CHAPTER-3

Consciousness Among Visible Beings

Abstract

Till a billion years ago life was mostly microscopic, nearly one twentieth of a millimetre. When life forms became visible and abundant after this date, they broadly fall under two categories: fixed or immobile and mobile or moving. The moving organisms—all animals—trespass the gravitation of earth by their own strength. Consciousness per individual in such a system is seemingly higher than the fixed type. Fixed forms face perils out of environmental destabilization because they cannot move. Running away and saving one-self from dangers seems to be the main factor behind the evolution for movement but it also helped food gathering and better survival. Initially the locomotion potential was low as in the annelids. However, in forms like insects, birds or mammals the motion has been considerably accelerated through appendages.

In the geological records, Ediacaran Period marks the beginning of visible trace fossils around 625 million years ago (Ma). They relate to slow movers, soft bodied animals like earthworms of today. The body fossil record of animals begins with the Cambrian Period commencing around 590 Ma. An illustrated account is provided for appreciating the pattern of life during 500 to 700 Ma. Most significant development during the period is commencement of skeleton in the organic world. The skeletal element includes mostly calcium compounds. Thus the life which was made basically of organic compounds only, imbibed in itself, a new element calcium in the construction of physical body. This skeletal element added greatly to the locomotion in the later ages besides acting as a protective sheath of brain among the brainy vertebrates. Earliest relatives of vertebrates with weak calcareous skeleton are seen to emerge during the Cambrian Period.

Evolution of sense organs is a feature among animals to exhibit their response to external stimuli. Touch, among them is first to be appreciated at the interface of body and environment. Appearing at the unicellular stage, it continues among the higher forms of life. The next organ to develop among animals is sensitivity spot for light first seen among the jelly fishes. This turns into eyes among annelids and later forms. Taste and smell develop subsequently at the level of arthropods and shared well by the vertebrates. Hearing is rare among invertebrates though some insects posses this faculty. It is more common among vertebrates.

A comparison of sense and locomotary organs among the fast moving invertebrates like dragonflies and birds among vertebrates shows a parallel development of skeletal and brain components. Among insects it is an organic exoskeleton associated with a very small, solid, knot-like brain. In the vertebrates, movement is on account of calcareous endoskeleton and its synchronization is done by a large hollow brain. There is a difference between the invertebrate and the vertebrate body plans also. The former contains a digestive sack covered by muscular body sheath. Brain is but a small knot of nerve cells. The latter contains, besides the two, a brain sack related intimately to, consciousness. Consciousness and calcium covered brain-sack have a distinct beginning among the chordates where the brain has evolved ultimately, after 590 Ma, into that of a *yogi* who has the potential to visualize experientially that the consciousness-body of the man lies beyond this physical self.

The cranial system, with nerves emanating out of it, is a new unit in the animal world higher in status than food sack and muscular system of the body possessed by the invertebrates. It has the potential of controlling and commanding the visceral and somatic systems of the body. If it 'felt' hungry, it directed the body to move and search food, eat and nourish itself. If in danger, mind commanded the body to move away. It is at this stage of the Cambrian revolution of consciousness that chordates acquired a definite 'I-ness' or 'self' emerging out of the brain sack. Vertebrates differ from invertebrates in possession of an 'I-ness' component in their consciousness. Also the locomotary organisation in the chordates is linked intimately to the brain-sack and its activity.

Evolution, in a three tier chordate animal had three options since Cambrian. First, enhancement of visceral and suppression of somatic and cranial segments; second, exaltation of somatic and suppression of visceral and cranial parts ; and third, expansion of cranial element and suppression of somatic and visceral components. All the three options are seen among living chordates. Sea-squirts, sharks and men are the examples in the respective categories.

In the vertebrate phylogeny, as simplified by rock records, fishes were the first to arrive by 425 Ma, followed by amphibians (355 Ma) and reptiles (330 Ma). Reptiles gave birth to mammals (222 Ma) and birds (145 Ma). Among the mammals the brainy ones or primates, including the man, arrived as late as 57 Ma. The nearest ancestors of man like ***Sivapithecus*** or ***Ramapithecus*** step into the geological record merely eleven or twelve million years ago. From ***Ramapithecus*** emerged ***Australopithecus*** around 4 Ma and then ***Homo*** or man around 2 Ma.

A gradual increase in the size of the brain case or cranium is seen between ***Australopithecus*** (500 cc) and man, reaching its acme in the now extinct Neanderthal (1550 cc). Cranial volume and intelligence, however, are erroneously correlated. It is seen that the 1550 cc Neanderthal was no more intelligent than the 1470 cc modern man. Even among the living men, the one with 1200 cc brain regards himself as much human as the one with 1600 cc. Intelligence has no difference between the two. Cranial capacity enhancement in man has, accordingly, little role after 1200 cc in adding to his intelligence.

Mental potential to understand simple words and commands exists even in Chimpanzee. What this ape lacks, however, is word power in a social frame to communicate with others of its species through sentences. Study of **Broca's area** in the brain-casts of fossil specimens suggests that speech has arrived in the ***Australopithecus-Homo*** lineage between 2.5 and 1.6 Ma when his cranial capacity was 750 cc. From here onwards any man—irrespective of racial type—said in his own language "I am a man". Facial morphology or cranial cubic capacity became redundant at this stage.

Some works suggest relationship between tool making, vocabulary and intelligence. Seemingly it has little relevance because tool making potential has no relationship with complex brain-work in vocabulary building. Vocabulary involves a group activity relatable to knowledge-building about surroundings. There are examples to show that words current in two tribes with the same meaning have been joined as syllables of a new word when they interacted, and, many words have expanded this way. Tools have remained the same, however.

As a species, man is not a morphological form. It is a knowledge and language based species. When he said 'I am a man' or 'mi onge' in the Andamanese, morphological distinction between an Europoid cranium and Negrito cranium is invalid because the identification of man lies with 'I-ness' and not with the physical body as in other animals. As a self identifying species, defined by words and knowledge, man opens his record with ***Homo habilis***. Morphological changes have continued in the population irrespective of word or knowledge building potential since 2 Ma. This knowledge has travelled far and wide due to interaction of men's mind during migration from one place to another. It is unrelated to his morphological type.

Some emerging trends of the human mind are semaphoric of the real direction of evolution of the human consciousness. Traits like Indian rope trick, spoon bending of Geller, photographs of Ted Serios, prediction of Cheiro and several accounts of life before life are the features of consciousness emerging in man lately

and still not common to the whole species. These are some of the initial traits of an evolving human consciousness in the new direction.

The consciousness which remained tied to the animal body in the lower humans has very lately emerged independent of sense organs and body. A *yogi* perceives in *samadhi* that he is not a physical body but lies beyond 'I-ness' of the physical self. He is a *brahm*. This is what the 'knowledge-sack' of the Cambrian has attained as the terminal evolution of consciousness, during the past five hundred million years.

A survey of major events of extinction among animals shows a direct jump of consciousness among the vertebrates after every major extinction. When visceric animals receded after the extinctions at the Paleozoic/Mesozoic boundary, the somatic animals acquire dominant role. They became extinct at the Mesozoic/ Cenozoic boundary after attaining gigantic sizes among dinosaurs, weighing above 40,000 Kg. The man has reached to the status of *brahm* when large woolly mammoths and other animals disappear around 13±5 Ka.

Colonization in the human species, on account of its being a mental population, is characterised by the mental parameters. In man, role of individual animal in a colony has been taken up by individual mindset embedded in a mega-mindset of a community. The latter is based on religion, culture or language. Mental colonization has its own role in the human evolution and shaping the destiny of man. His status is now exactly same as that of a bee in a bee hive.

Introduction

Organization of consciousness in living beings till a billion years ago was mostly on the scale of one twentieth of a millimetre, far smaller than what a naked eye can see. Subsequently, visible life appeared and increased considerably in the number of individuals, species and genera. In the first classification of visible or megascopic life, man distinguishes two categories : immobile and mobile. In Sanskrit these are *sthawar* and *jangam* respectively. A fixed life form is stable at a place under gravitational force of the earth and will not move unless air or water carries it away. Contrarily, a moving organism means that it is trespassing the gravitation of earth by its own strength. Consciousness per individual of such a system, therefore, must exceed the inertial strength of earth's gravitational field. Such megascopic forms of life happen to be all animals, phylogenetically higher than sponges and corals (Fig.2.4). In the fixed category, plants are the main component although floating animals like jelly fishes and fixed forms like corals also fall here. Even among the moving animal groups, some forms acquire secondary adaptations for an attached sedentary life after free swimming larval stage. In immobile forms like plants or corals, environment provides food and shelter. When energy of ecosystem drops or gets disbalanced , such ecologically sustained life dies. Due to fall of sea level in geological times, large expanses of coral reefs have died as seen in Andaman Islands and elsewhere. Similarly in forest fires trees perish as they cannot run away. This disadvantage of strong dependence on ecology for survival is mitigated through movement among creatures. It means that animals have taken motion for more successful survival; and, for meeting this requirement, consciousness per individual was specifically enriched (with antigravity) to break the gravitational field of earth in the course of evolution.

Running away and saving oneself from harshness and dangers seems to be the main factor behind locomotion though it has subsequently aided feeding. At the level of ***Amoeba***, this is the function of a single cell; in forms like ***Hydra*** a group of cells join to form locomotor mechanism. In advanced, visible forms, like insects, birds or mammals, there is a fast motion through appendages. Their motion has led to the development of sensory organs viz. eyes, which guide motion and also a nervous system to support complex sense and locomotary organs.

Evolution of life since Ediacaran, established simple initial phyla of invertebrates with annelid brain which is comparatively simple (Fig.3.1). During the Cambrian, motion and brain link took up an altogether

different form in evolution of chordates to form a comparatively complex hollow brain (Fig.3.2). A new consciousness centre, or hollow brain was established in them as seen now in a sea squirt larva. Expansion of this hollow nervous system led to intelligence among vertebrates in times to come, especially since 65 million years when mammals and birds dominated the biosphere. Mass extinctions seem to have aided in the process through creation of progressively more active and intelligent animals in the younger geological ages.

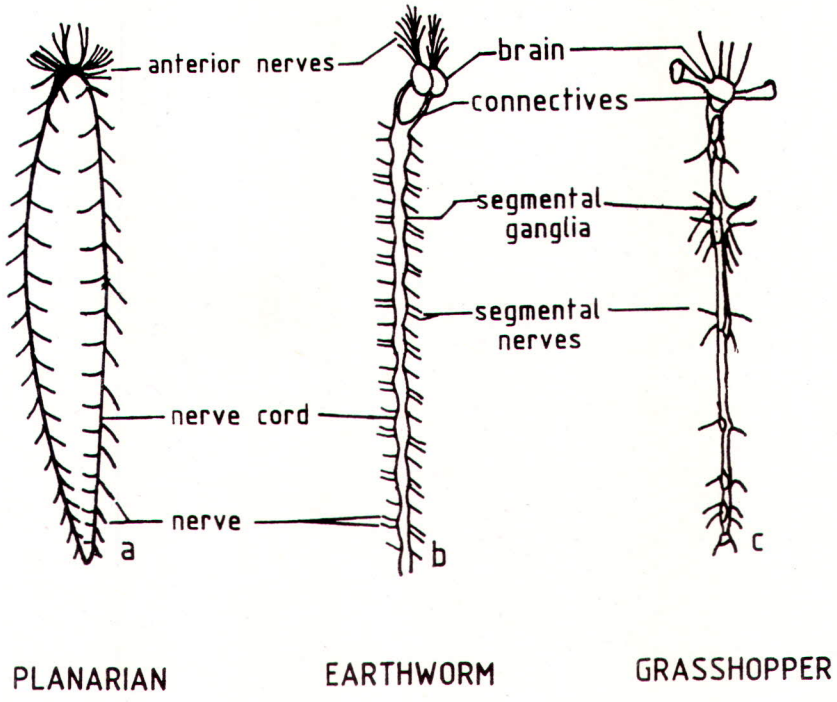


Fig. 3.1 : Nervous system of some common invertebrates : *a- Planarian, b-Earthworm and c-Grasshopper*

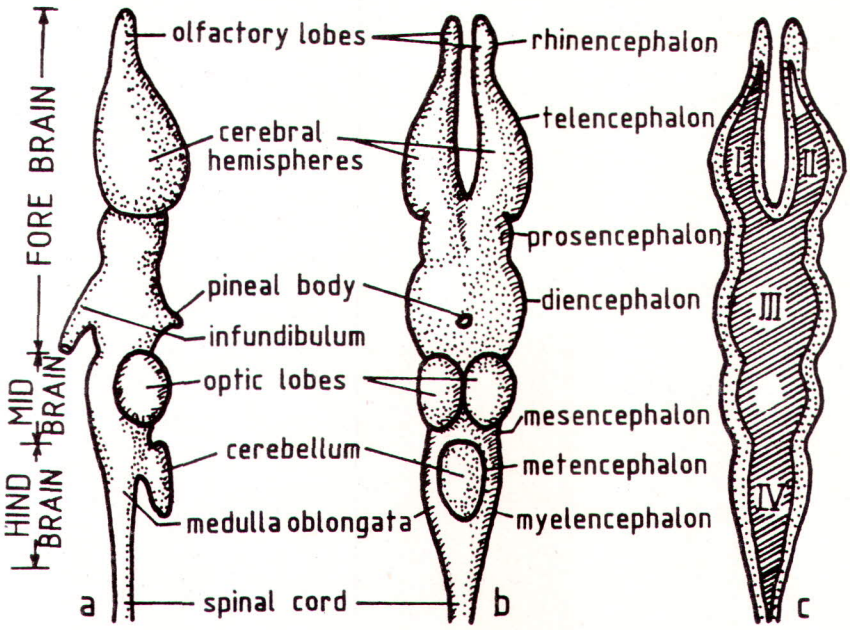


Fig. 3.2 : Chordate brain-plan in a frog. *a-lateral view, d - dorsal view and c-longitudinal section.*

A broad discussion is provided in the following pages about the expanding domain of organic consciousness among animals through different geological ages. Seemingly the increments in consciousness are in a stepwise pattern leading ultimately to a common man and then to a *yogi* (Fig.3.3).

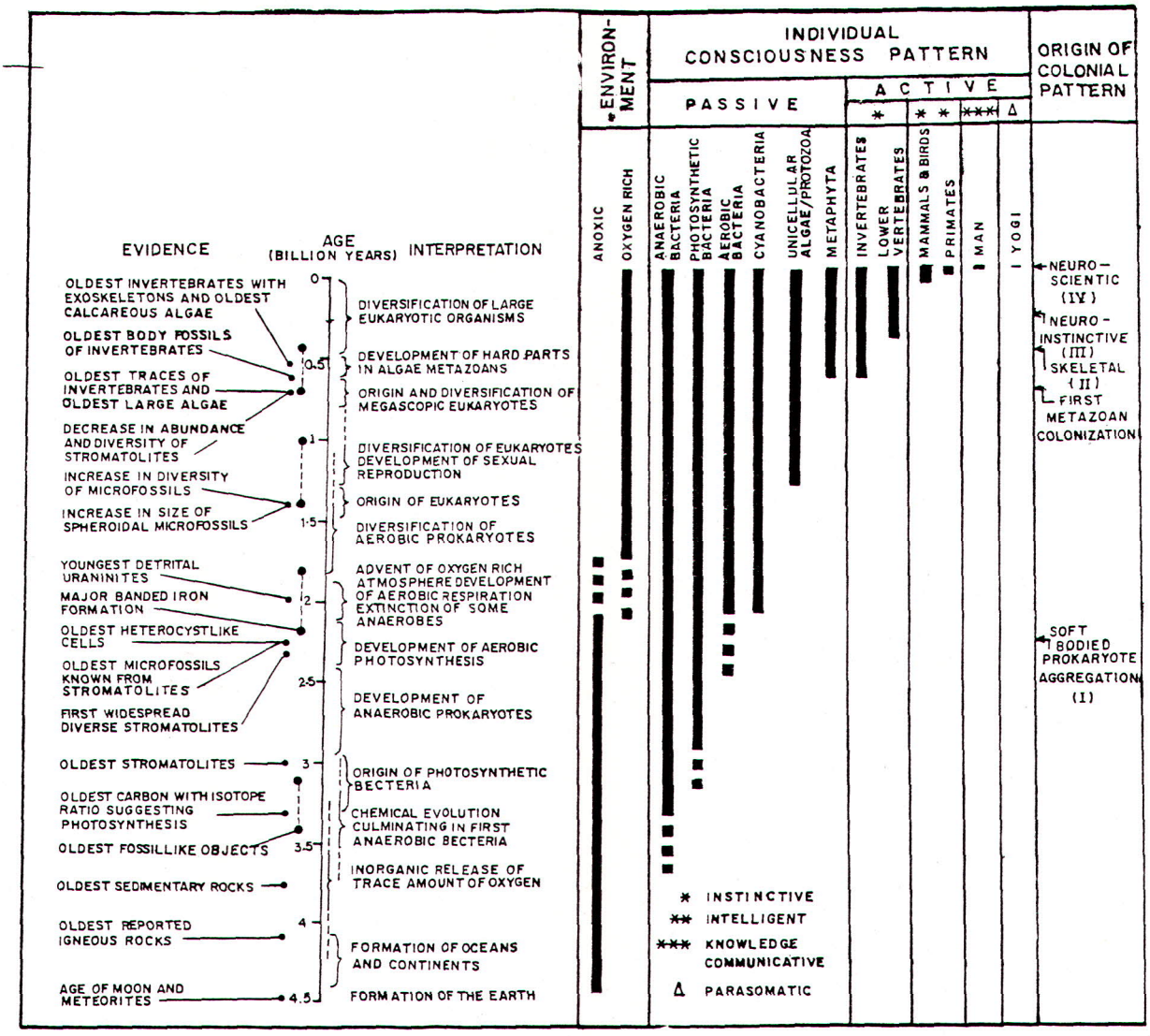


Fig. 3.3 : Evolution of consciousness pattern and colonization among living beings. *The organisation of consciousness among living forms from simple to complex, dates back to 3.5 Ga; and, similarly, colonization proceeds in four distinct steps . Firstly, it was in the life with pure organic body (I : 2.5 Ga) that was followed by the skeletal elements within the living beings like corals (II: 570 Ma). The neural or brain generated colonization of neuro-instictive type (III) arose among the invertebrates (insects) around 220 Ma. The true colonialism sets among vertebrates much later. It is neuroscientic or knowledge based colonialism of man (IV) arising about 25 Ka in pursuance of territorial goals among Europeans.*

Life during Ediacaran-Cambrian

Cambrian is the period when visible life with hard parts became abundant all of a sudden leading to a rich fossil record. This is a worldwide phenomenon at 590 Ma when oldest calcareous algae are seen in rocks (Haq and Van Eysinga, 1987) and first extensive expression of *savitaic* consciousness regime is felt in the calcareous skeleton in plants as well as animals. In the Ediacara Hill of Australia too, this boundary is neatly

picked up (Glaessner, 1982). What is most interesting about the fossils of Ediacara Hill, however, is occurrence of visible trace-fossils some hundred and fifty meters below the very base of Cambrian. Body fossils are totally absent in this Ediacara fossil zone which is inferred to date back around 625 Ma. In the geological record, the Ediacaran period marks the beginning of visible trace fossils while the Cambrian that of body fossils.

Paleontologists have devoted considerable energy to document a rich variety of life and the environments during the Ediacaran and the older Cambrian period i.e., between 500 and 700 Ma. Faunal records of the former and the latter have been discussed variously and scenarios of life during these periods illustrated (Glaessner, 1982; Morris and Whittington, 1982). Some animals of the Ediacaran period and their living representatives are also illustrated here (Fig.3.4). The following account summarises the fabric of consciousness as it is expressed in the life around 500-700 Ma (Figs. 3.5, 3.6).

The Ediacaran fossils are soft bodied, without any skeleton except minute needles or spicules as seen in some living sponges. These remind that the process of skeleton building among animals had set in during Ediacaran period. The fauna had attained some degree of complexity too. These include jelly fishes of varied types and sea pens—a group of specialised soft corals. There are segmented worms with strong head shields resembling ***Tomopteris*** besides more commonly occurring forms comparable to modern ***Spinter.*** The Ediacaran relatives of modern ***Tomopteris*** reached a size of half a meter. This group was the likely ancestor of the arthropods that included forms like trilobites during the Cambrian. Even the embryological development of coelom, or the body cavity, as seen today (Romer 1965), is comparable among insects and earthworms, supporting that these were closely linked during the geological past. This period of link ,fossil record shows, is around 600 Ma when the first arthropods have branched off from annelid ancestors.

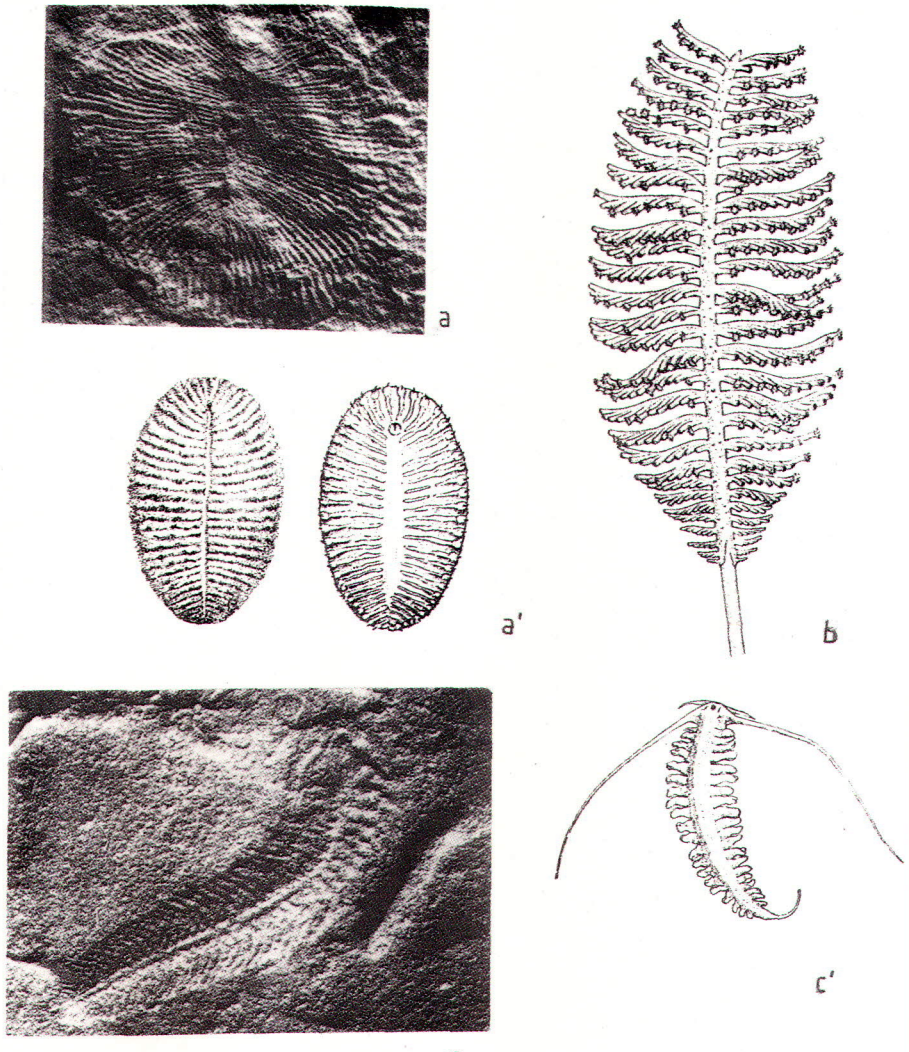


Fig. 3.4 : Some living fossils of Pre-Cambrian. *Living animals that resemble trace fossils of Pre-Cambrian impressions of the Ediacara Hills include : segmented worm like* ***Tomopteris*** *(a, a' - dorsal and ventral views of a living form);- specialized corals like sea-pens, e.g.* ***Penatula*** *(b) and a worm like Spinter, (c, c' living form).*

The Burgess Shale Formation of Western Canada is of Cambrian age and preserves excellent fossils representing life during the period. It is a good window for reconstructing the consciousness level in the creatures dwelling in the seas around 550 Ma. Displaying one of the best preserved fossil assemblages of the Middle Cambrian, the formation includes 119 species placed under different phyla or groups of animal kingdom (Morris and Whittington, 1982). Nearly 40% of these are faster moving arthropods. Worms, very slow in motion, constitute the next population of 27%; and, third in rank are the fixed forms or sponges (15%). The remaining 18% is made of very slow moving to sedentary molluscs, coelenterates, echinoderms and hemichordates-chordates in almost equal frequency. These forms differ markedly from the others in possession of a calcareous skeleton. **The Cambrian revolution in life thus sees a new biota where organic world embodies calcium for body building in discrete group of animals.** The prominent pre-existing lineages of annelid -arthropod line have no such skeleton and in the most arthropods it is essentially organic. The gross population includes fewer fixed and mostly moving forms (crawlers, burrowers, swimmers).

Most significant find of the Burgess Shale, in the context of consciousness is an ***Amphioxus*** like animal with hollow brain—***Pikaia***. It is preserved so nicely that there remains no doubt in inferring that the 'brainy' chordates were successful though insignificant phylum during the Cambrian. The earliest brainy forms nevertheless show hardly any difference in the activity from the insects around them except calcareous element in skeleton relatable to *savita* and the hollow brain developing acme of intelligence in the final run among *vedic* men.

Fossil record of Cambrian reveals that the plants as well as animals were both dwellers of sea. None of them had moved out on land. It is only in the later ages that such an attempt is seen by plants, invertebrates and vertebrates when their diversification begins on the land. Speed in locomotion, adding to the strength of individual consciousness among animals, accelerated after animals spread over the land and adapted it successfully.

Sense Organs and Brain

Sense organs developed in the animal kingdom from an early stage of evolution. Touch, among these is the first to be appreciated at the interface of body and environment. This perception is present even at the unicellular stage. Faculty of touch differs in complexity from unicellular life to the advanced forms like man. Human skin comprises above a dozen sense oriented cells for different functions like feeling heat, humidity, hardness and smoothness.

The next organ to develop among organisms is a sensitivity spot for light which evolved ultimately into an eye in most of the animals. This organ began to develop among coelenterates when light sensitive spots appeared in some jelly fishes. Many annelids have fairly well formed eyes while eyes of the insects with cone structure are highly specialized (Fig.3.7). Eye construction of molluscs is, in many ways, similar to our own where principles of a camera apply. There is a lens with aperture (iris) and the light falling on the lens is focused on the retina. This image on the retina is registered by the brain.

Taste is another sensory perception. It is appreciated specifically among the invertebrates at the level of arthropods. Among higher animals like mammals, the sense of taste is developed in tongue.

Smell again is a common faculty among insects and higher forms of life. It is incipient among lower vertebrates. Water dwelling forms lacking eyes or poor in sight like lampreys depend heavily on this faculty for their subsistence. The faculty develops, however, best among land mammals like dogs.

Hearing is not a common property among invertebrates although some insects, e.g. grasshoppers, do have hearing organs (Fig.3.8). Among vertebrates mammals and birds have highly sophisticated hearing devices both of which produce and hear different kinds of species related sounds.

The preceding discussion on the sense and the locomotary organs suggests that the higher forms of life, both invertebrates and vertebrates, develop parallel organs for appreciating and interacting with world

environment outside the body even though anatomically these organs are unrelated in construction. There is nothing common between the antenna of a cockroach and nose of a cow—both employed for smell. These are parallel evolutions to monitor 'smell particles' in the air.

Brain is an organ for gathering information and directing the body to act in response to stimulus generated by sense-organs. It is present in all the higher animals—invertebrates as well as vertebrates. Brains of these two major groups of animal kingdom are very distinct in construction, however. The former has a

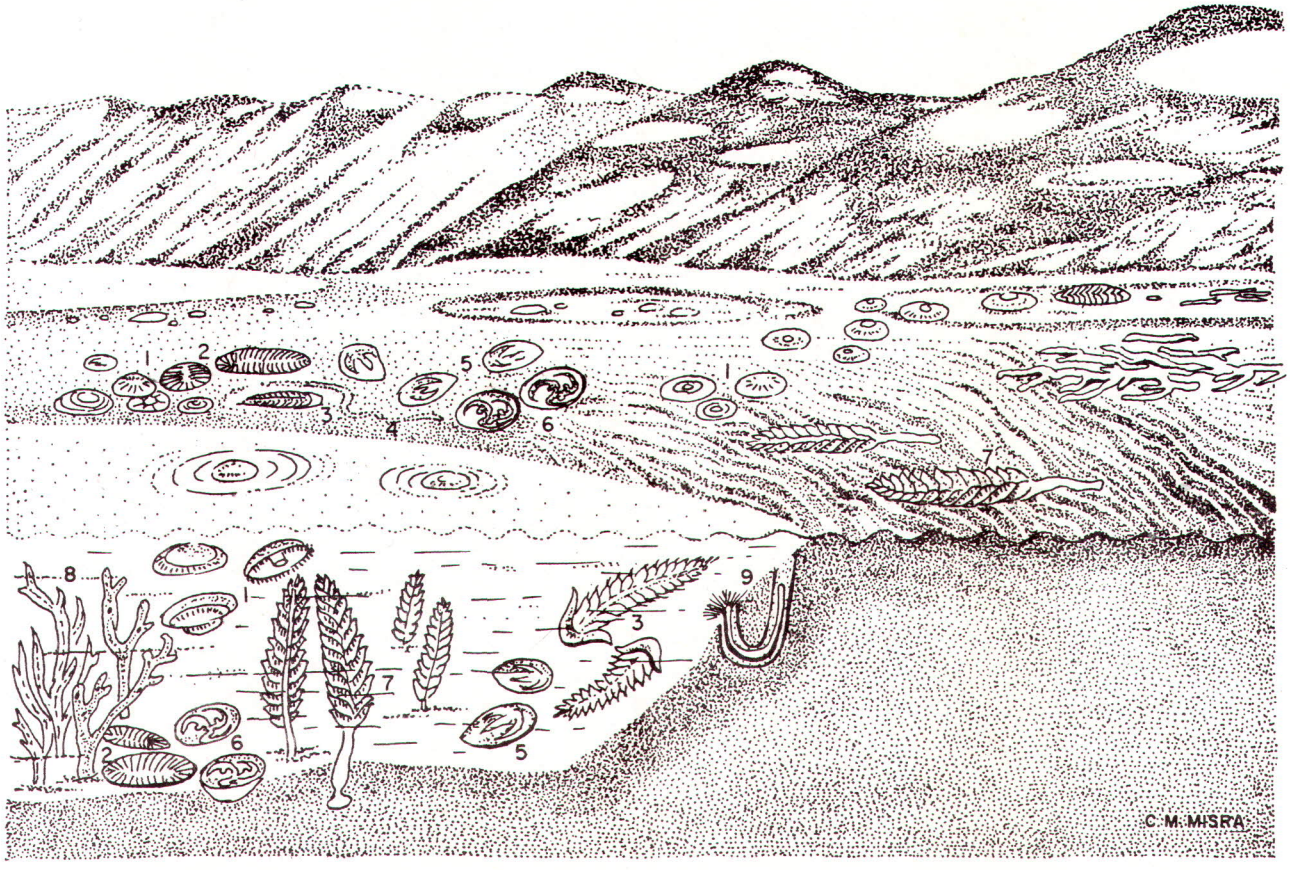
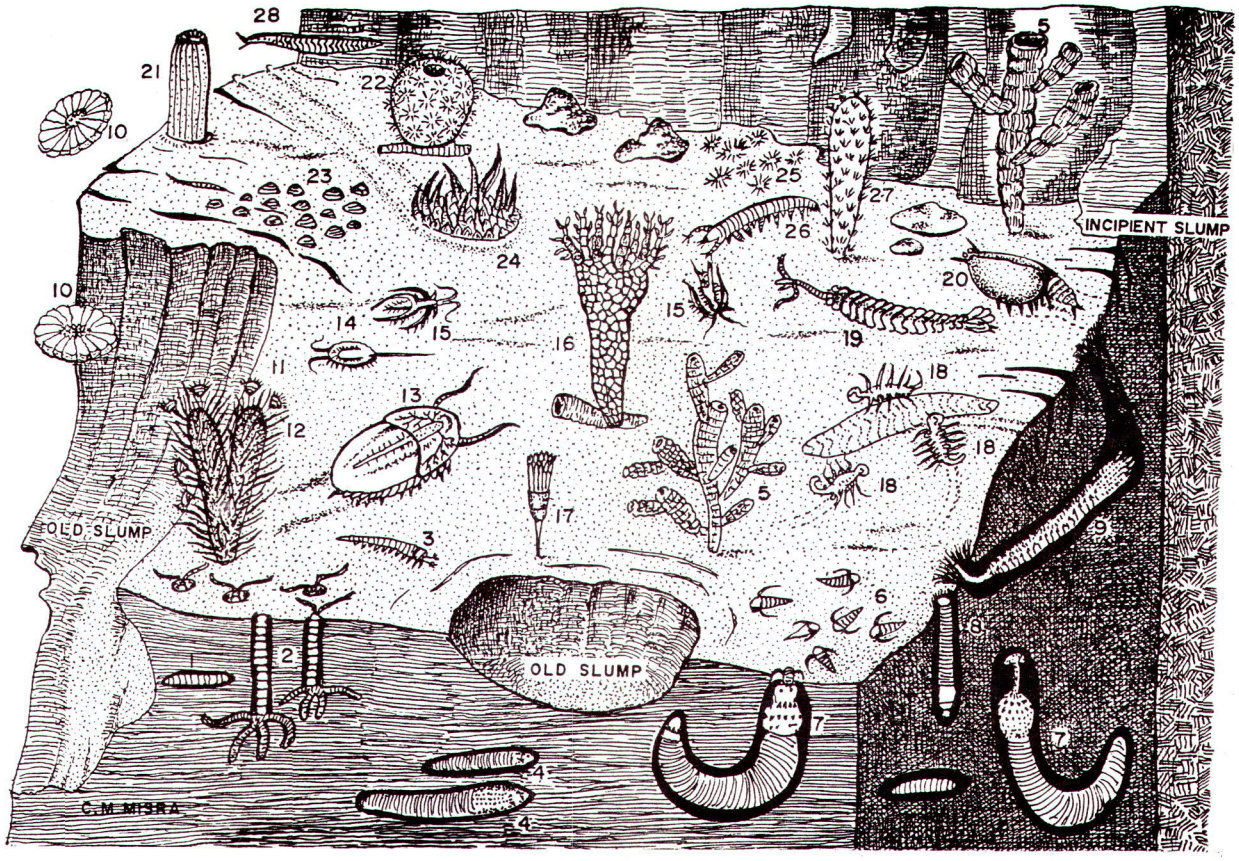


Fig. 3.5 : Life at the sea-bottom about 625 Ma. ***1- Jellyfish-like creatures; 2- worm*** **like** ***Dickinsonia*****; *3-segmented worm Spriggina floundersi; 4- worm trail; 5- Parvancorina which resembles no other known animal; Tribrachidium another unknown type, 7- the sea pens Rangea and Charnia ; 8- hypothetical algae and*** **sponges and 9) worm in a sand burrow.**

Fig 3.6 : Life at the sea-bottom around 500 Ma. *Immobile animals of the sea floor include : Sponges e.g.,* ***Pirania*** *(12), seen with the brachiopods attached to its spicules,* ***Eiffelia*** *(22);* ***Choia*** *(25);* ***Vauxia*** *(5)* ***Chancelloria*** *(27);* ***Mackenzia*** *(21) of coelenterate,* ***Echmatocrinus*** *(16) attached to an empty worm tube, and* ***Dinomischus*** *(17), of unknown affinity.The burrow-dwelling animals are* ***Peronochaeta*** *(1), a polychaete worm that fed on food particles in the silt;* ***Burgessochaeta*** *(2), a second polychaete that captured food with its long tentacles;* ***Ancalagon*** *(4), a priapulid worm,* ***Ottoia*** *(7) another priapulid,, seen at the centre feeding on the mollusk* ***Hyolithes*** *6) and at the right burrowing;****Selkirkia*** *(8),a third priapulid and* ***Louieslla*** *(9)a fourth priapulid.*

brain of the annelid stock. It is formed by fusion of two branches of a solid, ventral nerve-chord that encircle the gut before they reach dorsally to fuse into a ganglion made of swollen ends of the two branches. This solid mass of nerves constituting the brain is unlike the brain of vertebrates which is typically a hollow tube differentiated in segments and parts (Figs.3.1, 3.2). This spectacular gap, as it may be realized, arises out of the phylogenetic difference between the two groups. Among the invertebrates, it is the motion that has rearranged the nervous tissue of a primitive type like ***Hydra*** into nerve cord and brain of an earthworm. Among the chordates, on the contrary, it is a new primary unit of body, rich in consciousness by itself that commands the body system—apparently for its own ends. This unit is absent among invertebrates altogether.

Vertebrate brain-plan developed from a Cambrian chordate like ***Pikaia***, very similar to the larva of a sea-squirt with which this primitive chordate of Burgess Shale compares (Fig.3.9). As the free floating sea-squirt larva shows, it has three distinct units in the construction of body. Firstly a food sack, open at both



Peytoia *(10) is a free-swimming coelentrate shaped like a pineapple ring.* ***The sea-floor dwelling mollusk in addition to Hyolithes*** *are* ***Scenella*** *(23) and* ***Wiwaxia*** *(24) with its covering scales and defensive spines. Among the many arthropod genera of the sea floor are* ***Yohoia*** *(3),* ***Naraoia*** *(13) , an atypical trilobite;* ***Burgessia*** *(14).* ***Marrella*** *(15), may have swam just above the see floor.* ***Canadaspis*** *(20) is an early Crustacean, and* ***Aysheaia*** *(26), a stubby-legged animal. Other representatives of the sea bottom are* ***Hallucigenia*** *(18), feeding on a dead worm and* ***Opabinia*** *(19) seen here grasping a small worm with its single birfucated appendage. Finally, seen swimming alone at the top left, is* ***Pikaia*** *(28), the sole representive of the chordate phylum in this Middle Cambrian fauna.*

ends (mouth and anus), second a dorsal neural tube, closed sack continuing backwards , and third, a muscular segment of body carrying both the organs from one place to another. The body lies under the control of nervous system and serves the purpose of food gathering and reproduction for the nerve sack. Thus the chordate body is, at the outset, a three component system: a ventral food related or visceral unit, a middle in the hind known as muscular or somatic component , and the third in dorso-frontal part which may be referred as neural or cranial segment.

Apparently clubbed together three units of different functions made the earliest body of the chordate ***Pikaia*** on an entirely different plan compared to an annelid. The annelid has only food and muscular components and its solid brain is formed by terminal part of the main nerve in the muscular body. Chordate body has within itself an independent 'sack' or unit of knowledge for guiding activity and associated organs for movements. The latter

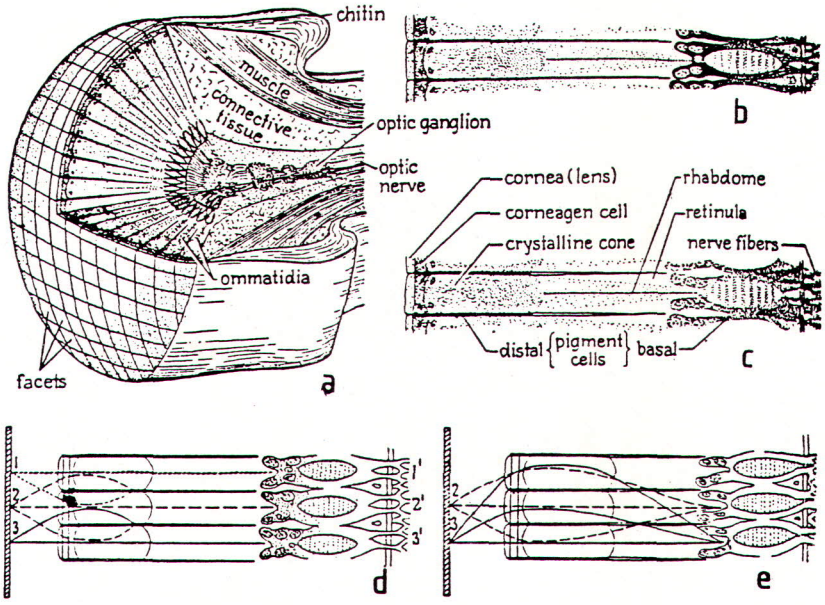


Fig. 3.7 : Construction of eye in Crayfish *a- entire eye section to show its general structure ; b- one ommatidium in the light, pigment extended ; c- ommatidium in the dark pigment contracted d- opposition image formed of separate images on retinulae from points 1,2,3 on object; e- superposition image each retinulae receives both oblique and direct rays from more than one point.*

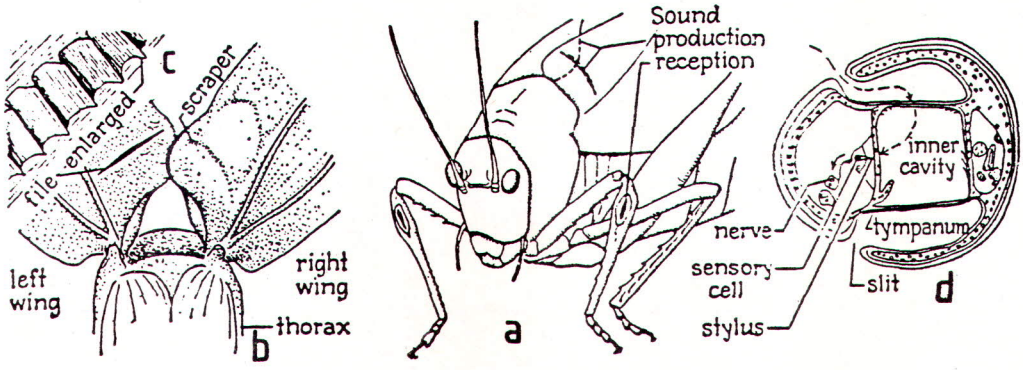


Fig. 3.8 : Sound producing and receiving organs in 'grasshopper. *a- Fore parts of a katydid showing the location of structure for sound production and reception. b-. Under surface of the fore wings with file and scraper that are rubbed together to produce sounds. c- Enlarged details of the file.. d- Cross section of foreleg showing the sound receptor or "ear" with paths of sound waves (broken line) and nerve impulses (solid arrow).*

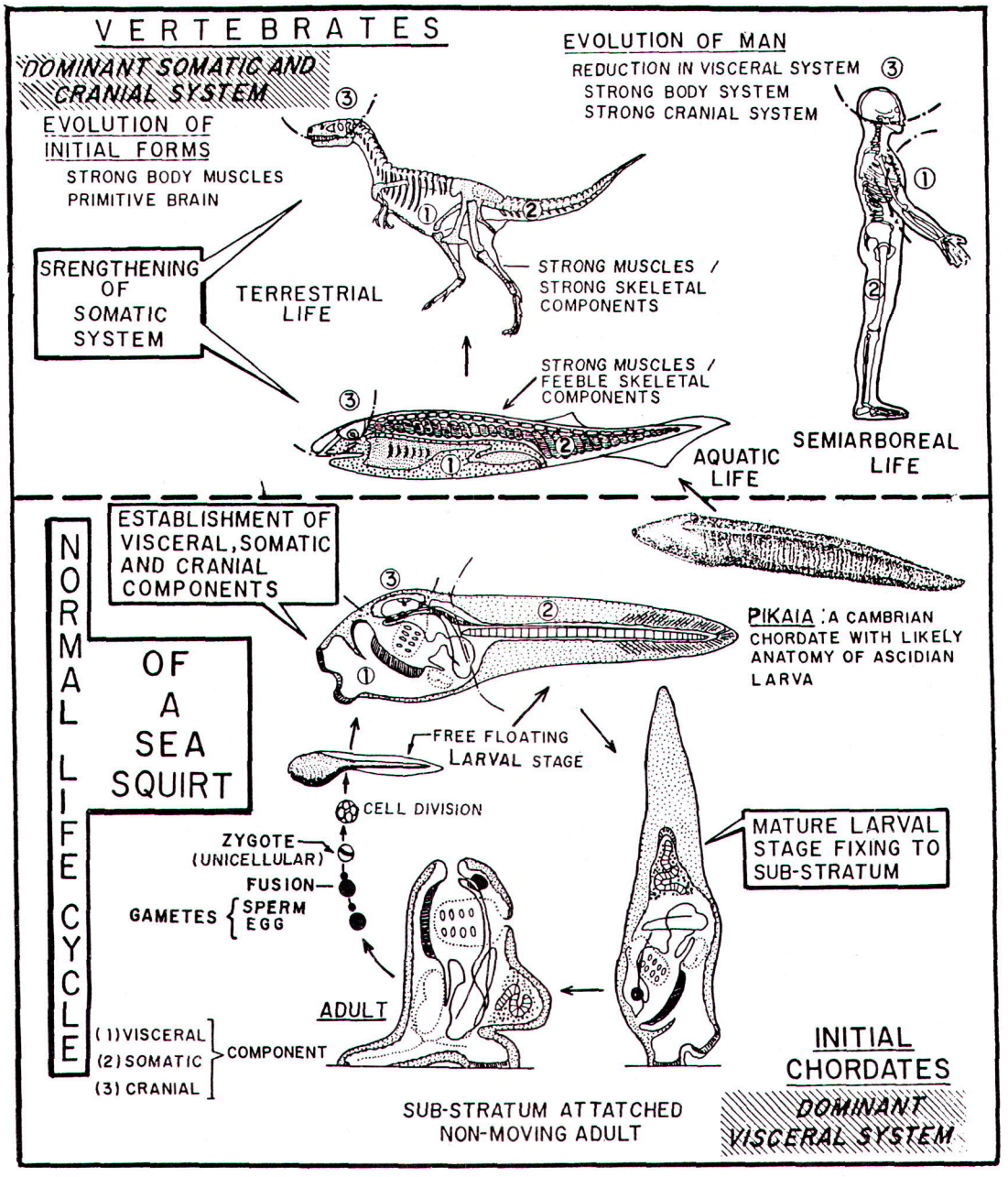


Fig. 3.9 : Origin and differentiation in chordate consciousness system. *Three segments of the chordate body—visceral, somatic and cranial—are present in the larval stage of a sea-squirt which is a micro-representative of the Cambrian chordate* ***Pikaia****.* ***Pikaia*** *is the ancestor of later chordate. Somatic segment and endoskeleton develops along the hollow nerve tube in the first place among the fishes. In the land animals, limbs develop and extend far away from the initial hollow spinal chord. Initial tetrapods and birds are with minor brain-volume but in case of man visceral segment reduces considerably, the somatic segment remains quite strong and the cranial segment shows extensive development into a complex brain.*

was used for the search of food and for safety. This was in addition to the two already developed independent units a; food sack and a muscular body as seen among the adult sea squirts (Fig.3.10). This knowledge sack or brain is secondarily eliminated when the animal adapts the invertebrate body plan of a major food sack associated with a minor body muscle segment. Formation of this consciousness-sack or cranial system in the history of evolution of animals, is a major step commencing in the Cambrian time (Fig.3.3). Calcium, *savitaic* consciousness and cranial-sack make debut in the chordate body of ***Pikaia*** to reach ultimately to a *yogi* stage of enlightenment some 570 Ma later.

The cranial system with nerves emanating out of it represents a new unit in the animal world as it possesses the potential of controlling and commanding the intimately related somatic system. The animal moved the body to search for food when the sack 'felt' it was hungry; and, when the sense organs sensed a danger, it moved the body away from its place. It is at this stage of the Cambrian revolution of consciousness that animals acquired a definite 'I-ness ' or conscious-self emerging out of the brain sack. Hereafter, chordates started living for brain instead of merely for food-sack. With the addition of brain-sack among vertebrates. The invertebrate instinct came to be supervised by intelligence

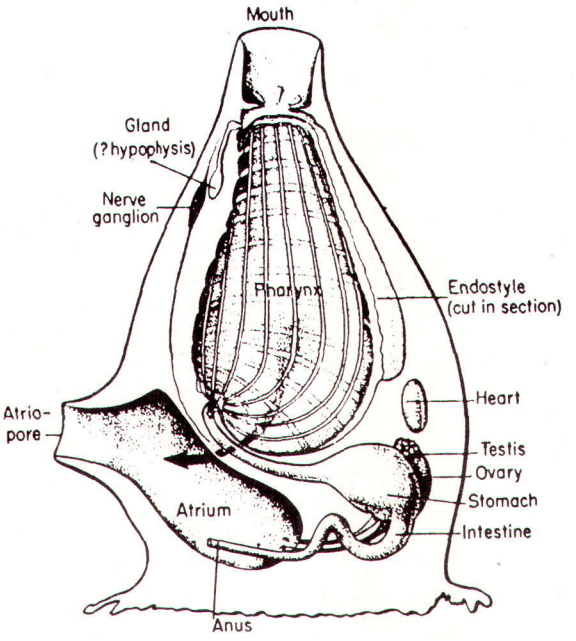


Fig. 3.10 : Visceral component in an Ascidian. *Sea-squirt's body is essentially a food sack with an opening for mouth through which food enters with water, gets filtered and reaches stomach. After digestion it is discharged through another outlet in the animal wherein the anus opens.*

In light of the above, a chordate body and its nervous system, though interacting with environment by the same primary sense and action organs as that of an invertebrate, has hardly any relationship with that of an invertebrate. Invertebrate consciousness is diffused into a body system centred around and controlled merely by instinct whereas chordate consciousness is concentrated in its hollow consciousness sack—the brain. It has the logic and subjugates the two other components, i.e. food sack and locomotary organs, for sustenance and growth of consciousness. The emergence of chordates in the geological record thus brings two distinct sects in the consciousness regime among animals. One, emanating out of the body system alone with minor nervous system; and, the other making its debut with the brain sack.

The size, structure and functions of human brain when compared with that of an insect, show that only a very small segment of this big brain is able to carry out all the functions of sense organs and movement. **Such a brain as man possesses is not at all needed if it was only to attend body functions**. Experiments further show that in a man's brain much of the functions now are in the field of feeling, logic, memory and creativity. The brain controls the somatic system for its own sake. The consciousness seated here even regulates the deprivation of food and oxygen intake for its own sake among *yogis*. The cranial system of man brings a better understanding of such functions which are purely on account of 'consciousness sack' of earliest vertebrates and suggests strongly that the vertebrate brain did not evolve purely on account of body or body functions. This stage has been long past among invertebrates. Memory, logic and analysis for truth seem to be the exclusive functions of the cranial component at man's level of evolution. Brain, in this respect

is not strictly a part of the body. It has also been profusely demonstrated that these properties do not end with body but often continue in a new body when soul transmigrates. The functions of our brain to support the somatic or visceral requirements are, accordingly, minor.

Romer (1965) in his appreciation of a jointed fabrication of chordate body writes "In many ways one may regard a vertebrate as two distinct animals, visceral and somatic..... welded into a single structure". What is demonstrated above is that instead of two there are three distinct components constituting us; **cranium, soma** and **viscera**. Modern embryologists tell us that men by the very embryonic stage could be distinguished as '**nervy**', **muscular** or **bellied .** There is no wonder that a man displays the widest variation of tendencies from near insect to purely angelic on account of this tripartite constitution of his body.

Evolution in a three tier animal, as in chordates, has had three options since the Cambrian times. First, enhancement of visceral and suppression of the somatic and cranial segments; second, exaltation of somatic and suppression of visceral and cranial parts; and, third, expansion of cranial and suppression of visceral and somatic components. All the three options are present among living chordates. Ascidians are essentially visceral and nearly abandon somatic and cranial components (Fig., 3.10); sharks and fast moving animals like ***Tyranosaurus***—nearly twenty metres high fast running dinosaurian monster—exemplify expansion of a somatic regime (Fig. 3.11) while a *yogi* of India with little food and oxygen intake represents expansion of the third or cranial component.

Emergence of Man

When Darwin put forth his ideas on the 'Origin of Species' on 24th November, 1859, "inclusion of man in the common descent of mammals was considered by many to be an unforgivable insult to the human race and it aroused a storm of protests" (Mayr, 1982). Scientists today have gone a long way in refining the ideas about man's ancestry on the evidence of fossils, biology and molecular biology (Washburn, 1982). The last shows that man's nearest kin among the living animals is chimpanzee whose nearest kin is orang-utan and all of them have emerged from the old world monkeys. These are the members of the order Primates in the class Mammalia of subphylum Vertebrata. Ascent of man, the best representative of cranial component in evolution , gives us the farthest point commencing with the first chordate of Cambrian where the visceral, somatic and cranial parts were unspecialized but the visceral was most dominant. Important dates in this long story are those when a primitive chordate stock gave rise to fishes during Ordovician (425 Ma) and later to amphibians during Carboniferous (355 Ma). This line moved further from amphibians to reptiles (330 Ma) and from reptiles to mammals (222 Ma) and birds (145 Ma). It is somewhat paradoxical that mammals had to continue from 222 Ma for another 165 million years for emergence of the brainy Primates or the human ancestors around 57 Ma. Further, the nearest ancestors of man—man like apes e.g., ***Sivapithecus*** or ***Ramapithecus***—step into geological scene only eleven or twelve million years ago in the then African and Himalayan forests. Some people regard ***Ramapithecus*** as a population - mainly female - within ***Sivapithecus*** (Jones et al., 1992). However, since this author himself has established the large male form of ***Sivapithecus***, the ***Sivapithecus levisi*** Pandey and Sastri, 1968, this taxonomic claim is not accepted. ***Ramapithecus*** is regarded as a population, emerging out of ***Sivapithecus***, on the direct evolutionary path of man. Somatism was considerably discarded in the ***Sivapithecus*** when the lighter , brainier ***Ramapithecus*** arrived on the scene.

Much delayed is the arrival of self-conscious intelligent animals on earth comparable to the modern chimpanzee. It was the successor of the ***Sivapithecus*** population in India. ***Ramapithecus***—who did not walk straight like man but like chimpanzee, partly straight and partly supported by hands (Fig.3.12). As Leakey conceives, two stocks differentiated out of the ***Ramapithecus*** population. Both walked straight. The first among these—***Australopithecus***, arose around four million years ago while the other, arrived around 2 Ma (Fig. 3.13). It was ***Homo*** or man. A generally more acceptable version, however, is derivation of ***Australopithecus*** from ***Ramapithecus*** and ***Homo*** from ***Austrolopithecus***. The latter includes only four

Fig. 3.11 : Zenith of somatic development in the fast running giant carnivore *Tyranosaurus* during Cretaceous Period.

species—***Homo habilis***, ***Homo erectus***, ***Homo neanderthelensis*** and ***Homo sapiens***. People often regard ***Homo nearderthelensis*** as a subspecies of ***Homo sapiens*** or the living man. Some others treat it as a variety or race (Barnouw, 1978). Leakey and Lewin (1977) have provided reconstructions for most of these forms. Some of them are reproduced here for their appearance and gait. There has been a continuous revision of names of human related genera. These do not alter the broad aspects of evolution of consciousness in any way because **quantum of consciousness is not tied up with the facial morphology of genera and species in the human group.**

A gradual increase in the size of brain is a feature seen in the fossil record of apes and man, and it reached its acme in the extinct ***Homo neanderthelensis***. Increase of brain size has been most often linked with increasing intelligence and to some extent it may be true in the early history of man. But as is well known that 1550 cc ***Neanderthal*** was not more intelligent than 1470 cc ***H. sapiens*** still living. The application of intelligence with the volume of cranium beyond a certain limit of evolution, is possibly an over simplification of evolutionary process in human consciousness. The most primitive humans with smaller body and brain size, like Andamanese, show hardly any difference in the intelligence level as compared to the large-brained Europeans (Man, 1883). Human cranium size varies today between 1200 cc and 1600 cc with average of 1470 cc. The one possessing 1200 cc considers himself as much man as the one with 1600 cc. Brain size, in man therefore, has hardly any consequence after the individuals start identifying and naming themselves as man. It is the date on which man is out of the premises of Linaean species identified as a morphologic population since none of them are knowledge communicating forms. When does this stage begin in nature ?

Memory, Vocabulary and Intelligence

Experiments on chimpanzees demonstrate the ability of this primate to identify the self in a mirror and also to memorize words as well as to coin simple sentences and type them. What it cannot do is to speak coherently. After a long training, a trainee chimpanzee has pronounced *up*, *cup*, *papa*, *mama*. Leakey and Lewin observe that chimpanzees, nevertheless, are astute observers of nature. Jane Goodall, observed "At the onset of a violent rain storm a group of males would run repeatedly up and down a slope, brandishing branches pepped from nearby trees and calling again and again". ***Ramapithecus***, the chimpanzee of Siwalik period, 7 million years ago, must have been doing all this like a modern chimpanzee. His mind could not give him words, though.

Fig. 3.12 : *Ramapithecus* . *Dwelling in the Himalayan forests about 7 Ma, this primate made the first effort to walk straight.*

Fig. 3.13 : *Australopithecus.* *The near human gait of walking straight was attained by this primate of Africa around 4 Ma.*

When did mind of ***Ramapithecus*** or any evolving humanoid ape learn to speak such simple words of caution like "rain ! run "or "Snake ! run" ? Possibly it was within a couple of million years of straight gait in walking when voice box and tongue being modified to spell words developed. An early date is suggested by a skull of ***Homo habilis*** regarded by some as belonging to ***Australopithecus***. The skull from Kubifora locality in Kenya numbered KNM-ER 1470 dates between 2.5 and 1.6 Ma. It has a cranial capacity of 775 cc. Ralph Holloway, has looked in the brain cast of KNM-ER 1470 for Broca's area "the brain centre that organizes words into grammatical format and initiates the muscle control required in making the precise speech sounds." In the brain cast of this nearly two million years old specimen the Broca's area is apparent as a small bump in the front left side of cast. Whether this meant that KNM-ER 1470 could talk is impossible to say because fossils don't preserve speech ! But, since morphology and functions are linked in the comparative anatomy, we discover that our ancestors were communicating long before us. Some simple words could

even date back to the very antiquity of straight walking ***Australopithecus*** around 4 Ma. A few anatomists do not still believe if man was speaking even before sixty thousands years—especially the Neanderthal who, at this level of time, shows positive evidence of speech (Arensburg and Tiller, 1991). This opinion is on considering the controversial morphological position of the hyod bone. The complex grammar of Andamanese, however, preserved since 55 Ka, lays to rest such speculations. Looking at the Andamanese grammar, existence of man's communication of knowledge through words is conceived around 2 Ma (Chapter-4).

Appearance of memory and intelligence is unique revolution in the organic evolution. It is no earlier than 12 Ma when the glaciation has set in the Antarctica around 15-13 Ma and a large flux of latent heat was available to the earth's biosphere for its response. The setting of the first polar cap in north around 3 Ma is quickly followed by a speaking man with Broca's area—in yet another revolution. The acme of the acceleration of memory and intelligence is seen in the *vedic* man during the terminal phase of the last glaciation (26-12 Ka). Subsequently, a retardation has set in and as discussed later in the chapter, the present day children are less intelligent than a 100 years ago.

Tools and Vocabulary

Speculations have been made about relationship between speech and acumen for making the tools among humans since 2.5 Ma. That the tool making potential has no relevance in the function of voice is common sense. Sounds among birds, as we note, are often linked to expression of emotion (songs) and fear (danger calls). Birds make no tools. Similarly, it was emotional and mental reaction to environment that produced words in man, it may be argued. Since terminal form of ***Australopithecus*** was akin to ***H. habilis***, we may think that spoken words possibly came to exist in the terminal phase of ***Ramapithecus*** or beginning of ***Australopithecus*** which undertook group activities like hunting etc. Simultaneously the erect walking pose of neck and head changed larynx and tongue morphology to enable the safety calls in the pre-existing of ***Ramapithecus***, to be expressed as specific words in the ***Australopithecus***, socially understood for actions, e.g. run or cut and names like *ma, papa* and *ram*. These expanded into vocabulary in the subsequent million years by adding at times unnecessary letters. An example here is Sanskrit word *udak* for water which may be contracted to *Ud* [AST: 6.3.57]. Again *u* signifies water in Khasi and *da* is water or river in Mundari. *ud*, thus, is another notation for water in Sanskrit combining two words of original usages. It further expanded to *udak*—a comparatively longer word for water with same meaning.

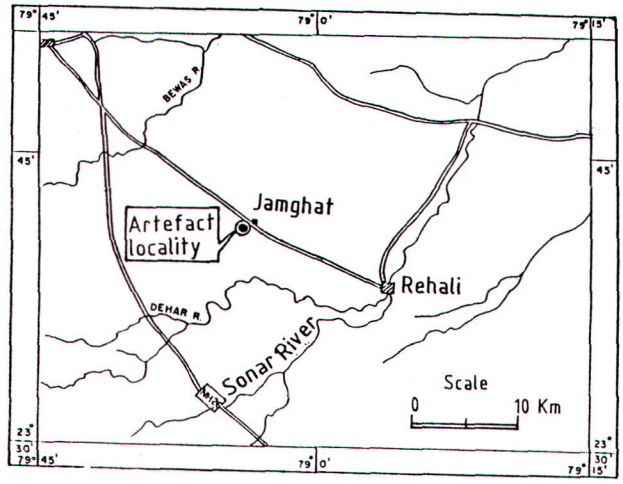
A Scientic or Knowledgeable Species

Innate ability of forming the words for naming and instructing the young possibly existed in ***Ramapithecus***. What ***Australopithecus*** and ***Homo*** attained after having their straight gait and vertical neck was to pronounce clearly the nouns and verbs for communication of information. These expanded during their successor ***Homo erectus***, where we see a growth of cranium from 800 cc to 1200 cc. At the latter figure, we are at the level of ***Homo sapiens*** in the cubic capacity of brain, though morphology of cranium is different enough to classify it as a distinct species within genus ***Homo***. Capacity of cranium, morphology of head or body for the purpose of knowledge communication has little meaning, however. If racially distinctive Andamanese and Europeans, with different morphology and cranial volume, can communicate the knowledge with each other, their brain sizes or morphological distinctions are irrelevant for definition of ***H. sapiens*** as a knowledge bearing 'cranial sack', whose terminal representation man is. Andamanese word *onge* means same as *man* in English irrespective of their morphologic difference, and, the first day a man addressed himself as 'man' in any language the advent of ***Homo sapiens*** begins. Morphologically, this form seems to begin with ***Homo habilis*** when coherent speech first appeared.

At the level of man—a terminal form of cranial type—identification of self or consciousness is tied directly with mind and speech rather than morphology of body. Criteria of skeletal morphology or identification of tool type and population, in such a case are no more tenable. The Mousterain tool industry,

for instance, typical of the Middle Paleolithic Neanderthal men of Europe and Africa is seen even among Andamanese who are a relict and marooned ***Homo sapiens*** population (Chapter-4). Knowledge of making Mousterian tools has travelled in different communities of men breaking barriers of physical morphology. Not only Mousterian, even the chopper axes of ***Homo erectus*** of Olduvai are found in India (Fig.3.14). Apparently, such long distance travel of knowledge has been through communication of knowledge for engineering skill of these tools. Morphologic basis of species in the human population is, accordingly, no more relevant.

Our experience shows that human species is a coherent population on language and culture basis and not on morphology as paleontologists often consider. Cranial capacity too has an erroneous bias of paleontologists to some extent originating possibly out of the earlier western mind which thought, out of self-exalting belief, that the larger brains in *'aryans'* of Europe meant greater intelligence. This funny faith has been operating among western minds right from the days of Karl von Linne (1707-1778), the originator of the binomial system of generic and specific names of animals and plants. He while identifying the human races has attributed "cruelty, melancholy, stubbornness and avarice to Asian man; spite, cunning, laziness and indifference to African man; and nobility, wit and inventiveness to European man" (Nesturkh, 1963). Size of brain at human level has also proved patently redundant when we see that the famous French writer Anatole France had a brain weighing 1017 grams in contrast to brain of Russian writer Ivan Turganev weighing 2112 gms. This bias, however, continues, even though we realize that modern man has a brain varying in size from 1200 cc to 1600 cc and it is also established that among ***Homo erectus*** of China the volume is 1220 cc, "very close to cranial volume of some modern anthropological



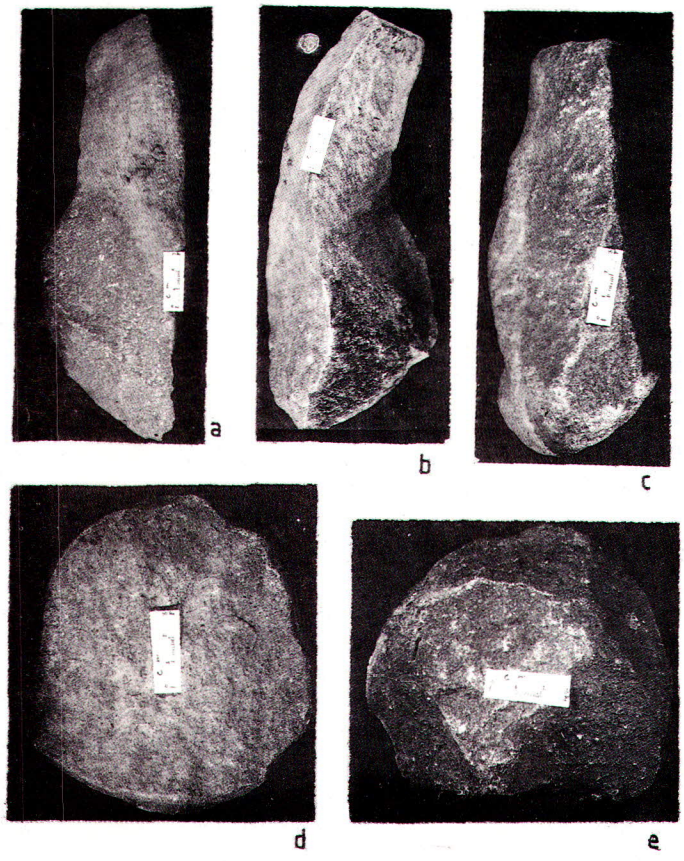


Fig. 3.14 : Primitive stone tools from Jamghat in Madhya Pradesh. *Primitive asymmetrical axe (a, b) two views of same;an irregular stone pestle (c) and a split pebble core (d,e). These forms fall under simple core and flake industry of Upper Pliocene and Early Pleistocene. The illustrated material probably belongs to Early Pleistocene.*

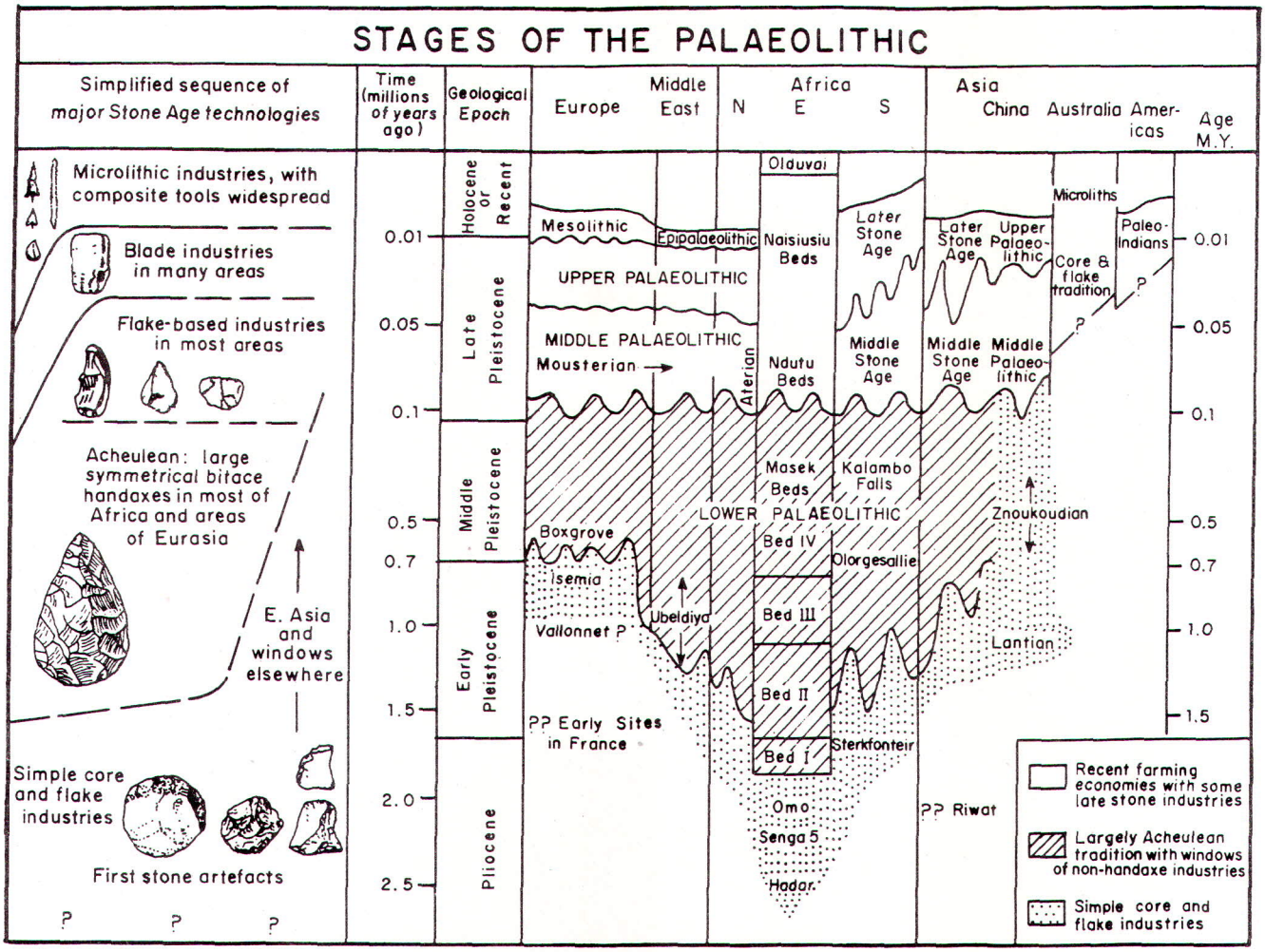


Fig. 3.15 : Classification of Higher Neogene and Quaternary.

types such as, for instance Goahiro Indians (South America)" (Nestrukh, 1963, p 38). Most paleontologists, however, are not conditioned yet to consider ***H. erectus*** merely an older representative of ***H. sapiens*** population communicating knowledge as the man of today. They, like Linne of the past, believe that ***H. erectus*** did not speak. This belief is illogical since Olduvaian tool types are as much present in India as Africa. These tools with specific facets did need a tutor to teach the young as well as men of the distant lands, through speech, how to make them.

There have been different morphologically distinct communities of men in separate geographic areas. However,since man's identification is not morphologic but based on knowledge, culture and tradition, all morphological forms, from ***H. habilis*** to ***H.erectus*** to ***H. sapiens*** constitute merely a single knowledge bearing population, moving in time with expanding knowledge base irrespective of their geographically controlled morphologic variation. This knowledge based population has had several cultural and tool levels (Fig.3.15). These are Olduvaian split pebbles-chopper axes at the ***Australopithecus-Homo*** transition (2 ± 0.5 Ma), Acheulian tools of Lower Paleolithic (1.5 Ma to .1 Ma), Mousterian tools of Middle Paleolithic (100 Ka to 32 Ka), Perigordian tools of earlier part of upper Paleolithic (32 - 20 Ka) and Magdalenian tools of upper part of Upper Paleolithic. We, as knowledge bearing men, are a single non-Linnean species which is artificially broken into different groups of Linnean classification. Unable to identify men as a single mental species, Linnean system breaks it into ***H. habilis, H. erectus*** or ***H. sapiens***. All these populations have consistently addressed themselves as man for nearly two million years when they started talking to one

Mental Traits

The enlargement of brain in human species is largely due to an expanding frontal lobe of the brain called cerebrum. Man has made tremendous progress in size and complexity of brain in contrast to a monkey or chimpanzee. His power of creativity involving language bound thoughts goes far in antiquity accelerating the process of growth. We also know that the cranial capacity in human brain was at its zenith long ago in the Neanderthal man of Europe and Africa. Neanderthal man died around 32 Ka, adding no glory to mankind with 1500 cc of brain—a little in excess of our own. He remained a Mousterain tool maker only comparable to marooned Andamanese with the same tools. He was a dull carpenter and not an intelligent grammarian. Addition of volume and enlargement of brain, the Neanderthals prove, is not directly related to intelligence. In the living man, therefore, the expansion of brain has had something else to attain besides the intelligence required to sustain the body. This 'knowledge-sack' of chordate has used the food and muscular components of body for best furtherance of consciousness since six hundred million years; and, in the man, this would not turn surveillient to these two segments like invertebrates.

The evolution of mental traits in man has three distinct stages. In the first stage man exerted near minimum influence on the environment and he, with his vocabulary, is as much a part of nature as any other animal though organized better for food gathering on account of language and intelligence. This condition still typifies the Andamanese who reached the island around 55 Ka and are in the same state (Chapter-4). From this stage he was led further to intelligence, introversion and consciousness accretion in the Indian subcontinent through memorization, logic and rituals. As the renunciative trend ensued, man found himself to be a *yogi*. A *yogi* exists as 'I-ness' of pure consciousness, beyond physical body in the state of *samadhi*. In this trend, logic is supreme and emotions become zero. This condition, reached around 15 Ka, led to enlightened man and *videh*. There is a third trend also that developed in the man occupying the circum-Mediterranean territory vacated by the Neanderthal people. Man's developments in this area were conditioned by community reflex or colonialism . Population of this land excelled in the control of individual through faith and emotion of community, in contrast to the individual achievement of a *yogi*. Chronologically, the beginning of this trend can be linked with cave culture of Europe during the Upper Paleolithic Period (30 Ka). This trend of strengthening community consciousness is just opposed to the trend of enhancement of individual consciousness. A comparison of the two traits is summed up in the Chart 3.1.

Effects of Extinctions

In the history of earth, a well noted phenomenon is the event of mass mortality or mass extinction. Two of these events are very well known : one at the Paleozoic/Mesozoic boundary (250 Ma) and the other at the Cretaceous/Tertiary boundary around 65 Ma (Fig.2.6). These events have cast their shadows on the trend of

	Yogi	Colonial man
1. Highest state of consciousness	*Samadhi*	Awaken
2. Gross actions for the gain	Individual	Communal or colonial
3. Purpose of existence	Self	Colony
4. Control of action by	Logic	Community emotion
5. Pattern of mind	introvert	extrovert
6. Guiding principles in life	Right action based on Truth	Acquisitive intrests of colony irrespective of right and wrong
7. Innate tendency	Renunciation	Acquisition
8. State of self	Peaceful	Agitated

Chart 3.1: Comparison of *yogic* and colonial mind-sets

somatic and cranial evolution among vertebrates. There seems to be a specific link between the extinctions and the expansion of consciousness field or intelligence among vertebrates.

The first major event of mass extinction at the Permian/ Triassic boundary is summed up by Maxwell, 1989 p.152." Marine life was devastated, with 57% reduction in the number of families (Sepkoski, 1986) and an estimated 96% extinction at the species level (Raup, 1979). Terrestrial forms were similarly affected, with a 77% reduction in the number of tetrapod families (Maxwell and Benton, 1987). All major groups of marine organisms were affected with the crinozoans (98%), anthozoans (96%), brachiopods (80%) and bryozoans (79%) suffering the greatest extinction (McKinney, 1987). Other severely affected groups included the cephalpods, corals, ostracodes and foraminifers, all predominantly tropical groups or members of the reef building community".

The event is often regarded as gradual, covering a few million years. The most significant point in the episode is its near total elimination of the older calcareous life forms like foraminifera, corals, brachiopods and others.

The second major crisis of the zoosphere on this earth is at the Mesozoic/Cenozoic boundary. Ever since the beginning of geology as a subject in the eighteenth century, the end of the Cretaceous period has been known as a period of major extinctions. Nearly a third of all the families of animals known in the Late Cretaceous times were no longer alive at the beginning of the Cenozoic era (Newell, 1982, p 94). Ammonites and Cretaceous planktonic foraminifera were completely wiped out in seas as also the dinosaurs on the land. Nothing heavier than ten kilograms was left walking on the ground. In terms of bone weight none of the vertebrates over two kilograms of bone survived. In the seas the Cretaceous planktonic foraminifera made of calcium carbonate underwent dwarfing and destruction in a zone called P0 (20 Ka), reaching a size below 0.1 mm from an average of nearly 0.35mm. This fall of size in the calcareous forms may mean a reduction of calcium mass by nearly a hundred to hundred and fifty times. This is also seen at species level in the bottom dwelling foraminifera. A robust form like ***Dorothia oxycona*** (Reuss) reduces to nearly half when seen across the boundary (and figured as ***Dorothia minutula***, Pandey, 1978). An extreme calcium low is seen at Cretaceous/ Tertiary or Mesozoic/Cenozoic boundary in Meghalaya. In a somewhat less intense extinction of larger foraminifera across the Eocene /Oligocene boundary, body weight of average largest specimen falls by nearly 500 times within a period of a few thousand years when mass-extinction sets in the larger foraminifera (Fig. 3.16). Mass mortality and extinctions are natural consequence when the skeletal element reduces so drastically because the animal cannot grow to mature size. **A common feature of almost all extinctions of Phanerozoic relates to reduction of calcium among the surviving forms. This applies even to man when bulky, heavy boned Neanderthal became extinct in colder zone of western Asia and Europe around 32 Ka. Nothing happened to the semistarved light weight Mundas, Santhals or Khasis in India. Woolly mammoth too dwarfs to about ¼th in size before exitinction.**

A comparable event of extinction, though on a lesser scale, lies right at the close of Pleistocene in North America when several mammals disappeared. The radiocarbon record leaves no doubt as to the 23 extinct large mammal taxa that lived only 18000 years before and vanished by the time we reach 9000 years in past (Bornosky, 1989). Post-glacial warming has killed these heavy-bones just in 9 Ka.

The voids created by these extinctions in the animal world were invariably filled by animals of newer type. Major extinctions have brought strong changes in the vertebrate fauna and some of them seem to have promoted even human evolution. Extinction at the Permian/Triassic boundary is followed by monstrous muscular beasts in the Mesozoic—the best developed somatic beings on earth (Fig.3.11). Some of these predators and herbivores weighed 40,000 Kg (Bakker, 1982).

The Mesozoic muscle building process, or somatism had started developing after termination of the belly dominance or viscerism at the end of Paleozoic. The visceral part retreated in the volume of body among several vertebrates during the Mesozoic with little effect on brain. When Mesozoic animals became extinct at the Cretaceous/Tertiary boundary (65 Ma), they left only dog sized animals and small reptiles behind that did

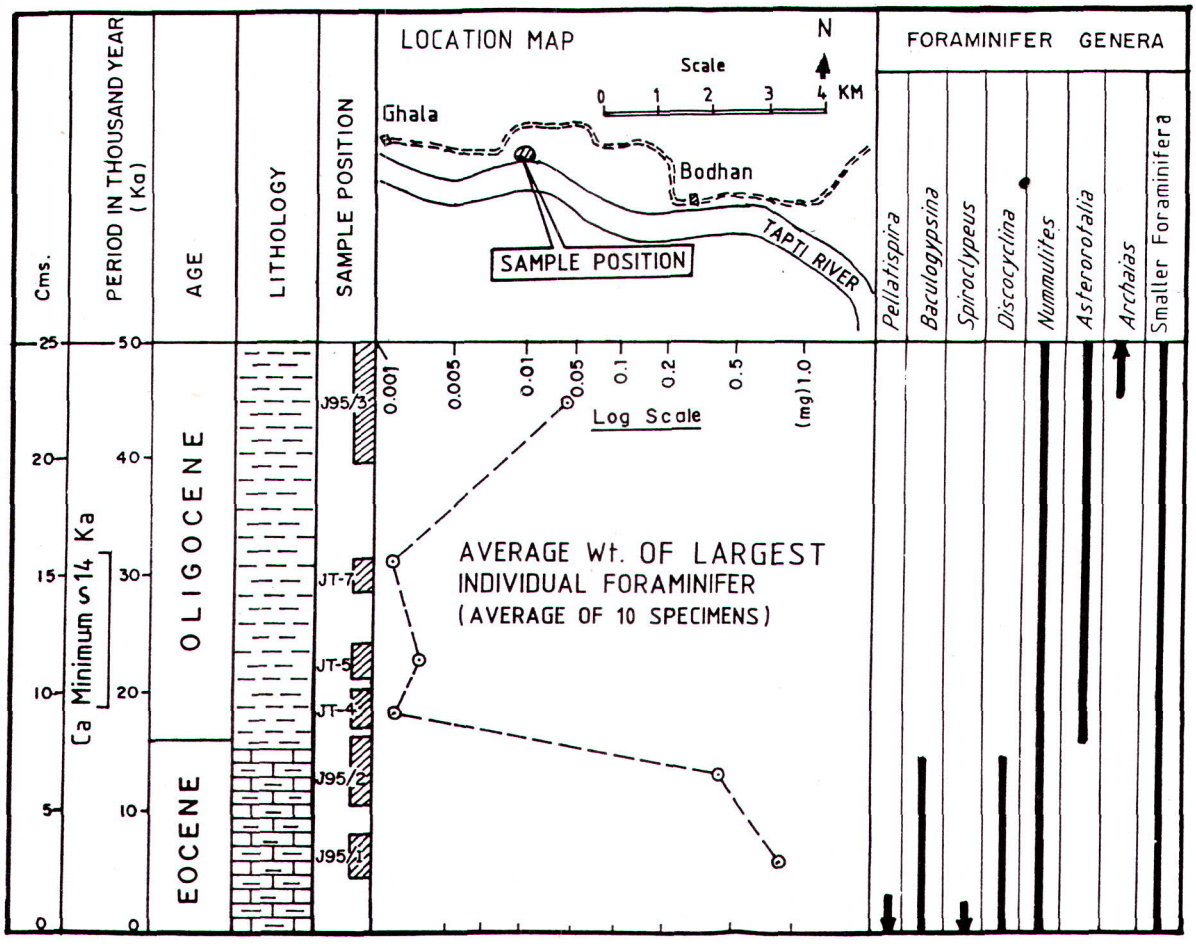


Fig. 3.16 : Drastic fall in the calcareous skeletal mass of foraminifera across Eocene/Oligocene boundary in the Tapti River section of western India.

not exceed 10 Kg. After extinction of the dinosaurs, vertebrates with strong muscle profile declined and brain commenced its expansion during the Cenozoic.

The beginning of Tertiary sees strengthening of mammals and birds, whose body to brain weight is not very far from that of man, suggesting likely strengthening direction of the cranial segment or intelligence. A good push in the activity, nevertheless is seen only at the close to extinction of Bugti mammals in India around 12 Ma (Fig.3.17). A good number of heavy boned gigantic mammals like ***Beluchitherium*** and ***Aceratherium*** disappear. Principal anthropoid apes appear on African-Indian soil shortly thereafter, e.g., ***Procosal***, ***Sivapithecus*** and ***Ramapithecus***. The last among these survived till the growth of large mammals in the Late Pliocene around 3 Ma. No younger remains than ***Ramapithecus*** are seen in the Himalayan foothills but in Africa very close to 4 Ma we see an erect walking humanoid—the ***Australopithecus***. It is very much in the zone of large mammalian extinctions. The change from ***Australopithecus*** to man as a scientic species is only nominal as discussed earlier.

Some of the mass extinctions as seen above have added positively to the growth of organic consciousness. Most significant among these is the last extinction phase around 13±5 Ka. During this period

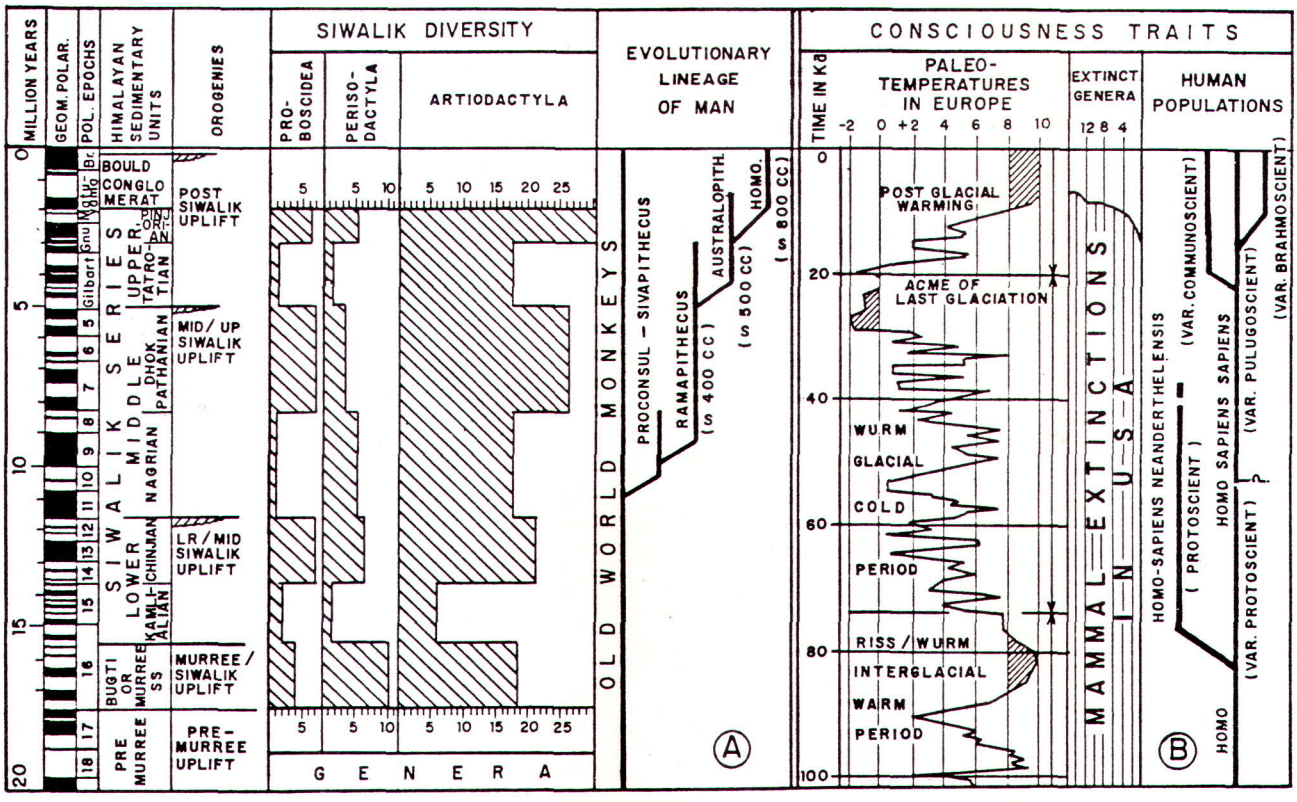


Fig. 3.17 : Mammalian extinctions and consciousness patterns in primates. *In the Siwalik Series major extinctions of large mammals after Chinjian Stage brings Sivapithecus as a successful primate from which Ramapithecus branches off. Again appearance of Australopithecus in Africa coincides with another massive extinction of mammals in Siwalik and genus Homo appears when most drastic extinction of Siwalik mammals is recorded in the Himalayas. During this period consciousness has stepped progressively as reflected by the cranial capacity of the primates. Within the human population extinction affects the thought quality and psychic potential considerably. Initially man was less concerned about worship and life beyond physical body. But by the Middle Paleolithic, he was aware of the life beyond death as a protoscient or low-consciousness man. Later, he conceives a mega-consciousness regime of* ***Puluga*** *or God around us (Pulugocient). From this trait, during the massive extinction of large mammals around 18 Ka to 12 Ka emerged the* ***Yogi*** *in warmer climate.* ***Yogi*** *discovered* ***brahm*** *(brahmoscient). Communal man (communoscient) had already emerged from the primitive stock before arrival of the yogi. These scientic types are unrelated to physical morphology of the man.*

a small fraction of the people on the Indian soil excelled in memorization, calculation, logic and rituals of higher order. They developed skill to control the body by consciousness. They also established a higher state of consciousness in man—the *samadhi*. The period of last extinction of mammals, therefore, is most relevant for the evolution of man's exalted consciousness. The cause of this extinction seems to have promoted the ultimate development of consciousness regime among the earthly beings.

Colonization Patterns

The man, as discussed earlier, is a mental species rather than a physical, Linnean type. Since individuals

are distinguished by mental frame and trait, their colonies are also characterized by the same parameters. It is here that a human colony structure is very distinct from the coralline colony or a reef. In a colony of corals, the basic unit is a physical coelenterate polyp, embedded in a calcareous skeleton, which constitutes the physical body of the colony called reef. In man, the role of individual polyp is taken by a discrete individual mindset which is attached to or embedded into a colony of mega-mind-set following specific values in life style . These values and traditions of life are governed often by faith with little scope for logic. Thus the values of colonial life which Old Testament freely encourages is the enslavement of other animals or men because 'man has been created by God in his own image to rule over the others'. Contrarily the *upanishadic* teachings of Hindus say "God is everywhere, live a life of renunciation, since wealth belongs to none" [ISH:1]The latter is just opposed to the former and one wonders at the opposite instructions of the same God to two types of men! Similarly a community may be conditioned not to eat pigs and another not to eat cows. These logically fragile premises on which the human colonies have been built include religion, culture, language and philosophies.

During the course of evolution, the colonial fabric and values of life have changed within the same population from time to time. Such examples are in the areas of Black Sea-Caspian Sea part of Turkey as also Afghanistan where one 'thought colony' has invaded and occupied the other. In the former area, during the historical past, first occupants were *vedic* people whose seals have been found in Bohzkoi bearing names of *vedic* Gods like *Mitra*. The area was later occupied by Jews, then by Christians followed by Muslims. In Afghanistan the early colonial impact of *vedic* population prior to 2.5 Ka was followed by that of Buddhists instead of Jews or Christians before the area became Islamic around 1.2 Ka. All such colonial developments are irrespective of physical morphology or blood group of men. Christian, Islamic and Buddhist populations are spread over all the racial types from Negroid to Caucasoid to Mongoloid.Cranial volume, physical features of the body or blood characteristics have no bearing on the mental colonization.

Fig. 3.18 : *Homo habilis.* *The first talkative man with simple construction of words appeared in Africa around 2 Ma.*

The earliest dates in the evolution of a weak colonization in the human species go back to ***Homo habilis*** or ***H. erectus*** around 2 Ma who were behaviourally social in attitude (Fig. 3.18, 19). Even in the existing population of Andamanese, divided into a couple of tribes, this system operates. In this colonial development reminiscent of a million year old tradition, the first unit of colony is a family, followed by the second order unit— tribe. These fall under a later developed third order unit of colonization comprising of belief in their common God *Puluga* (Chapter-4). However, there is no

colonial identification on a geographic segments like 'Bengali' or 'Indian' in the early days of evolution. The latter constitutes a fourth order of human-colonization brought into force by the western world through occupation, administrative control and instilling the feeling of nationalism.

Geographically tied colonialism has obviously evolved only after men started permanent city cultures and the next generation would own the same place, township and house. Such developments commenced around 15-10 Ka when centres of towns were founded. Language based communalization is an extension of geographic unit emerging in the western world with the city states that had established firm grip on generations of people with the same language. Business and transactions helped it greatly. Colonization among animals has been of two types—physical e.g. in corals; and, mental as in men and bees. The former evolves earlier than the latter (Fig. 3.3).

The mental colonization has its own role among the humans and bees. A generalization in the colony building, however, seems to be shared by both. The northerly populations are more materialistic, more productive in terms of materials and more cohesive. The bees of Italy when compared to those of India show a behavioural difference. *Apis mallifera* the Italian bee, when grown in Himachal Pradesh shows high egg laying capacity of queen, non-swarming instinct and four to five times more honey than Indian bees, *Apis indica cerana*. The latter shows low fecundity of the queen, excessive swarming and frequent absconding nature. The same also applies to the human colonial system. Populations between latitudes 0 to 32° have less magnificent cities, buildings ,wealth involvements and colonial invasions as compared to those between 32°N and 64°N. Further north again, decline sets in, after 60°N.

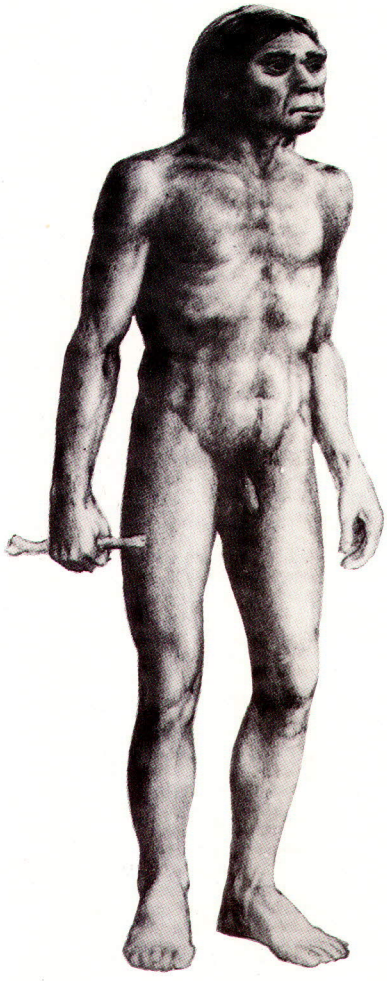


*Fig. 3.19 : **Homo erectus** .True representative of the modern man, with nearly same size of cranium as some fellow humans still possess.He comes on earth at a date quite close to 1 Ma and man has improved upon this substramum in knowledge gathering till date.*