ELECTROMAGNETIC WAVES AND THE BEAUTY

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What is the basic source of the living world in the planet earth? What will happen if the sun ceases to radiate? How do we get the perception of the living world around us?How do many animals and insects see in dark?How do microphone, radio, television work?

To answer all these questions we must know about a radiation which is very essential to all of us, called Electromagnetic radiation shortly EM radiation.It is all around us. Without this radiation, we cannot think about a living world.This radiation consists of electromagnetic waves. The theory of EM waves was first developed by Maxwell around 1864.EM waves are nothing but a combination of two mutually perpendicular sinusoidelly varying electric and magnetic field which are perpendicular to the direction of propagation of the wave.Later on , EM waves were produced experimentally in the laboratory by Henry Hertz in 1888.

EM radiation consists of electromagnetic waves with wavelength ranging from almost zero to infinity.Today we are familiar with electromagnetic waves having wavelength 30 fm ($1fm=10^{-15}m$) to 30 kilometer. It travels with a velocity of 3 lakhs kilometer per second in space. The classification of electromagnetic radiation with respect to wavelength is called electromagnetic spectrum.

The EM spectrum are divided into seven parts according to their wavelengths and energy ranges. The table below shows the seven parts of the electromagnetic spectrum. The boundary of the successive regions are fuzzy and not sharp as shown in the table.

Region	Wavelength range	Energy range
Gamma rays (γ)	1 fm.....1 pm	1200 McV.....12 McV
X rays	1 pm.....10 nm	1'2 McV..... 120 eV
Ultra Violet (UV)	10 nm.....400 nm	120 eV.....3 eV
Vissible light	400 nm 800nm	3 eV.....1'5 eV
Infrared Mys (IR)	800 nm.....1cm	1'5 eV.....12 meV
Microwaves	1 cm.....10 m	12 meV.....12μeV
Radiowaves	10 m.....1 Km	12 μeV.....120 neV

Here $1fm = 10^{-15}m$; $1pm = 10^{-12}m$; $1nm = 10^{-9}m$

$1Mev = 10^{6}$ eV, $1meV = 10^{-3}$ eV $1\mu ev = 10^{-6}eV$

$1neV = 10^{-9}$ eV.

It is seen from the table that measurable part of the electromagnetic spectrum ranges from 1 femtometer to 1 kilometer.In comparison to the total spread of the electromagnetic spectrum, visible region is very narrow. This very narrow region i.e. visible region gives us the perception of the physical world. Without this visible light, we will not be able to see anything around us, though we may have eyes with normal vision.

In human, vitamin A, when oxidized,yields retinal---a pigment which can absorb visible light with wavelength 380 nm—750 nm. This absorption causes electron excitation.in the retinal membrane and triggers a nerve impulse to the brain and thus we see the various object around us.

When light falls on leaves of a tree, light photons with wavelength around 450 nm and 650 nm are captured by chlorophyll and remaining light in the range 500nm to 600nm are reflected back by the leaves, since this reflected wavelength region falls in green region, the leaves appear green in colour. A change in absorption and reflection causes leaves to change their colours. The green leaves used the absorbed energy to prepare food for the plant by the process of photosynthesis. If the sun ceases to radiate light, then all the plants will die.We all the humans and living animals depend on plants for oxygen and so ultimately, all the life forms will die.

Many animals like owls, cats, some snakes and insects can see in dark because their eyse are sensitive to infrared radiation. These animals have sensory pits which are used to image infrared radiation. IR radiation are emitted by all the objects because of their ambient temperature. Human beings also emits IR radiation of 10 micron (10m).The IR radiation coming from different objects help these animals to see in dark.Now-a-days infrared cameras are used to detect enemy movement at night.Sometimes we hear that some person feel the presence of another person in dark. It is nothing but due to his highly sensitive perception of IR radiation.Some remote controls used IR radiation which are then detected by the sensors of television ar air conditioner. IR waves are also used in physiotherapy and to heat food.

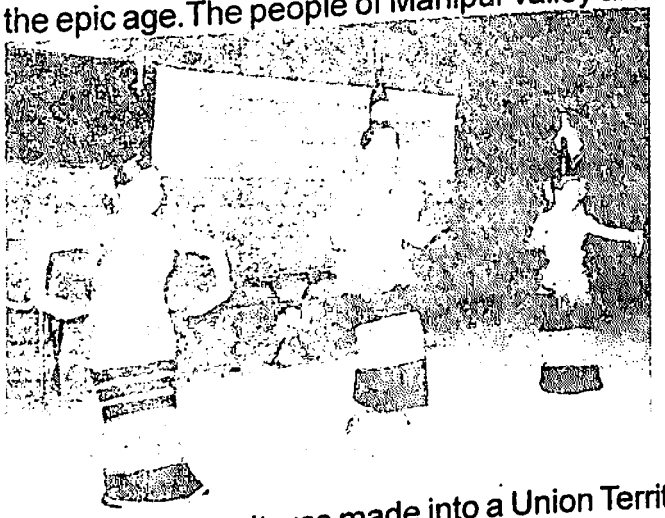
Microwaves are good for transmitting information because it can penetrate light rains, clouds and smoke, Mobile telephone, walkie-talkie, aircrafts, ships and coastal guards works with microwaves. It is good for viewing earth from space. Now-a-days microwaves oven are used in the kitchen as well as in the laboratory for rapid heating of the substances.

MEGHALAY :- Meghalay , abounds with bounty of nature is another state of North East India. The bulk of the inhabitants belong to three major tribal groups- the Garo, the Khasi and the Jaintias, while another section of the population is made up of such other tribal groups as the Rabhas, the Hajongs, the Tiwas and the Koches.The societies of the Khasis and Jaintias and to great extent of the Garos, are matrilineal in character,which distinguishes them from other societies of the region.

NAGALAND :- Till 1963, Naga hills formed a district of Assam. It was made into the state of Nagaland in that year. The inhabitants of Nagaland are known as Nagas.There are more than twenty Naga tribes and sub-tribes, the more well known among them being the Angami, Ao, Sema, Lotha, Konyka,Chakesang,Sangtans, Changs,Yimchunger,Rengma,Zeminaga,Zetiangnaga etc.

MIZORAM :- Mizoram which was once upon a time district of Assam,was made into union territory in 1972 and attained full statehood in February 1987. The term Mizo,which means highlander refers to a composite group of allied tribes. with the Lushais, being the most dominant group among them and the other tribes as Hmar,Oanei,Chakma, Chittagong Ralte, Paites,Lakher, Kuki etc are found in Mizoram. The Mizos are a sturdy people.

MANIPUR :-A former princely state with mythological account tracing back their history to the epic age.The people of Manipur valley are followers of orthodox Vaishnavite Hindu Religion.



With their houses being perhaps the cleanest in the world. The greatest contribution to the country is the Manipuri dance, one of the four classical dance in India.Like other state in Manipur there are so many tribal groups inhabiting here. The Meitei's have been the politically and socially dominant group. The other tribal groups are the Aimal, Anal, Angami, Chiru, Chothe, Gangte, Hmar, Kabui, Kairo, Kachanaga, Mao, Maram, Maring, Mousang, Mayon, Purum, Simte Sabte, Tangkul, Thadou, Vaiphul, Zou, etc.

TRIPURA :-It was made into a Union Territory in 1957 and conferred full statehood in 1975. The geographical situation of the state is as follows:- Bangladesh on the North, West and south-south-west,Assam and Mizoram on the east. The original inhabitants of Tripura have been tribal groups like the Tipras, the Rheangs, and the Hrangkhols. Besides these there are the Bhil, Bhuta, Chaimal,Chakma Jamatia, Lepcha, Lushai, Mag, Noatia, Riang, Ushai, Tripuri etc. Among them the Tripuri is the most dominant group.

REJUVENATION

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Putting down the receiver of the phone, Sunita resumed with her errands of household chores-mundane, banal, a never-ending tale as if. However through her work, she mused over the news of Deepa's marriage and the sea change that she noticed in her friend off late. Ofcourse these devèlopments in Deepa's life re-kindled everybody's interest in her otherwise inconspicuous life.

Deepa's marriage was not only a social, religious ceremony but also the highly rated month long event from the day the news broke. It is needless to say that her fortune of getting yet another chance of marital bliss was received with much skepticism. Freedom is our birth right, so is the right to live worth fully and happily a deserved right. And Deepa has indeed made a judicious choice for her re-birth. Then why is her marriage weighed up so much? Indeed she had the courage to do so. But it is a solace to see that in spite of numerous doubtful reasoning, Manav and a handful of her colleagues constantly bolstered her sagging moral registering unflinching faith in her.

The rising sun was more like the yolk of the egg but with its glare becoming sharper, stronger; intensified the heat and discomfort of the busibodies under the modestly decorated pandal.Had the nuptial bonds been sealed by the mutual consent of most of the guests,heat and related discomfort and ire would not have shown.But Deepa's agony was unmeasurable-the pain of defying the elders, of betraying the promises of love and fulfilment made to Sagar for eternity. The strong smell of smoked fish emanating from makeshift kitchen brought her back amongst the chattering friends.Unquestionably it was the caring support and help of Manav that helped her to weather through the stormy period of her life. Gradually she developed a faith in him. He on the other hand tried to help her overcome her grief as otherwise a great talent would have gone to waste. He did not carry any vested interest towards her nor any sympathy.He was merely compassionate towards her.

Life had been good to her up till a certain period. With supporting and caring parents and confidence in her to do good to herself and others, helped her sail smoothly across school, college and university. There were a slew of job proposals by the close of her research work. Imparting knowledge, sharing information, discussing relvant matters and invigorating the mind and soul of her students were her passionate liking. Rightfully she was the judicious choice for the best Teacher's Award for three consecutive years. For a few, she was the subject of envy and for the multitudes a perennial source of help and support. Her marriage to Sagar was a matter of jubilation. She was at the crest of her life when suddenly catastrophe stroked her making her life ghastly.

The disintegration and metamorphosis was for her worst.Her life was a quagmire of

irreparable loss, despair and despondency : hope deferred.Having lost the company of her husband, life dithered for a while. With the elapse of time, she tried to muster her courage to start life anew by concentrating on her work but somehow she could not.Her shock and pain wouldn't let her think any other.

Her friends even tried to arouse interest in life's activity and she too tried to elude her agony and futility, but in vain. Life's mystery intrigued her. The more she tried to efface herself of her sorrows, unfulfilled desires and dreams,more she is made aware of its want. During such moments of futility, the inspiring words of Manav was like an anodyne. The peace in Manav's heart urged her to bring back the lost solace. Her effort to help herself continued and even saw some success. Life trudged on thus for a decade and she stubbornly tried to seal her belief in eternal love for Sagar by being in mourning forever when she surprisingly saw herself giving consent to the second chance, the proposal of marriage sent by Manav. The unrealized craving for companionship, support in physical reality is atavistic in human beings and she was no different.This might have made her accept his proposal.In Manav's she had developed a firm faith and belief that his presence in her life makes her feel worthy and happy.She realised that it was Manav who always tried to orient her disoriented life. Though he met her at the prime of her life and could have proposed marriage, he refrained from that as he respected her emotions for Sagar and silently supported her.Now she needed to support him.And she confronted the questioning and prying eyes, the moral police and sarcasm with the firm support of Manav.

The ceremony eventuated not after some hasty decision but after much procrastination.How suprising and unpalatable it was to discover that those elderly denizens whom she looked upto for being wise, open faced, open-minded, vehemently opposed her marriage to Manav for being a lowly-born. Issues like widow-remarriage,inter-caste marriage are still portentous, dubious though these have been discarded long back. Still many cowered to those customs including her for a while.Many meets are being arranged over the issue of women emancipation, dignity, and freedom etc.....But alas of no use, for it is not followed in letter and spirit by some fanatics who impede the progress of the society. They should have embraced the decision of Deepa because she had dared to save herself; to re-establish her life and carry progress in her life.Life is a great gift of God and needs to be nourished.Society should have honoured her decision and nourished the human values of a good and ideal society. Society should have also been liberal and whole-heartedly given a second chance to Deepa. Why is society double faced in matters related to a woman?A second chance for a man is a fair deal and also should be for a woman. Equality should be practised for the progress of the society, politically and socially.But such matters are still the unreached realms for a woman as few people are liberal towards them. Society did indeed extended support in the form of Manav and her friends who emboldened her and removed her fears and discouraging thoughts.She had a faith that at least sometime in the future, the resentful ones will understand her and bless her and help the changing tide come more forcefully. Through tempest she sailed across to be bonded in wedlock and rejuvenate life with goodness and no speck of hypocrisy.

"CHILD LABOUR"---A CURSE FOR THE SOCIETY

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The practice of child labour is as old as the history of mankind. It is a very complicated developmental issue affecting human society all over the world. Child labour is the shame of any developed or developing country or nation.It has been the tradition in this country that children from the very beginning have been participating in work both within and outside the family.In the earliest times,children used to be engaged in work relating to agriculture and the grazing of animals. In the medieval period, they used to be involved in various crafts and trades besides agricultural activities. In the present complex society set up, characterized by the use of energy and technology for mass production of different types of commodities with maximum speed children can be seen performing a number of jobs which by their very nature are hazardous to their physical and mental growth and development.

In most societies, work is a means of social participation and involvement. It is a part of socialization without disturbing the other activities of the child such as health and recreation can be accepted.On the other hand, a child is in need of adult protection for physical, psychological and intellectual development till he/she becomes an adult and independent.Making a child work beyond his capacity by foregoing educational and recreational benefits for more hours will be harmful to the child.Children in rural areas especially those belonging to backward classes, who are neither students nor workers,who are not enrolled in the school system or dropouts,become child workers in urban areas.The absolute number of illiterate children in the school going age is steadily rising year after year.About half the children are unable to read and write.

A working child is defined as a child in the age group of 5 to 14 who is doing paid or unpaid labour and working within or outside the family.Generally child labour can be defined as employment of children in gainful occupation which are dangerous to their all round development.The defination of child labour is not uniform all over the world.According to the census of India,a child worker is one who works for the major part of the day and is below the age of 14 years.Child labour is meant for 'working child' or 'employed child'does not necessarily mean child labour. For example, when children work only to collect their fees or to get work experience during vacation or off time as cannot be considered as physical or mental toil it improves their total development.Thus some factors of work are to be properly judged like age, occupation and social situation etc.

Child labour is a problem that has been going on for a long time. It has taken place in many countries such as America and Asia. There are about 250 million children who are working between the ages of 5 to 14 years. Child labour first took place between 1908-1912. Usually children were forced to work because they were from poor families. Some of these jobs included working in a mill,being a minor, working in factory, sea food workers, fruits pluckers and salesmen. These

jobs were very dangerous and were not fit for children. About 4% of all 12-17 year olds have worked illegally. Asia is one place that has a lot of child labour. with 32% of child labour occuring their.One place in Asia that has a lot of child labour is India. Other places where there is child labour are Malaysia, Burma, Sri-Lanka, Indonesia, Philippines and Nepal.

Child labour is one of the worst things in India.In India it has been continued from ancient times and is contrary to the values of modern society.Child labour in ancient India existed in the form of child slaves. A lot of children in India work in the agricultural industry and are at risk for many diseases. The dirrerent types of job for labours in India are as newspaper worker, miners, factory workers, salesmen, household help, industrial worker etc.The female child mostly perform skilled, trained, physical work which has better pay. So, obviously the country prefers male child for working.

Causes of Child Labour :

Child labour is a socio-economic problem.It is a problem of poor and destitute families,where parents have to depend on the earnings of the children.It is now considered as one of the biggest and worst problem.Some causes of child labour are as follows :

* Poverty
* Parental Illiteracy
* Tradition of making children learn the family skills.
* Large Family.
*Absence of Universal Primary Education
*Social apathy and tolerance of Child Labour
*Ineffective enforcement of the legal provisions pertaining to child labour
* Non availability of and non accessibility to schools
*Irrelevant and non attractive school curriculum.

Absence of compulsory education at the primary level,parental ignorance regarding the bad effects of child labour,the ineffectivity of child labour laws in terms of implementation,boring and unpractical school curriculum and cheap child labour are some of the factors which encourages the phenomenon of child labour.It is also very difficult for immature mind and undeveloped bodies to understand and organize themselves against exploitation in the absence of adult guidance.Poverty and overpopulation have been identified as the two main causes of child labour.Parents are forced to send little children into hazardous jobs for reasons of survival,even when they know it is wrong.Monetory constraints and the need for food, shelter and clothing drives their children in the trap of immature labour.Overpopulation in some regions creates paucity of resources.When there are limited means and more mouths to feed, children are driven to commercial activities and not provided with their developmental needs.

Illiterate and ignorant parents do not understand the need for wholesome proper physical,cognitive and emotional development of their child.They are themselves uneducated,so

they do not realize the importance of education.Adult unemployment and urbanization also causes child labour.Adult often find it difficult to find jobs because factory owners find it more beneficial to employ children at cheap rates.This exploitation is particularly visible in garment factories of urban areas.Adult exploitation of children is also seen in many places.Elders relax at home and live on the labour of poor helpless children.

The industrial revolution has also had a negative effect by giving rise to circumstances which encourages child labour.Sometimes multinationals prefer to employ child workers in the developing countries. This is so because they can be recruited for less pay with more work being extracted from them. Moreover there exists no union problem with them.This attitude also makes it difficult for adult to find jobs in factories,forcing them to drive their little ones to work to keep the fire burning in their homes.Livelihood considerations can also drive a child into the dirtiest forms of child labour like child prostitution and organized begging.

Laws Pertaining to child labour :

1. Indian Factories Law 1881
2. The Indian Port Amendment Act 1931
3. Children(Pledging of Labour)Act 1933
4. Employment of Children Act 1938
5. The Bombay Shop and Establishment Act 1948
6. The Indian Factories Act.1948
7. Plantation Labour Act 1951
8. The Mines Act 1952
9. Merchant Shipping Act 1958
10. The Apprentice Act 1961
11. The Motor Transport Workers Act 1961
12. Atomic Energy Act 1962
13. Bidi and CigarWorkers Act 1966
14. Shop and Commercial Establishment Act in various states.
15. The Child Labour Prohibition and Regulation Act 1986

However, child labour can not be abolished only by enforcing acts or by educating all concerned about the ill effects and social hazards of child labour.Along with these measures several economic alternatives and non-economic incentives should be planned by involving families, employers, politicians, business and corporate houses and schools.

Trade union in India has so far not been involved in child labour. Even though employing children directly effects employment opportunities of adults and also reduces their bargaining capacity, trade unions have still to give a thought.

In India there are more than 25 crores children under the age of 14 years.The great challenge

of India,as a developing country is to provide nutrition, education and health care of these children.According to the Indian census 1991 there are 11.28 million working children under 14 years in India. Over 85% of this child labour is in the country's rural areas. India has also announced a National Policy of Child Labour 1987.This is the first developing country to have such a policy. The Central Advisory Board on Child Labour was constituted in 1981 to review the implementation of the existing legislation administered by the central government.It was reconstituted on November 2,1994.International Programme on the Elimination of Child Labour(IPEC) was created in 1992 with the overall goal of the progressive elimination of child labour.Article 24 of the Indian constitution and section 67 of the Factories Act direct that children below 14 years are not to work in factories. There are more than 250 million working children in the world today between 5 to 14 years as estimated by ILO (International Labour Organization). As per 2001 population census, children in the age group of 0-14 constituted about 360 million and accounted for 35.3 percent of the total population.Though there is an increase in the absolute number of children, the proportion of children in the total population is declining between 1991 and 2001.By census of Indian projections the proportion of children(0-14)has further come down to 32.1 percent during 2006.

To conclude, children of a young age who are away from their family, the primary socialization agency will be at risk for these children will be exposed to many social evils around them. This weakens their health and in turn human resource in the country. They forego education which is an important factor for good personality development. Their economic position, though they are earning now, will not improve in future and will not be sufficient to meet the present cost of living. On the whole, these children will live throughout their lives without any encouragement and ambition which in turn affects the national economic development.

The following suggestions are made for prevention of child labour and for the betterment of acedemic conditions and welfare of the child workers :

- The government should see that all villages, towns and cities should be covered under Integrated Child Development Projects (ICDS)as they cover a comprehensive package of services for the family with strict monitoring on the functioning of the projects for prevention child labour.
- Parents should be properly counseled to help pursue education in respect of their children.
- The local government institutions must be made responsible at grass root level for compulsory enrolling of children in schools and other institutions such as Anganwadi Centers,Creches etc.
- The stress level of children is to be assessed and properly counseled from time to time.
- The parents of the children should be given training/orientation on alternative livelihood to come out of poverty.
- Voluntary agencies can play a vital role.They are required to develop network with various

government departments,training institutions and financial institutions to deal with their issues more effectively.

- An action plan is to be prepared in respect of every child with his/her active participation for his/her rehabilitation.It should be supported by social welfare scholarships and educational loans so that the family would be free from the burden of education of their children.
- Strictly punish to those agents and employers who employ children as bonded labour under domestic laws and juvenile Acts.
- Launch a nationwide public awareness campaign regarding legal prohibition of bonded child labour and explain the action to be taken and the resources that are available to bonded child labour and their families.
- Impose strict punishment on those industries that violate the Child labour Prohibition Regulation Act.
- UNICEF should take all necessary steps for elimination of bonded child labour on a priority basis in all countries.
- WHO should create an international awareness campaign on adverse health problems for children in bonded child labour.
- World Bank should approve additional loans and subsidies with strict implementation of elimination of bonded child labour.

Above all. CHILDLINE is a national 24 hours free phone emergency service for children in need of care and protection.Any child /concerned adult can call 1098 free of charge to report a child in distress.It aims at protecting the rights of the children of the poorest of the poor and ensuring access to quality service and technology.

Today's children are tomorrow's citizen.When children are provided with opportunities in various areas like health, education, recreation etc from their tender age they will grow with strong personalities in their future life.But in recent times due to child labour practices,a few categories of children are foregoing healthy personality development.If societies have to save the present and the suceeding generations from the scourge of child labour they have to resolve to combine efforts to achieve the goal of universal child education.A child who is not in school is involved in some type of labour; remunerative or otherwise.Generating political will and mass participation by different groups is also necessary.Enactment of law is only a first step.Along with this,enforcement of other social policy,laws and socio economic welfare measures should also be initiated which can ultimately change the existing system of exploitation based on social and cultural inequalities in our society.

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THE ROLE OF ESSENTIAL TRACE ELEMENTS IN BIOLOGICAL SYSTEMS

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Introduction :

The elements that are absolutely necessary for life processes are called essencial elements. They play positive role in biological systems.Out of the 109 known elements 30 elements are considered as essential for the survival of living organism. Of these 19 are trace elements. Out of which 12 are transitions metals. Their may be several elements yet to be identified as essential elements. The past years hane witnessed an explosive increase in our knowledge of the many element that are essential for life and maintenance of plants and animals. In the 20th century the treatment of anemia with iron and the association of iodine deficiency with simple goiter marked as the only two trace elements recognized as essential for animals. The efforts of Klaus Schwarz in the 20th century of the experimental induction of trace elements of deficiencies results in evidence supporting the essentiality of Se, Cr. Sn, V, F,Si, Ni, Pb, Cd, As and Li. Molybdenum average about 1-2 ppm in rock, soil, plants and marine animals and even lower in land animals. Yet it is an essential trace metal. There are many useful elements for which no specific function has yet been proved. The development of analytical thechniques (Atomic Absorption, Atomic Fluoresence, Actvation Analysis and X-Ray Flouresence) determines the concentration of the trace elements in ppb.

Criteria For Essential Elements :

An essential element is that required for the maintenance of life, its absence result in death or severe malfunction of the organism. An element is considered essential when a deficient intake produces an impairment of function and when restoration of physiological level of that element relieves the impaired function. The element should have a direct influence on the organism and be involved in its metabolism. The effect of a particular essential element can not be wholly replaced by any other elements. According To G. C. Cotzia, the biochemical criteria for an esential element are (1) the element should present in tissues of different elements at comparable concentration, (2) its withdrawal produces similar physicological abnormalities regardless of the species (3) its presence reverse or prevent these abnormalities and (4) these abnormalities are accompanied by species bioechnical changes that can be remedied or prevented when the deficiency is checked.

Thus the principal criteria for essential elements are (1) a physicological deficiency appears when the elements is removed from a purified diet, (2) the deficiency can be relieved by the addition of one specific element, (3) a specific biochemical function is associated with a particular element.

Periodic Survey of Essential elements :

The natural abundance of different elements decreases with increase in atomic number, so heavier elements are not very important as far as biological activity concerned. Natural abundance limits the availability of the elements for biological importance. Molybdenum is the heaviest metal and iodine is the heaviest non-metal of known biological importance. The metals of importance in enzymes are principally those of the first transition series. The others elements of importance are relatively light - Na, K, Mg, Ca, C, N, P, O, Cl and H.

The 30 essential elements have been classified into the 6 bulk or structural elements, 5 macro -minerals and 19 trace elements are summerized in the following table.

1. Bulk Structural Elements	H, C, N, P, O, S
2. Macro-minerals	Na, K, Mg, Ca, Cl
3. Trace Elements	Fe, Zn, Cu
4. Ultra-trace Elements	a) Non-metals : F, I, Se, Si, As, B
	b) Metals : Mn, Mo, Co, Cr, V, Ni, Cd, Sn, Pb, Li

All of the non-metals with an atomic mass less than bromine are considered to be essential. The most prominent groups of trace elements are observed in the transition and post transition metals. The transition metal with increasingly filled d-orbital electrons leading to a gradual change in metalic properties so they can form stable complexes with sulphur, Nitrogen and Oxygen all of which are side chain constituent of protein. Iron occupies a dominant position among the transition metals in the vertebrates as the metal of choice for hemoglobin and other haem proteins. Zinc and Copper serve as coenzymes or prosthetic group for a number of enzymes.

Function Of Essential Trace Elements :

The essentialtrace elements are required for growth and survival of cells of organism. They normally occur and fuction in the cells at extremely low concentration. There is an impressive number of trace elements, especially among the transition metal irons that have been shown to serve as required growth factor at very low concentration. Probably there is a universal transition metal binding site that can respond individuality to a variety of different metal ions as long as they are not blocked by another metal ion.

In most of the function of the trace elements focus on their role as metallo-enzymes. The dominant of them has been the trance elements because they serve as required prosthetic groups in active site or as coenzymes for indispensable metalloenzymes. In the metallo-enzymes, a fixed number of specific metal atoms like Fe, Zn, Cu, Mn, Mo, Co, Ni, etc. are firmly associated with a specific proetin. This combination produces a unique catalytic function. Nearly ond third of all known enzymes requir a metal ion as a functional participant. The important examples of metallo-enzymes are the proteins that containFe, Zn, or Cu ions in their active site. Metal such as Fe and Cu have another parameter that of readily changing their oxidation states so that they can also serve as catalytic eletron carrier.

Specific Function of Essential Ultra Trace Metal :

Of the essential ultra-trace metals Mn, Mo, Co and Ni have been identified as forming metallo-enzymes. Manganese metallo-enzymes are present for several important enzymes superoxide dismutase, arginase, pyruvate carboxylase and glycosyl transferases. Manganese appears to be directly involved in the enzymic machinary of carbohydrates metabolism with possible like to lipid metabolism. In nitrogenase, molybdo-metallo-enzymes. the metal exist as a Mo-cofactor, a complex, of the metal with the novel organic molecule, called molybdipoterin. In plants and microoragnism, Ni, is known to function in several metallo-enzymes such as urese, several hydrogenases and carbon monoxide dehyrogenase. The role of cobalt is the best understood of any of the essential ultra-trace metal. Both vitamin B_{12} have a cobalt ion complexed in their equtorial positions by four nitrogen's of a macrocyclic ligand called corrin. The corrin is covalently bonded through and amide-phophate ribose side chain to a 5, 6 - dimethyl benzimidazole group which coordinates with the cobalt ion. These compounds serve as a cofactor in various enzymes reactions in which a hydrogen atom is inter changed with a subsituent on an adjustment carbon atom.

In most of the cases, metallo-enzymes have provided the best model for determining theoperation of trace metal ions in biological systems. The specific functions and deficiency signs of Mn, Mo, Coand ni are summerised in the following table :

Ultratrace metal	**Deficiency sign**	**Specific Function**
Mn	Growth Depression, bone deformaties, membrane abnormalities. connective tissue defects	Carbohydrate metaboiism superoxide dismutase, pyruvate caboxylase etc
Mo	Growth depression	Oxydases : aldehyde, sulfite, Xanthine, molybdopterin
Co	Anemia : Growth retardation	Constituent of Vit, B_{12}
Ni	Growth depression, reduces N utilization, reduces Fe metabolism	Constituent of urease, reduced hemopoiesis

Specific Function of Essential Ultra Trace Non Metal :

The halogens F and I are highly specific. Fluoride has a remarkeble anti-dental caries effect. This may be related to its ability to replaced OH, thereby stabilizing the structural matrix of bones and teeth. Fluoride can inhibit certain key enzymes, snolase, pyrophosphatease. Among the non metals selenium is the most important. Despite its high toxicity, Se has shown to be component of several enzymes involve in essential oxidation reduction reactions. Very little is known about the remaining non metals, Si, As, B, Silicon has a structural role in connective tissue and in osteogenic cells. The biological function of As is not known. Arsenic affects arginine, membrane phosphorlipid and Zn metabolism. The primary focus on Boron has been on its essential role in plants, probably involving membrane function and nucleic acid biosynthesis. In 1986 Baumann estblished that

iodine is an indispensable constituent of thyroid gland. The biological function and deficiency sign of ultratrace non metal are listed in the following table :

Ultratrace non metal	Deficiency sign	Specific Function
F	Growth Depression, dental caries	Structure teeth and bones, replaces OH, inhibits enolase, pyrophosphat
I	Goiter, reduces thyroid function	Constituent of thyroid hormones T_3 and T_4
Se Muscle and pancreas	Constituent glutathione degeneration, hemolysi	perozidase and other enzymes
Si	Growth depression, bone and matrx deformities	Structural role in connective tissue and osteogentic cells
As	Impairment of growth, reproduction, heart function	Increases arginine, metabolism methyl compounds
B	Growth of angiosperms impaired, nitrogen fixation	Control of membrane fuction, nucleic acid biosynthesis

Conclusion :

It is difficult to determine the essentiality of an elements. The widely used term 'trace element' is not precisly defined. For example Mo, averages nearly 1-2 ppm in marine and land animals, yet it is an essential trace meyal. The remaining transition metals are poorly absorbed by cells and are relatively non toxic. The post transition metals Au, Ag, Pt,Hg have played significant role in the biological chemistry but they are not considered as essential. Neither the lanthanides nor actinides occur in animal or plant tissues. Only traces of lanthanides (less than 0.5 ppm) are detected in the bones of animals exposed to them. Elements may influence each other in biological processes; the effects can be synergistic or antagonistic, or competitive. The copper deficiency occurs in presence of excess Zn and Fe. Many inter elements effects work both ways i.e. toxic levels of Mo are over come by adding Cu^{2+} and SO_4^{2-}, the reverse of Cu deficiency. Trace element interation is not limited to competition and antagonism.An example of a positive interation is the role of Cu in promoting Fe mobilization and hemoglobin biosynthesis. The element that have nither essential nor beneficial role to play but have a positively catastrophic effect on normal metabolic processes are known as toxic elements.

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ORNAMENTAL FISHES

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The lovable ornamental fishes are always in great demand as pets in aquarium.But they are endowed with tremendous revenue earning potential. Practice of keeping of aquarium fishes now become most popular hobbies and its a good means of livelihood today.

Ornamental fishes, both conventionally and technically are small in sizes and gorgeous with attractive colour and majestic movements purported in the aquarium. However, non-colourful fishes will also receives ornamental status and remain in great demand from the aquarist if they do exhibit peculiar body, morphology, strange locomotion and rare in occurence (Dey -1995)

The beels of Assam is prevalence of large number of ornamental fishes may be defined as which are reared as pets not for consumption. They are also called as "living jewels" due to theirgreat variety of colours, shapes, behaviours & origin. Conventionally ornamented fishes are smaller in size attrative coloured with magistic movement as exposed in the aquarium. The ornamented fish diversities of Assam expose potential for its trade in the global market.

The ornamental fishes have great demand as aquarium fishes. There are many popular ornamental fishes which are marketed all over the world. India contributed about 650-700 species. Ornamental fish trade helps in growing interest among enterpreneurs in breeding, rearing and marketing of the ornamental fishes.

Some of the Indian indigenous Ornamental fishes are available in the beels of Assam. They are :

Chanda nama (Chanda), Chanda ranga (Chanda), Channa marulius (Sol), Channa orientalis (Cheng), Channa punctatus (Goroi) Colisa fasciata (Kholihona), Colisa lolia (Kholihona) Heteropneustes fossilis (Singi), Botia derio (Botia), Anabus ticto (Puthi), anabus (Kaoi), notopterus (Kanduli), Tetradon cutcutia (Gangatop), Nandus nandus (gadgadi), Mastacembelus armatus (Turi), Kokila etc.

Some common, but desired exotic fishes available in the Indian ornamental fish market are - Gold fish, Guppy, Angel fish, Mollies, Sword tail, etc.

Some expensive exotic fishes are - Piranha, Arowana, Alligator gor etc.

About 95% of Indian ornametal fish export is based on the wild collection. Northeastern states are the major suppliersof these fishes.

With the increasing demandof ornametalfishes, both in the domestic and international market, the Government of India has assigned the trade name ~Sun rise product". There some measures should be taken for keep in the ornamental fishes at the sources. Enterpreneurs may be encouraged to breed and rear ornamental fishes of international demand.

Most of the indgenous fishes in trade are directly collected from the wild. Uncontrolled pollution may lead to depletion and extinction of many ornamentalfishes. Intensive resource exploration and unscrupulous trading may lead to depletion of our ornamental fishes. So, the conservation of such wonderful gifts, the ornamental fishes are urgently needed.