly represented the land where Jesus lived, taught and was crucified - such was the range of studies of Dr. Parija.

He had disciplined himself in life from his student days and thus could face the vicissitudes in life with equanimity and steadiness. Discipline characterised him as a teacher, as a research scholar, and as a citizen. He often bewailed the present indiscipline among students. Politics has become an obsession with most students. Politics is not the only aspect of our life. Any one who has politics as his primary interest or agitation as a career is not necessarily a student being enrolled as a student just as a pram being placed in a motor garage does not necessarily turn out to be a motor car or an automobile. As the scripture says - "a little leaven leavens the hole lump." The great scientist Albert Einstein when asked by the research student of the Harvard University for a piece of single advice which should guide them in future, readily answered, "Young men, devote an hour each day to examine your pre-conceived notions or what you have learnt and the time thus used would be most rewarding." A well regulated life is the hall mark of a student and in fact of any one who would be of any worth in this life.

Dr. Parija had that worth as a man. As a friend he was genial, to his opponent he was Polite, as a good teacher he stooped to lift up the least among the taught, as a preceptor he was rich in counsel, in his sufferings he suffered heroically, as a father set an example of simplicity and self-denying love and among the common people he became a commoner with simplicity in manners and habits. He brought a sense of dedication to the cause of science, education and the welfare of his countrymen whom he served. His place is void is now. This can only be filled by men endued with a sense of dedication and loyalty to duty in the spheres of work they have been called to accomplish.

When I met Dr. Parija for the last time, he said "now we are in the railway platform waiting for our train to come and take us away". In my letter of condolence to him after the passing away of his good wife, I wrote "the only consolation we have is that we are at the end of our tether in this life". So it is, time is fleeting away, and those who take time by the forelock and make the best of the opportunities, will have no regret at the glow of the setting sun.

Source : Utkal Prasanga Special Issue 1978.

Biju Patnaik and UNESCO-Kalinga Prize

Prof. Surya Narayan Misra

Kalinga Prize, otherwise known as UNESCO - Kalinga Prize was instituted in 1951 by UNESCO. It was the product of seminal contribution of one of the proud sons of India, late Bijayananda Patnaik (popularly called Biju Patnaik). Shri Patnaik also founded the Kalinga Foundation Trust. The Kalinga Award was an innovative attempt by Shri Patnaik during the early days of the formation of the United Nations. Though British India was one of the founding members of the world body, the idea about the organisation and its specialised agencies was not properly disseminated. Further, the then Odisha was not one of the advanced states of the Indian Union. Late Biju Patnaik, though was associated with adventure and forward looking nationalist struggle, yet he was not the leading figure of the state administration. He was emerging slowly as an industrialist but with a strong passion for development of his motherland. He was greatly influenced by the personality and achievement of Samrat Kharavela of Chedi dynasty who extended the boundary of the state / his empire beyond imagination. Those were the days when Kalinga was a great empire and it had the historic impact upon Samrat Ashok of Kalinga War fame of 261 B.C. to transform him from Chandashok to Dharmashok. Late Biju Patnaik remembered the great days of our glorious past and attempted to make Kalinga a household name. So was the institution of Kalinga Prize whose sixtieth foundation year is to be celebrated during 99th session of the Indian Science Congress inside the campus of KIIT University which symbolises the name Kalinga and the dedicated services of its founder.

The Kalinga Prize was first given in the year 1952 and the recipient was Louis de Broglie of France. The recipient of this annual award must have demonstrated during his/her illustrious career as writer, editor, lecturer, film producer, radio / TV programme director - talent in interpreting science and technology for the public. Further, the recipient should have striven to emphasise the international importance of Science and Technology and the contribution they make for the improvement of public welfare, enrichmnt of the cultural heritage of nations and finding solutions to the problems faced by human civilisation.

The Kalinga Prize is regarded as a prestigious international recognition for outstanding Science popularisation work. The Director General of UNESCO selects the prize winner out of nominations received from member - states on the recommendation of a four member international jury.

The annual prize known as UNESCO - Kalinga Prize is funded by the Kalinga Foundation Trust, the Government of Odisha and the Department of Science & Technology of the Government of India. The award consists of a prize money of £14,000 sterling which covers the monetary value of the prize, certificate, UNESCO Albert Einstein Silver Medal and the cost of administration of the prize.

The prize winner is offered Kalinga Chair by the Department of Science & Technology of the Government of India to tour four week period to interact with Scientists and Science communicators. The awardee is provided with appropriate facilities to familiarise him/her with Indian life and culture including Indian research, educational institutions, industrial development and economic progress. The Kalinga Chair also comprises of a certificate and cash award of US $ 5000. He is also invited to visit Indian Universities and attend the meeting of scientific societies. The prize is awarded during the celebration of the World Science Day at New Delhi. Since 2011 to mark the 50th year of the award the Government of India has instituted the Ruchi Ram Sahni Chair which goes to the Kalinga prize winner.

Among the award winners since 1952 seven Kalinga awardees were Nobel Prize winners also. Sri Jagjit Singh was the first Indian to receive Kalinga Prize in 1963. In 1973 and 1975 no one got this prestigious prize. The other Indian Kalinga Prize winners are Narender K. Sehgal (1991), Jayant V. Narlikar (1996), Dorairanjan Balasubramaniam (1997) and Yash Pal (2009). Due to change of UNESCO rules there were no award from 2006 to 2008. According to a UNESCO circular in 2010 the UNESCO-Kalinga Prize has been awarded to 65 persons from 22 countries. The United Kingdom has shared the credit 10 times followed by USA 9 times. India secured the prize four times. In South Asia besides India, Pakistan has got twice and Bangladesh once. Out of 65 laureates seven were Nobel Prize winners. Men have shown better role in popularisation of Science. They have taken this prize 60 times as against 5 times won by women.

Because of the laudable role of late Biju Patnaik, Kalinga (now Odisha) has claimed a visible space in the international prize scene as a donor country. The award initially was known as Kalinga Prize. But under new rules it is now called UNESCO - Kalinga Prize.

In 2001, during the Golden Jubilee year of this prestigious award another great moment appeared for Odisha / Kalinga. On the occasion of the 50th Anniversary of the Kalinga Prize the International Astronomical Union through its Commission of Minor Planet Nomenclature had decided to name minor planet (Asteroid) No. 26214 as Kalinga. This asteroid was discovered in 1997 by the Czech astronomer Dr. Petr Pravel from the Ondrejov Observatory of the Czechoslovakia Academy of Sciences. Kalinga the asteroid is at a distance of 2946 Astronomical Units (AU) from the earth. An AU is equivalent to 149,597,871 Kilometres.

For all these, Odias will remain ever grateful to its pride product late Biju Patnaik. He was a statesman among politicians and a politician among the Statesmen.

Prof. Surya Narayan Misra, Emeritus Professor, KIIT Law School, KIIT University, Bhubaneswar-751024.

'Kalinga' Now : A Celestial Beacon

Dr. Anil Kumar Mohapatra

Biju Patnaik had many arduous-but-realizable dreams tagging 'Kalinga'[1] to them, but had never dreamed of anything beyond earth to name it after. Now, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) has stretched it from the terrestrial to celestial plane to acknowledge the contribution and spirit of the great soul and the visionary who instituted the Kalinga Prize in 1951. It named - a minor planet (i.e. an asteroid) no.26214 as 'Kalinga'[2] to mark the 50th anniversary of the institution of the much acclaimed Science Prize in 2001. The asteroid was discovered by a Czech astronomer Dr. Petr Pravec in 1997. And, a decade has been passed after that, and this year, we are observing its 60th anniversary.

By instituting the Prize through the Kalinga Foundation Trust, its founder president Biju Patnaik showed in an exemplary way how a 'statesman'[3] should remain well ahead of his contemporary times by 'seeing into the future'. He was aware of the mandate of the Indian Constitution which was then one year old. Biju knew that our Constitution sought a panacea for all ills in the Indian society mostly in the promotion of science. Article- 48 of our Constitution urges the State to endeavour to organise agriculture and animal husbandry on modern and scientific lines. Article-80 provides a sizable space in the Council of States (Rajya Sabha) for persons having special knowledge or practical experience in respect of Literature, Science, Art and Social service. And, the latent duty expected of every Indian citizen thought not mentioned in the original Constitution (now it forms a part of the Fundamental Duties under Article-51A) to develop the scientific temper, humanism and the spirit of inquiry and reform; and to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement. These articles give Constitutional credence to our adherence to science.

Biju realized that development of any sort, economic growth and the welfare of the people in general had been greatly influenced, directly or indirectly, by developments in science and technology. Being a champion of science and technology, he, therefore, 'believed in the modernization of society on a scientific basis. He established the Kalinga Foundation for dissemination of knowledge in science. He also founded the Kalinga Prize for promoting scientific knowledge. The idea behind setting up Kalinga Prize was that every one should have at least a basic understanding of science'[4]. Biju thus instituted this international prize as a symbolic gesture to fight poverty, conservatism, ignorance

and backwardness existing in the world in general and in Orissa (now Odisha) in particular.

Since 1952, the Kalinga Prize (renamed as UNESCO Kalinga Prize in 2009) -an internationally coveted award for the popularization of science has been given annually by UNESCO in coordination with the Kalinga Foundation Trust for the demonstration of exceptional skill in presenting scientific ideas to lay people. The recipient's talent in interpreting science and technology for the public that is useful in promoting public welfare, enriching the cultural heritage of nations, and solving problems facing humanity besides its upholding the international importance of science and technology is taken into consideration. Therefore, a Kalinga laureate may be a distinguished scientist, journalist, writer, editor, lecturer, radio/television programme director or film producer. The Prize is administered by the Science Analysis and Policies Division of UNESCO. Each member state (at present UNESCO has 193 member states and 6 associate members) is entitled to nominate a single candidate, through its National Commission for UNESCO. The laureate is selected by the Director-General of UNESCO upon the recommendation of a four-member Jury designated by him out of whom one member is appointed on the recommendation of Kalinga Foundation Trust. Till now the prize has been awarded to 66 people from 23 countries which include five Indians namely Jagjit Singh (1963), Narender K. Sehgal (1991), Jayant V. Narlikar(1996), Dorairajan Balasubramanian (1997) and Yash Pal(2009). The list of laureates too includes great personalities like Bertrand Russell and Julian Huxley and seven Nobel laureates. Dr. Rene Raul Drucker Colin of Mexico will be the next person to receive the prestigious UNESCO Kalinga Prize for the year 2011 for his contribution to popularise science among common men.

An effort for the popularization of science in India dates back to the days of Raja Ram Mohan Roy who came with an out-and-out support for rational and scientific education of western type. He held that such education was responsible for great developments in the western world. He was in favour of embracing Mathematics, Chemistry, Anatomy and other such sciences. He published some journals in different languages 'to spread literary, political and scientific knowledge among the people of India'[5]. Swami Vivekananda too advocated for a synthesis of the Indian spiritualism with that of the western materialism or science which would suit to the needs of Modern men. Gandhiji appreciated the use of technology with certain reservations. To him, it must not deprive a man of his livelihood in the name of development. Rabindra Nath Tagore[6] once told, "I am not a scientist, but from childhood my strong desire to enjoy the rasa of science knew no bounds... Although he was critical of technology dominating over man in some of his plays (Muktadhara, Raktakarabi), he readily embraced its beneficial effects. In Sriniketan, where the emphasis was on rural reconstruction, he introduced many technologies like weaving, carpentry, leather work and so on. In Personality (1917) he wrote: "Science is at the beginning of the invasion of the material world and there goes on a furious scramble for plunder. Often things look hideously materialistic, and shamelessly belie man's own nature. But the day will come when some of the great powers of nature will be at the beck and call of every individual, and at least the prime necessaries of life will be supplied to all with very little care and cost. To live will be as easy to man as to breathe, and his spirit will be free to create his own world." Partha Ghose further writes, "To Rabindranath scientific truths were not mere abstractions and formulas but concrete living truths that inspired him to write

great poems and compose wonderful songs. He assimilated and internalised the scientific spirit and weaved it into the very fabric of his philosophy and his artistic creations. So complete was the fusion that the songs and poems appear to stand by themselves as great artistic creations far removed from the world of science"[7]. Nehru was in favour of the use of science and technology for better production and development. He regarded dams and industries as the temples of modern India. He believed there was no alternative to industrialization in the modern world. He therefore, paid special attention for power generation and irrigation projects etc. Among the scientists who have popularized science in India include Sir Jagadish Chandra Bose, Prafulla Chandra Ray, Srinivasa Ramanujan, Sir Chandrasekhara Venkata Raman, Meghnad Saha, Satyendra Nath Bose, Shanti Swarup Bhatnagar, Homi Jehangir Bhabha, Subramaniam Chandrasekhar, Vikram Sarabhai, C. R. Rao, K. Chandrasekharan, Har Gobind Khorana, G. N. Ramachandran, Harish Chandra and M. K. Vainu Bapp etc. The list is not all inclusive as many are left deliberately keeping in view the time and circumstances under which they worked and earned achievements when little infrastructure and little support from the Government was available. Among the recent ones we can include the ex-President A.P.J. Abdul Kalam and Professor Yeshpal etc.

In case of Odisha the credit for popularizing science among common men must go to Samanta Chandra Sekhar. He remains till now as a house-hold name in the field of astronomical science in Odisha. His 'Siddhanta Darpan' which embodies his accurate astronomical calculations regarding the movement of planets surprises many as he did it being completely unaware of the scientific and technological developments in the West. He only used the traditional methods for astronomical measurements. Among the modern Odias the name of Madhusudan Das comes first to mind. He strongly supported the use of scientific and modern techniques of agriculture in Odisha to eliminate poverty from its soil. He established industrial units like 'Orissa Art Wares' and 'Utkal Tannery'. Among the persons who have popularized science in Odisha, the names of Professor Pranakrushna Parija till the recent ones like Gokulananda Mohapatra, Kulamani Samal and Rabindra Mohan Senapati etc. are noteworthy. However, with regard to the application of science into development outputs the credit and applauds in most part shall go to none other than Biju Patnaik. Saying all these, in the end, we must admit that none of our Odias has yet been qualified for the Prize even though it was instituted by an 'Odia'[8] long ago. That has made the Kalinga Foundation Trust to consider instituting a separate State Level Prize for Odias namely – 'Kalinga Samman' for Popularization of Science among the common People in the state from the Year 2010.

In the present world, science and technology have become indispensable. Science and technology is looked upon to provide the missing-link between poverty and prosperity. Science generates ideas, knowledge and information. It changes attitudes and creates new values. The march of science has enough potential to antidote the evils of superstition and irrational beliefs. Technology, which is the application part of the knowledge, has been instrumental in bringing socio-economic changes. The application of science has transformed our subsistence agriculture into commercial agriculture; it has revolutionized communication and commerce. Scientific knowledge are being utilised in health and in other socio-economic sectors. Science and technology have played a crucial role in disaster

management and disaster mitigation. With science and technology, we, in India have made commendable advance in space exploration, energy, industrialization, electronics and oceanography. It is due to science and technology we are now a leading economy in the world. However, the narrative reflects only one side of the reality. The gloomy part of it is that rural India does not make similar progress like that of the urban. The dichotomy between the two called 'Bharat-India' divide is looming large. Many are still in misery and thus remain below-poverty-line despite there has been a significant increase in our Gross Domestic Production and Per Capita Income. The boons of science are not reaching the impoverished and downtrodden. The perils of environmental degradation, pollution and climate change are so threatening that survival of humanity beyond a specific period remains a question to be addressed. The availability of safe drinking water given the shrinking ground water level has been a matter of concern. Therefore, there must be an interface between the researchers and policy makers on one hand and the rest of the society on the other. There must be a constructive use of science and technology for the better, sustainable and equitable management of resources which can lead to a genuine development of the country. It brings to mind an often quoted Gandhiji's talisman[9]: "Recall the face of the poorest and weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it? Will it restore him to a control over his own life and destiny? In other words, will it lead to Swaraj for the hungry and spiritually starving millions". And, at this juncture, 'Kaling' as a beacon from the heaven may prevail upon the scientists and policy makers to use and utilize the divine blessings came through science to make life better on earth not its demonic barter for vested interests. Could this dream of 'Kalinga' be translated into reality by linking heaven to earth – future will tell!

Notes and References:

1. Ghadai, Balabhadra(2008), "Biju Patnaik, the son of the soil", *Orissa Review*, February - March P.35. He has mentioned that "The name of Kalinga was so dear to the heart of Biju Babu that he set up Kalinga tubes, Kalinga Airways, Kalinga Iron work, Kalinga Refractories and the Kalinga, a daily Oriya Newspaper. In 1951 he established the international Kalinga prize for popularisation of Science and Technology among the people and entrusted the responsibility to the UNESCO.
2. See the letter of the Senior Programme Specialist-Science in the Office of the UNESCO representatives to Bhutan, India, Maldives and Sri Lanka written to the Managing Trustee Kalinga Foundation Trust , Anand Bhawan, Cuttack vide Letter no DIR-jk/Kalinga/08-01 Dated 4.10.2001.
3. Prochnow, Herbert V.(1949), "*The Toastmaster's Handbook*", New York: Prentice-Hall, p. 264. It has quoted Edmund Burke's observation on statesman that, 'the great difference between the real statesman and the pretender is that the one sees into the future, while the other regards only the present; the one lives by the day, and acts on expediency; the other acts on enduring principles and for immortality.
4. Rout, B.C.(2005), " Biju Patnaik: A tribute", *Orissa Review*, March, P.2.
5. Nayak, G.C. (2004), "Indian Political Traditions", New Delhi: Kalyani, p.55.
6. Ghose, Parth(2011), 'Man of Science', *Frontline,* Vol. 28, No. 27, 31 December – 13 January, 2012.
7. Ibid.
8. See the *Constitution (Nine sixth Amendment) Act, 2011* which has substituted Odia for Oriya in the seventh Schedule of the Constitution of India w.e.f. 23.10.2011.
9. Anand, Mulk Raj(ed.)(1988), "*The living thoughts of Mahatma Gandhi*", New Delhi: National Council of Educational Research and Training, p.XII.

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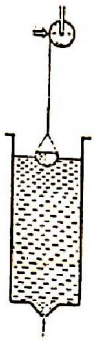
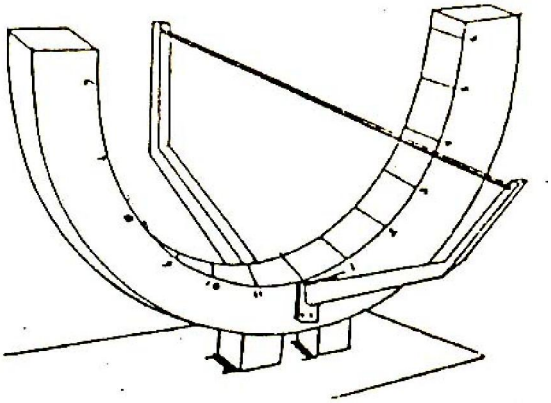
The Legacy of Samanta Chandrasekhara

Nikunja Bihari Sahu



Swayambaha Yantra

One of the greatest original astronomers of all time, Samanta Chandrasekhara extended and enriched the scope of Indian astronomy by virtue of his practical observations of the night sky. His full name is Mahamahopadhyaya Samanta Chandrasekhara Sinha Harichandan Mohapatra. However, in Orissa he is popularly known as Pathani Samanta, a nick-name given by his parents on account of their first two children having died in infancy. India has, over the years, produced many outstanding scholars in Astronomy such as Aryabhatta-1 of Kusumapura (476 A.D.), Varahamihira of Ujjaini (503 A.D.), Brahmagupta of Bhillamala or Bhinmal in Rajasthan (598 A.D.) and Bhaskara-II of Bijayapura or Bijapur in Karnataka (1114 A.D.). Samanta Chandrasekhara is said to be the last link in this long chain of classical astronomers that our country has produced.



Chapa Yantra

Early Days

Although the exact date of birth of Samanta Chandrasekhara is debatable and shrouded in mystery, he is believed to have been born on 13th December, 1835 in a royal family of the princely state of Khandaparagarh presently in the district of Nayagarh. Struck with poverty, child Chandrasekhara had little scope of having any formal school education or access to the breath-taking developments of science which was sweeping the whole western world at that time. There was no teacher who could instruct him into depth and he was quite ignorant of any language other than Sanskrit and his mother-tongue Odia. Only a paltry collection of books in his family library written on palm leaves in Sanskrit in purely classical style was the sole source of information for him. He has to content himself within the hills and jungles of his native place with only the stars as his guide.

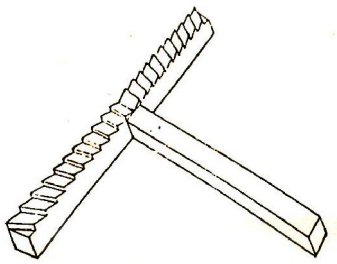
Need for Accuracy

It is said that at the age of 10, one of his uncles initiated him to astronomy and showed him few stars in the sky. This aroused his curiosity for the stars that persisted as a lifetime passion. At

the age of 15, he noticed that the position of stars was not in accordance with the rules prescribed in the famous astronomical texts or Siddhantas followed at that time. Again and again, he measured with a graduated rod the relative distance of heavenly bodies anticipating an agreement between the observation and calculation, but every time his hopes were dashed to the ground. He was not sure whether the rules were fundamentally wrong or his observations lack the accuracy as demanded by the merit of such task. Only correct measurement was necessary to settle this doubt which inherently requires efficient instruments. As there was no instrument maker at that time to supply him with the requisite tools to carry out such precise measurements, he had to develop his own set of instruments out of whatever materials he found, such as bamboo and wood. Sometimes, he used shell of the fruit Bottle gourd, an iron bowl as the raw material. Needless to say, the clear and blue canopy of the sky seen from his place was his observatory that offered him endless scope for astronomical pursuit.

Tools

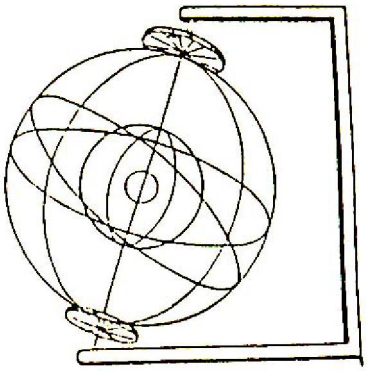
His instruments can be broadly classified into three categories, i.e. instruments for measuring Time, Versatile instruments and Armillary Sphere. In the context of the highly sophisticated instruments in use these days for astronomical measurements (capable of millionths part of a degree in accuracy), it will be interesting to have an idea of the instruments he was actually using. Instruments for measuring time include sun-dials like Chapa Yantra, Chakra Yantra, Golardha Yantra, and of course, a Water clock called Swayambaha Yantra. Chakra Yantra which measures time for an entire day consists of a graduated disc with a staff fixed at the centre. Chapa Yantra, basically a semi-circular dial with a pointer aligned at the Pole-star, measures time for half of a day. Golardha Yantra is a hemi-spherical sun-dial.



Mana Yantra

The instruments which were for versatile use primarily include a stick called Shanku and a 'T' shaped instrument called Mana Yantra. Shanku, or Gnomon as it is popularly known, consists of a stick of measured height fixed vertically on a leveled ground. By measuring its shadow length cast by the Sun at different times, it was possible to determine the directions of a place, the Local Time, the Latitude of the observer, the Altitude, the Zenith Distance and the Declination of the Sun and its position along the Zodiac belt. However, his most favourite instrument was the Mana Yantra which readily measures angles in the sky as well as on the ground. It consists of a wooden staff to which is attached a cross-piece in the form of a 'T'. The cross-piece is notched into stairs and pierced with holes to indicate the angle subtended by the distant object at the free end of the staff. With this instrument in hand , he is said to have measured the height of the Saptasajya hill with a fair degree of accuracy once upon a request made by the then British Commissioner of Cuttack Mr. Cooks. With Mana Yantra, he also measured the height of the Mahendragiri hill of Manjusha in Parikuda upon a request made by the king of Manjusha and his value was verified by the then Madras Government. Both Shanku and Mana Yantra can also be used to determine the height and distance of a hill, tree, lamp-post or cloud. Of course, for such a task (where both the Height and Distance of the object are unknown), separate

measurements from two different distances have to be taken.



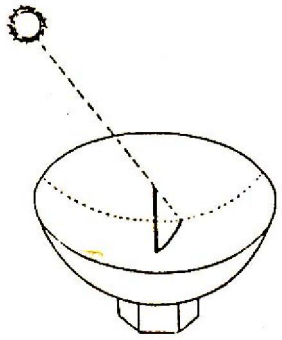
Gola Yantra

Armillary Sphere or Gola Yantra was a very common device prevalent among classical Indian astronomers and is basically a three-dimensional model of the celestial sphere. It was used as a demonstration kit for showing to students various great circles used in astronomy as well as for measuring the Latitude and Longitude of planets. In this mode, it was able to show the direct and retrograde motion of the planets along the zodiac circle.

Landmark Contribution

Samanta Chandrasekhara, at the first hand, attempted to improve the existing calendar system that regulates the daily rituals of the Hindu society. This was very important, as the native Hindu almanac computed from the rules given by the old Siddhantas were falling into serious errors and no two almanacs agreed in their computations. Samanta Chandrasekhara has, therefore, painstakingly re-determined the elements of the old Siddhantas aided by his practical observations. The ephemeris computed from his elements proved to be more accurate than any other almanacs available at that time, and hence, provided a standard source of reference in the otherwise chaotic situation prevailing at that time. Not surprisingly, his calendar system was accepted in many learned circles including the temple authorities of Puri for performing various day-to-day rituals of the deity.

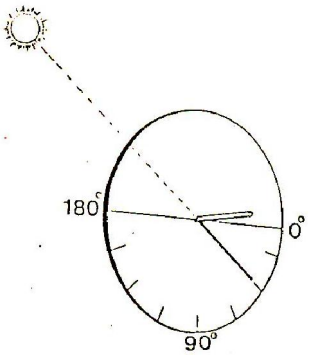
He has prescribed several corrections to be applied to the mean motion of the planets so as to precisely determine their positions in the sky. The ephemeride computed from his elements were in close agreement with the Nautical Almanac followed in Europe at that time. While the Bengali almanac may be in error by as much as 4^0, the corresponding error in Siddhanta Darpana was restricted to only half a degree.



Golardha Yantra

Chandrasekhara has discovered some original corrections to be applied to the mean motion of the Moon to account for its three important anomalies, i.e. Evection, Variation and Annual Equation. Although some of these anomalies were known to independent observers at various tomes, Chandrasekhara was the only Indian astronomer who has detected and measured all these three values.

Another important contribution of Chandrasekhara was the improvement of the values of Parallax for the Sun and the Moon which were so important for the calculation and prediction of eclipses. To determine the parallax of the Sun and the Moon, their respective distances from the Earth have to be expressed in terms of Earth radii. Chandrasekhara has suggested an innovative experiment with a coin so as to determine the ratio of the Distance to the Diameter for the Sun and the Moon. A table comparing the values for the Horizontal Parallax as determined by various observers of that time is appended below:



Chakra Yantra

Parallax of Objects	Old Siddhantas	Chandrasekhara	Modern Value
Sun	3' 56"	22"	8.9"
Moon	52'42"	56'28"	57'03"
Difference of Parallax for the Sun and the Moon	48'46"	56'6"	56'51"

Siddhanta Darpana

Armed with the devices, Chandrasekhara spent nights after nights in the all absorbing game of star gazing. At the age of twenty-three, Chandrasekhara started to record his observations systematically and compiled these findings in a masterpiece treatise written in Sanskrit on palm leaves called Siddhanta Darpana which he completed at the age of only thirty four. But it took 30 years to get published in Devnagari script from Kolkata. It contains 2500 number of slokas of which 2284 are compiled by himself and the rest are due to other scholars. This book contains numerous instances of astronomical methods of determining the position and motion of planets, mathematical treatment of spherical astronomy, instrumentation techniques, improvements over earlier measurements, theories and models.

Acclaims and Accolades

For his landmark achievements in the field of astronomy, he was conferred the title Mahamohopadhyaya in 1893 by the British Government in a special convocation ceremony held at Cuttack. He was compared with Tycho Brahe, the Danish astronomer for his striking similarity in life and works.

His treatise Siddhanta Darpana earned him wide acclaim abroad. His work was highly appreciated by the prestigious British journal Nature (Vol. 59, March 1899) and the American journal Knowledge (Vol. XXII, Jan-Dec, 1899). According to the journal Knowledge, "Of all the numerous works in astronomy published within the last few years, this is by far the most extra-ordinary and in some respects the most instructive …….. and is a complete system of astronomy founded upon by naked eye observations only…… The work is of importance and interest to us Westerns also. It demonstrates the degree of accuracy which was possible in astronomical observation before the invention of telescope, and it enables us to watch, as it were, one of the astronomers of hoary, forgotten antiquity actually at his work before us today." The journal Nature writes, "We should imagine him to be greater than Tycho, for without the same assistance, without the encouragement of the kings and the applause of his followers, he has advanced his favourite science quite as effectively as did the Danish astronomer…….. The effect is to leave us at every page with a higher opinion of the author labouriously recording his observations on a palm leaf, and unselfishly devoting his life to the services of his country-men who do not appreciate the nobility of his effort and the entirety of his devotion."

Samanta Chandrasekhar is clearly the pride of our State. He symbolizes how best human talent can rise within various earthly constraints, and hence, his life and works will continue to be a source of inspiration for the young for years to come.

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Astrology, Astronomy and Spiritualism in 'Siddhanta Darpana': A Comparison with Similar Thoughts

Dr. K.C. Sarangi

Jyotisham api tatjyotih ……
Jnanam jneyam jnanagamyam ……

(Gita, Chapter 13, Verse-18)

The creator of 'Siddhanta Darpana' was indeed one among millions. He worked and struggled in the solitude to 'hear the unheard and glimpse the invisible'.

'Siddhanta Darpana' is an immortal creation of the famous Odia astrologer Samanta Chandrasekhar. Astrology emanates from the Vedic thoughts. It is immensely useful for the society. Aruna Kumar Upadhyaya, in his translation of 'Siddhanta Darpana' in Devnagari script writes:

'*Udwesya Jyotisa' is known as the eyes of the Vedas. Setting it apart, it is difficult to know the time of ancient literature and scriptures. Without knowing time of the scriptures, any discussion on the Sashtras may not be proper and hence may not be understood in the proper context.* (Preface i)

Upadhyaya further clarifies with specific reference to 'Siddhanta Darpana':

'*Siddhanta Darpana' is useful in two ways. Hitherto, the disputed subjects in all astrological theories have found a solution in this great book. One may, therefore, benefit the knowledge of all astrological literature by reading this one great book on astrology. Secondly, the writer, Late Samanta Chandrasekhara, wherever, had not explained the astrological theories of the past, he had, at least, given indication how to approach the same. Last but not least, Chandrasekhara had made correction in the movement of the Moon. In its correctness, it is equal to the modern astronomy.* (*Ibid,* Preface-ii).

As a subject, the present astrology in India is taken into account from the period of Aryabhatta. However, there are rare astrological master-pieces like, 'Jyotisha Bhaskar', written by the Divine teacher Brihaspati, which shines like the Sun in the sphere of astrological sciences. This is not available in the public domain. References about the same may only be available in the great and exemplary Samhitas written by

Sri Achyutananda, the rarest genius and the Saint who adorned the soil of Utkal during the regime of king Prataprudra. In the ancient time, Magadha was one of the richest places not only in India but also in the entire world. In the capital city of Magadha, institutions were established for imparting knowledge on 'Khagola'. Aryabhatta was the Principal Preceptor in one such institution. The name of this capital city was 'Puspapur' or 'Kusumapura' at that time which is the present Patna city. Since there was an apprehension of the invasion of Huns, Aryabhatta wrote a formulae (Sutra) to indicate the availability of astrological knowledge there. He writes:

aryabhatta stwiham, nigadati satyam.
kusumpure varcitam jnanam.

Through the above couplet, Aryabhatta symbolically states that all astrological knowledge are available at Kusumapur. After Aryabhatta, Barahamihira and Bhaskar wrote about this great mystical science basing on their respective studies of scriptures. None of them, however, has explained what is the flow of the number in assessing the movement of the planets. However, 'Siddhanta Siromani' written by Bhaskar is one of the standard treatise on astrology of present day as observed by Sri Aruna Upadhyaya in his preface to 'Siddhanta Darpana'. (P. XV).

In the Indian tradition among the astrologers, Samanta Chandrasekhar and Bala Gangadhar Tilak were considered to be the contemporaneous exponents. Whereas Tilak studied English and modern Mathematics, Samanta Chandrasekhara had no scope to learn about these secular branches of studies. As a consequence, he had to struggle ceaselessly. Furthermore, this rare genius and his immortal creation could not be appropriately recognized by the western scholars nor even by Indian scholars outside Odisha. Another hurdle was that though Samanta wrote in Sanskrit language but he used Odia scripts. Thanks, however, to Professor Joges Ch. Ray whose introduction brought some recognition for this unprecedented talent.

At that point of time, it was unsettled whether the earth is static or the Sun is static. When western scientists were of the opinion that the earth moves round and the Sun is stationary, Samanta placed a completely different proposition. Samanta said that the earth is static. He assailed the western arguments saying that 'if all the stars are illuminating as the Sun and all of them spread light in all directions equally being static how then night dawns upon this earth'. His second argument was that 'if all the planets are moving around their orbits, what makes the largest planet, Brihaspati move so fast?' His reasonings could scarcely be countered by the western scientists. Chandrasekhara had no scope to telescope. His only instruments were two sticks and his deep concentration on the sky. Whatever may be the scientific position of his stand on the above issues, viewed from the present standard, it is no exaggeration to say that it was a great fortune for Odisha that such a talented son like Samanta Chandrasekhara was born in its soil. Born though in a small princely state like Khandapara, which has little importance in the world geography, Chandrasekhara had a tremendous sense of belonging for the state, its people and its highly adorable deities. Deeply moved by the culture of Odisha, he writes in 'Siddhanta Darpana':

yatra khetram pabitram vilasata sitarung mitra netrasya gatram,
gotrayatratimatrah tadavayava sruta dipavatyo vicitrah
swasthanasthah padasthapita nijajanata devatah

santi nitya
martyah smartah smararta haricharanratah ca
utkalah stat kalighnah.

(Prakasha 23, Verse-2).

In the State where the Kshetra and body of the lotus eyed Lord Krishna exist, the state wherein exist several mountains, the State where in the temples, there is perennial Diwali and the deities though seated in their own respective temples confer high status to their devotees, the State where the people apart from doing their jobs sincerely, also actively utter the holy name of God and worship His lotus feet, the same Utkal State may destroy the vices of 'Kaliyuga'. The poet-astrologer asserts that the people of Odisha may appear small considered from the angle of material progress. But they reveal divinity in their appearance 'udra, proudha, prabhavo jayati paribadhah sanadeshasya soyam'. Such honour and sense of respect for Odia tradition, culture and people do find parallel comparison only in the descriptions in 'Kapila Samhita'. The great Saint Kapilacharya writes:

sarbapapa haram desam udram debaistu kalpitam
srunudhwam kathyamanam hi vistarenasya bho dwijah,
tasmina odre sada santi krishnarkaparbatiharah
ekashya ekashya khetram tu sarbapapa pranasanam

(Chapter 2, Verse 2 & 3).

According to Kapilacharya, Utkal is a State designed by the Divine to be the abode of Lord Krishna, Suryanarayana (the Sun God), Lord 'Maheswar' and Divine Mother 'Parvati'. The greatest glory of the state is the river Mahanadi. Kapila Samhita reveals that the river which flows close to the lotus feet of Lord Neela-Madhaba is the 'Divine Mother' 'Suradhuni', Bhagirathi whose sacred water sanctifies the Indian soil and Indian people from time immemorial.

tatradese dwija srestha nadinam uttama nadi
mahanandiiti vikshata sarvapapa pranodini
tasyam nadyastu mahatmyam kathayami punah punah,
jashyam snatwa nara srestham dibyalokam abapnyati (Chapter-2, Verse 4 & 5)

Sukanti, a great sage of ancient India, brought the Divine Mother Ganga "papaghnim Janhabi bhaktabatsalam" (the Divine Mother who loves all devotees and the destroyer of sins) to Utkal (Chapter 2, Verse-23). Sukanti prayed the Divine Mother who is 'trailokyapavini' to flow towards Purba Sagar i.e. Bay of Bengal. Moved by his prayer, the Almighty Mother answered :

mahanadi iti bikhyatam gamisyami atra sarbada
bhagirathena anita jathartham papanashinee
tasmat sataguna prokta twayaham duritapaha
sarbada taba kirtistu sthasyati atra mahitale

(Chapter 2,Verse 33 & 34)

The Divine Mother said, 'Son', your penance be completed without any obstacle. When I will flow towards Purva Sagar (Bay of Bengal), 'I will not be known in my name. I will be known as Mahanadi from here'. (Kapila Samhita edited by Kedarnath Gabeshana Pratisthana, Grantha Mandira 2000 P.113). Bhagiratha once could do this because of his atmic consciousness, equity, equal-mindedness, shunning of all material prosperities, keeping the bird-like mind quiet and peaceful in heart and doing the assigned work in an unattached manner. (Yoga Vasistham Ramayana, Nirvana Prakasana). So also could do the sage Sukanti in a like manner. Similar was also the perseverance of Chandrasekhara who could bring the Jnana-Ganga for the humanity in the shape of 'Siddhanta Darpana'. Such is our culture, such is our glory and such is the blessing of the Almighty for this State and its people. The great sage, Kapilacharya, was firmly of the opinion that Utkal is the greatest among all the states and such a

state does not exist on the earth. Lord Purusottam is the king of this State. The principal deities of this State 'Krishnarka Parvati Hara', Lord Krishna, Lord Sun, Divine Mother Parvati and Lord Shiva all eternally reside in this State. All sacred Tirthas exist in this state. All the sacred Tirthas of the State are enriched with natural beauty. The saints do observe penance near them. Rivers, mountains, ocean, forest land, all situated in this State are magnified by the blessings of the deities.

Prajna Purusha, Pathani Samanta also created few other masterpieces apart from 'Siddhanta Darpana' namely 'Darpana Sara', 'Darsa Dipika' etc. But the book which has engaged the eminent scholars' attention across the centuries has always been 'Siddhanta Darpana'. The honour of the poet echoes in the heart of all Odias: *"siddhanta darpana heva nahin laya, nara dehe thiva jabat hridaya"*. (As long as conscience exists in humanity, Siddhanta Darpana will not lose its glory). This talent colossus, achieved miraculous height without any infrastructure or scientific instrument or secular learning as earlier stated. This attracted immensely Prof. Joges Ch. Ray, who writes:

He had no one to encourage him in his pursuit, and no notice was taken of his work. Our Govt. could only confer upon him an empty title which he had never coveted. Geniuses are like delicate plants, never plentiful anywhere and depend upon tender care for growth and development and facility. Let me therefore hope that the past neglect of his countrymen may yet be compensated, and that better may yet dawn upon our old and crippled observe of heavenly bodies (Ray, Introduction to 'Siddhanta Darpana).

As earlier discussed astrology, had its origin from the Vedas. Vedas are the creation of the Almighty Father. According to Rig Veda (10.121), the Lord known as 'Hiranya Garbha' was the first to exist. He then became the first Lord of the creation. He was the sole Lord of all those that breathe in the whole world. He created the earth and the sky. His laws are eternal. (R.N. Vaidya, Introduction to Vedas). Such an inspiration for exploring the Vedic knowledge engaged the attention of Samanta Chandrasekhara in whose conscientious writing the majesty of the universe prevailed. As a result, what emerged from 'Siddhanta Darpana' is a poet-seer-astrologer, a Vedic scholar and also a devotee of the highest order. Chandrasekhara writes:

antarbedi tribedi nigatitamahima adhityaka nityakantah
tungahsrungani jasyamara nikaragruhah pavani yad vaneeshreeh
prakaro yatprapatah pramatha patinutopatyaka purjadeeya
sa srisambhodbhari vitaratu jagatam mecakam mecakadrih

(Prakasha 23, Verse 6).

(The Lord who knows the heart of all; whose greatness is praised highly in all the Vedas; the high floors of Whose mountains are always elegant; in Whose mountains' cage, the divine Deities stay and with their associationship, the devotees are sanctified, the walls of Whose temple are as high as mountains, the sacred precinct of Whose temple is always worshipped by Lord Shiva and Whose temple's sacred premises are always calm and cool (the rays of the Sun being covered by the clouds), the Lord of this Neelagiri may like to bless us always).

The saints, indeed, are very simple in their hearts and they always think of the wellbeing of the society. Through all their writings they only

pray for devotion before the lotus feet of the Lord, 'Rama charana rati dehu' as Goswami puts it in Bala Khanda of 'Shree Rama Charita Manasa'. It goes without saying that Samanta Chandrasekhara was a saint, equally pious. The flag known as 'Vaijayanti' which adorns 'Nilachakra' of Lord Sri Jagannath's temple has also not escaped the notice of the brilliant poet-seer, Chandrasekhara who writes in Siddhanta Darpana:

tunga prasada srunga pratilaba pabana andolita vaijayanti
bachhakalpadru tirtheswar sirasi caratpallavasri jayanti
jamyaswamyatitamyajjana brujina camu murjitam tarjayanti
payanmaya bhavadhwa shramamiva shaminam vijanaih marjayanti.

(Prakash 23 verse 7).

In the Nilachakra of Lord Sri Jagannath, the Vaijayanti Flag is flying every moment in a rhythmical manner. There is no dearth of air at that place. The movement of this Flag, like the dancing waves in the ocean, beautify the environment in such a manner that it defeats the beauty of the dancing leaves of 'kalpabrikshya' of Tirtheswara. The flag bestows immense blessings. The sinners who are being penalised severely by Dharmaraj -'Yamaraj' and his courtiers are saved by the grace of this Vaijayanti as they are purged of their sins by its sight. In this world of illusion, let this 'Vaijayanti' flag mitigate the struggles of our wearisome journey, as peace assuages the mind.

The poet-seer's vision was not confined to any regional or geographical limitation. He wished the salvation of the entire humanity. It is extremely difficult to believe that such a brilliant master-piece, like 'Siddhanta Darpana' could not be much explored due to constraints. Time has, however, taken some new dimensions. The steps taken by Sri Aruna Kumar Upadhyaya in translating the Odia script into Devnagari script, undoubtedly, will go a long way in facilitating further research. He has created a rare opportunity for interested scholars. Central Universities across the country, different Sanskrit Universities may add to the height of such endeavour by discovering the real message, this blessed soul of the country wanted to give to the humanity. In the process, many invaluable wisdom may also come to lime-light. Professor Joges Chandra Ray was so much moved by the description in 'Siddhanta Darpana' that he wrote in February 1899 in his introduction to the Book.

In this state of indigenous sciences, it is singular to find a man born and brought up in the recesses of the hills of Orissa far removed from all educational activity, and the influence of imported western civilisation, silently treading his way into such a difficult science as Mathematics. It is a unique experience in the department of national development to find a man really striving after knowledge for its own sake under difficulties whose magnitude is no less startling than the boldness of his attempt (Introduction to 'Siddhanta Darpana')

Five remarkable qualities of Chandrasekhara, apart from his rare wisdom, are clearly perceptible from his noble living (a) He was striving, as Ray puts it, after knowledge for its own sake. This speaks of his 'Karma Sanyasa yoga'. The 'Gita' has upheld 'yoginah karmakurbanti sangam tyaktwa atmasuddhaye'. (Chapter 5 Verse-11). (b) Chandrasekhara was also quite humble in his approach. (c) Humility, however, did not trespass into his self-confidence. He was rather sure of his conviction. (d) Rarest among his qualities was his presentation as a totally surrendered devotee of the Cosmic Power, and

his writing in an unattached manner placing the entire presentation before the Lotus feet of the Lord. (e) Lastly he was very kind and concerned about the difficulties of his fellow beings.

His humility is clearly visible in the chapter 'Upasamhara Varnananam' (Prakasha 24) of 'Siddhanta Darpana':

bhimasyapi parajayojudhibhaved buddhi bhramah syat muneh
kadacitkataya pyatolpa vidusa masadrunshanka katha
tasmad yad yad suddha mantra ganitam yadva sahartham padam.
tatsarvam parisodhayantu krutinah krutwanu kampammayi.

(Verse 157)

At times, Bhima was defeated in the war. The saints and wise men may sometimes, commit errors. Not to speak therefore, of a person of little wisdom like me. Wherever there is any mistake in this book or any repetition having the same meaning, the wise men and experts may correct these themselves showing kindness on me. The humility of the seer-astronomer is unique and incomparable. This humility alone is the goal of all education. The didactic value of 'Siddhanta Darpana' for the society and the educational system is, thus, perceptibly clear. Later Sai has explained about humility in unequivocal terms, "In times gone by, universities were referred to as 'homes of humility' since humility was the characteristic of an educated person. Pride is the root of aggressiveness; it is the nature of wild animals. But the mark of man is humility in the presence of elders, teachers and parents. There is an ancient maxim which says, 'Education imparts humility, humility ensures credibility, credibility brings wealth, wealth induces charity, charity confers peace and joy, here and hereafter' (Sathya Sai Speaks, Vol. XIV P.173).

On the other hand, the poet-astrologer maintains his self-confidence and is sure of his own vision. He writes in 'Siddhanta Darpana' in the same Prakasha:

brahmandakhanda bhanda sthiratara dharani mandala bhranti sounda
prodandaim landadanta valavala dalana kuntha kanthiraba shreeh
soyam neeladri singha nnwayavadana darinirgartah praptadurgah
sphita swasya tirastu prathama viganita skandha sarah pravandah

(Verse 158).

'Siddhanta Darpana' may be a thesis or a book. Amidst the three Skandhas of astrology, this is the best in astrological calculation. It is not easy to realise its inherent theme. Its author having born in the clan of Neeladri Singha, it emanates from his mouth like a lion. In this entire universe the earth is static. The lion denying its movement will overpower the arguments of western scientists whose arguments are like the acumen of an elephant. The glory of this Grantha may be increased further and further.

Chandrasekhara's concern for the struggling humanity, 'the milk of human kindness' as Shakespeare puts it, is visible from the following incident. In 1866 the unfortunate severe drought took place in Odisha. Many people breathed their last due to starvation. Khandapara was also no exception to the cruel impact of this drought. At that time, unable to make both ends meet for the large family Chandrasekhara had, he approached the royal throne of Khandpara for some paddy. Fulfilling his wishes, the then king of Khandapara allowed four cart-full of paddy from the granary at Kantilo. Thirty one year old Samanta as he was at that time, while returning with paddy, many people and admirers met him on the road and greeted him. Coming to know about their poverty, kind-hearted

Chandrasekhara was deeply moved. He distributed three cart-full of paddy and returned home with only one cart-full of paddy. Truthfully, he explained the incident to his wife. When his wife told him that you had given away three cartful of paddy; otherwise we could manage three months more. With a smile in face, Chandrasekhara replied, 'perhaps you failed to understand. The three cartful of paddy given to the people only would be our future property. We may manage with the rest.' "Self-less giving, in the appropriate place, indeed, is human's future property. If such sacrifice exists in an overwhelming manner, in this age also, man can assume the dignified height of Harischandra" (Biography of Samanta, Sri Dayanidhi Khadiratna compiled 'Siddhanta Darpana' P.17).

Chandrasekhara was honoured as the Second Bhaskar by some scholars of that time. Be that as it may, starting from his 14th year working ceaselessly and self-lessly for 20 years with surprising austerity, he completed Siddhanta Darpana. His supporter and admirer, Prof. Joges Ch. Ray showed him a telescope quite at a very late stage, when the great scholar was old, sick, poverty-stricken. Breathing a heavy sigh, Chandrasekhara remarked 'If I could have got one such thing earlier how much convenient it would have been for me'. (Sri Raghunatha Singha Samanta 'Yugajanma Chandrasekhara' Ibid preface).

The Gita says, 'ya nisha sarva bhutanam tasyam jagarti sanjami'. When others while away their time in the pursuit of pleasure, the 'Sanjami' (self-restrained) remains awakened to his duties and responsibilities. Even in adolescence, instead of revealing the childlike playfulness, Chandrasekhara evinced immense interest in 'Jyotisa Shastra' (astrology). According to Raghunath Singha Samanta, the star world of the 'Mysterious Controller of the Universe', its magnificent attraction and hidden knowledge kept Chandrasekhara engrossed from childhood. He was, indifferent to the worldly life. He was, 'Jyotih-loka-dhyani', 'Jyotih loka vilasi', 'Jyotirvid'. He was the fire in the sacred Jajna of perseverance associated with the studies of astrological science' (Ibid). The author himself has admitted that the sky, planets and stars have agitated his heart. (Prakasha 24, Verse 151)

The king of Manjusa, Jagannath Rajamani, the famous poet Radhanath Ray, Prof. Joges Chandra Ray, Vidyabhusan Dayanidhi Khadiratna, Sri Bira Hanuman Shastri, Sri Aruna Kumar Upadhyaya and other scholars have all tried in their own ways to bring the wonderful creation of this rural genius to the limelight. True, 'Mahamohopadhyaya' award could possibly be conferred on this great scholar due to the untiring efforts of Prof. Joges Ch. Ray. The soil of Utkal is immensely indebted to all these eminent personalities. But the real mystery of his twenty years' ceaseless efforts is unravelled yet. It needs scientific, objective and prudent research and further studies. The eminent scholars in the line may, as Samanta himself appeals in the Prathama Prakasha of 'Siddhanta Darpana' read, explore and bring to the world of knowledge some light that this great silent worker envisioned:

siddhantadarpanesmin salochananam pratarpane nipunah
kwapi kwapi vishesam pasyata ganitagama gramat

(Verse-13).

The sacred wish of Chandrasekhara was that the result of his prolonged perseverance should remain useful on the earth for very long time 'ayam granthah sphuratu ciramantah kshititalam (Prakasha 24, Verse 152). In 24th Prakasha of 'Siddhanta Darpana' there also exists a 'Kautuka Panjika' which enables to know future

'tirtha snana joga' etc. quite earlier, '*kautukapanjikeyam mahopakarayasatam sadastam' (verse 65).* In preparation of this, he made studies of the almanac prepared by his own father (24 Prakasha Verse 2).

Late Chandrasekhara Singha Harichandana Mahapatra Samanta, popularly known as Pathani Samanta, thus, shone in the sphere of nineteenth century astrological learning of the country like a star. Born on 24th December 1835 at Khandapara, he left for his heavenly abode on 11th June,1904 (Saturday) in Puri while uttering the name of Lord Jagannath and taking 'Mahaprasad' from his son Gadadhara. Sri Raghunath Singha Samanta has mentioned about the same in 'Yugajanma Chandrasekhara' (Introduction to 'Siddhanta Darpana' compiled by Dayanidhi Khadiratna). For Chandrasekhara, who was born in the lap of noble souls, Shyamabandhu and Vishnumali, by the grace of Lord Remeswar, the 'Time was Brahman'. According to him, the Lord is 'Anadi, Ananta and incarnation of Time'. He has no end. He is above everybody. He is 'Maha Iswara'. He is inside everybody; the 'Infinite Divinity' as later Sai puts it. He is exceptional and He exists as soul in every living existence. Chandrasekhara writes in 'Siddhanta Darpana' referring to 'Kurma Purana':

anadiresabhagavan kalah anantah akrharah parah
sarvagatwat swatantratwat sarvatmatwan Maheswarah
parambrahma ca bhutani vasudevopi shankarah
kalenaivacasajyante sa eva grasate punah

(22nd Prakasha, verse 4 & 5).

(Time is Paramabrahman, Vasudeva and Shankar. Hence, Time creates the living beings . In course of time, this Time alone devours all existence).

A surrendered devotee, an unattached Karmayogi, Chandrasekhara has prayed with immense gratitude to Lord Sri Achyuta (Sri Jagannatha), acknowledging the Lord's blessings all through his work. He affirms that through remembering the Lord and uttering His name, penance, Jajna and all other dedicated spiritual Sadhanas get fulfilled without fail. He writes:

sarveshu kaleshu samastadeshesu karyeshu tatha iswareswarascha
sarvehswarupaih bhagavananadihmamastu
mangalyavivrudhayehharih
yasyasmrutya ca namoktya tapojajna kriyadisu
nyunamsampurnatamjatisadyo vandetam achyutam

(Ibid, Verse 6 & 7).

At all times, in all countries, in all works, Iswara exists as the Lord. He is Bhagavan, He is endless and is seated in the heart of all beings. He is adored as 'Hari'. He has always blessed me for completion of my humble endeavour. I bow down before Him, Who is Sri Achyuta.

The world has seen many astrologers, astronomers, Mathematicians elsewhere also. But with the above scientific brilliance, such a God-intoxicated 'Karmayogi', a poet par excellence and a seer of highest order is incomparable in the modern history. Prof. Joges Ch. Ray writes in his Introduction that poverty had punched him in his old age and had compelled him to incur a large debt. He had given a lot many things to the society and world of learning. But it was unfortunate, not a single goodwill gesture of his endless struggle received genuine appreciation in his lifetime. History of English literature reveals that even centuries after his demise, Shakespeare was recognised as the highest dramatist and poet, the world had ever seen. History repeats at times. We may still hope that his book, his talents are given due and deserving honour being recognised both nationally and internationally. The saga of life of this great genius, was, indeed, a struggle all through as it usually happens to all rare talents. Joges Ch. Ray is very candid in his description:

I do not pretend to express any opinion on the literary merits of his work but it appears to me that the metrical composition alone, apart from its value as a contribution to Hindu astronomy is such as to entitle him to a high place among the writers of Sanskrit verse of the present day. (Introduction)

Bhaskar was his ideal master. It is said, Bhaskara had also followed Brahmagupta as his guide when writing his 'Siromani'. Chandrasekhara was the true disciple of his ideal preceptor. Chandrasekhara's respect for his Lord and superiors is explicit in the pages of 'Siddhanta Darpana'.He first offers his obeisance to Lord Jagannatha, then his ideal and Guru, Bhaskara, 'vande gurum Bhaskaram' (Prakasha 16, Verse 3). He acknowledges the benefit, he (the author) and the society have drawn from Bhaskar's 'Siddhanta Siromani'. He writes in the same verse:

praksiddhantacayam pramayanayana nahram mahahrahksharam
yah siddhanta siromani pranigadannaprinayat praninah

Bhaskara composed 'Siddhanta Siromani' since many ancient decisions appeared to him not correct. He had written about the details of planets in his time. By doing this he had done good to the society. Chandrasekhara has also expressed his indebtedness to Bhaskara, his preceptor. This speaks of Chandrasekhara's devotion to his Guru. He is also happy to note that his humble attempt to explore the science of astrology and astronomy was possible by the grace of Lord Jagannatha. He writes:

mahahkincinneelachalanilayee leelakrutatjagat jagannathakshyam tanmanasi vinidhaya ghanadhanam
tadeeyanu krosad grahaganitamakshyaravasat ahamkrurderica matitatam golaganitam

(Chapter 16, verse 4).

He meditates in his heart on the Sacred and Sublime Effulgence i.e. Lord 'Sri Jagannatha', the Lord who is also the Supreme Lord of Neeladri and Destroyer of all sins. This world is His (Lord's) play-ground. Samanta writes with profound gratitude that due to Lord (Sri Achyuta) Sri Jagannatha's grace, he has completed 'grahaganita' (astronomy) and has also attempted astrology thereafter.

Such respect for Spiritual Preceptor and such devotion, concern for humanity are, indeed, in the line of the Vedic tradition. Such scholars do rarely come upon this earth to help the humanity. Sri Achyutananda's 'Sunya Pothi' is an ideal example. (Orissa Review, July,2011,P.130).

Samanta Chandrasekhara divided 'Siddhanta Darpana' in 24 Prakashas. Besides, Chandrasekhara had clarified that the entire 'Siddhanta Darpana' can be broadly divided into two principal divisions i.e. Graha Ganita i.e. Astronomy (Purvardha) and Gola (Uttarardha). Gola means astrology. (Purna Chandra Bhasa Kosa P.236). Altogether there are five 'adhikaras' in the Book. Besides, Chandrasekhara has also given a brief description of each Prakasha in Verse 66 to 91 of 24th Prakasha. The vital aspects of solar eclipse and lunar eclipse are described by the author in 9th Prakasha. In 10th Prakasha, he also refers to Baraharamihiracharya and his 'Brihat Samhita'. According to Chandrasekhara, however, during solar eclipse, the giver is the Sun and the receiver is the Moon. Chandrasekhara, time and again, acknowledges that whatever he wrote he did under the divine guidance of Lord Krishna seated in his heart. Lord Sri Jagannath was perennially seated in his conscience, Who inspired and guided him all through. The Lord is inexplicable indeed. This is evident from his writing : 'yenaham ha deetisthata mukharitah kasmaicit tasmai namah', (24 Prakasha Verse

144). He has also written earlier in the similar vein:

hasanta mati sundaradhara suvruttanetrasriya vasanta sishuchanda ruk sarada khanda pandu dyutee
vasanta masitacale vividhadeshalokakule dishantam avayam bibhuum bhuban mangaksham bhaje

(Prak.10,Verse 37).

I adore Lord Sri Jagannatha who bestows fearlessness. His eyes are always alert to have the universal welfare. His eyes defeat the morning Sun and the full Moon of the autumn in their beauty.

It is axiomatic that this blessed son, born by the grace of of Lord Rameswar and the almighty Mother, Parvati who was keeping Lord Krishna all through in his heart, must have written whatever he felt wise for the larger interest of the society. The harmonious wisdom in his writing beggars all description. In fact, in 'Siddhanta Darpana' Samanta Chandrasekhara has given some valuable information not available in earlier solutions, 'siddhanta nudita apihagadita ye ye vishesamaya' (Prakasha 24, Verse 150). According to him time is of two types : eternal and janya. Parameswar is the eternal Time. The Parameswar, though unapproachable to speech and mind, incarnates Himself, bestowing kindness on his devotees. 'Janya kala' is born out of God, the Parameswara. Similar description was given earlier by Swayambhuva Manu. Chandrasekhara also holds that in 'Brihat Jataka' Suryanarayana is described as 'kalatma', that is why the Sun is accepted as the source of all powers. He (The Sun God) represents Parameswara. 'Janyakala' exists from the time of the creation till the Pralaya only. This is divided into nine categories, Chandra, Nakshatra, Savana, Baharspatya, Soura, Manava, Paitryadaiva and Brahma (Prakasha 22, Verse 25).

Eventually, it is apt to say that the future generation may benefit by systematic and concentrative studies of the above masterly creation. His admirers may also do justice, if the valuable guidances enshrined in 'Siddhanta Darpana' are utilised for the greater public interest of the State, Nation and World, which primarily was the author's vision. Samanta Chandrasekhara has clarified that Sastras are written for the welfare of the society and hence, there should not be any mystical approach (Gudharthabhava) in the same. In that event, all will not be interested in the same. So far as astronomy or astrology is concerned, it should be written in simple, direct and in a conceptually clear manner. As such, these are very difficult subjects. Hence there ought not to be any use of difficult word or word having implicit indication. He writes in 'Siddhanta Darpana':

sashtrekrute yadi jagad vyavaharhetou
gambhirata bhavati tat nikhila pravritih
na syadtotra ganite sugamavidheye
sabdasya patabamanadaraniyameva.

(Prathama Prakasha, verse 10).

A, genius of multifaceted talents, Chandrasekhara was, thus, the 'divine personified' born on earth to assuage and mitigate the suffering of the people through astronomical, astrological and spiritual wisdom. His sole objective was to create a healthy and enlightened social environment. At the same time he had ceaselessly sung the glory of Lord Jagannatha, His (the Lord's) 'vijaya vaijayanti' and His Mahaprasada (Divine 'Mahaprasada') always danced before the writer's eyes. According to the author, the Lord's 'Mahaprasada' rescues man from rebirth. 'ýanmahaprasada paripuritodar karananah pabanah' (Prakasha 20, verse 112). Hence it is not astrology or astronomy alone that he preached but he was also guiding the people towards salvation. The message of 'Siddhanta Darpana' will, therefore, cross the barriers of time.

Aryabhatta, Satananda, Bhaskara, Kamabhatta and other eminent scholars have contributed to the field of astrology in their own ways. Chandrasekhara with due regard to all of them, and after carefully examining all their theses, has placed his own humble reasonings. At a time when modern scientific wisdom was unknown, he created a thesis which deserves very high esteem and profound appreciation. His calculations will stand infallible for million years from the date of their making as the 'poet-seer-astrologer-astronomer', himself, had envisioned, 'bhavishyat ayutav dantam naitevya iti me matih'; (Prakasha21, verse 53).

He was born in a small princely dominion like Khandapara where 'Nature seemed a dream of the Divine' (Savitri, 359). He remained all through, a silent researcher for whom 'Kartavyam karma iti' i.e. assignment enjoined by self (Atma) was extremely important and for whom writing such a difficult thesis as 'Siddhanta Darpana' was a 'Vedic nitya karma'. His perseverance continued for twenty years. He was free from desire. In him flashed, as Sri Aurovindo writes elsewhere, 'the power of self-knowledge and the pure objectless self-delight of self-realisation' (Essays on the Gita P.109). The creator of 'Siddhanta Darpana' was indeed, one among millions. He worked and struggled in the solitude 'to hear the unheard and glimpse the invisible' (*Savitri* P.359). It is a fact that even after 107 years of his leaving for his heavenly abode 'a person of his kind' has not dawned upon this earth to explore in the proper manner the invaluable wisdom he created for us or move it further. Sri Aurovindo's vision for 'a diviner force' may also hold good in case of Samanta Chandrasekhara;

Whoever is too great must lonely live,
Adored he walks in mighty solitude:
Vain in his labour to create his kind,
His only comrade is the Strength within.

(*Savitri* P.368)

Indeed, Samanta was 'an image made of heaven's transparent light', a 'bright pure image in a priestless shrine.'

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