THEORETICAL EVOLUTION IN PSYCHOLOGY: A CHRONOLOGICAL ANALYSIS IN RELATION TO OTHER DISCIPLINES

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DECLARATION

I, N. Sathianarayanan do hereby declare that this thesis **THEORETICAL EVOLUTION IN PSYCHOLOGY: A CHRONOLOGICAL ANALYSIS IN RELATION TO OTHER DISCIPLINES** has not been submitted by me for any Degree, Diploma, Awardship, in this University or any other institution.

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Certified that this thesis entitled **THEORETICAL EVOLUTION IN PSYCHOLOGY: A CHRONOLOGICAL ANALYSIS IN RELATION TO OTHER DISCIPLINES** is a record of bonafide research work carried out **by Sri. N. SATHIANARAYANAN**, in Psychology under my supervision and guidance and no part of this has been presented for any other degree.

Dr. JOHN BABY
Supervisor

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CHAPTER I

INTRODUCTION

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1. BEGINNING OF THE STUDY

Psychology the science of overt and covert behavior may be considered as the subject most related to other fields of knowledge. It is very much directly connected to Philosophy, Sociology, Medical Sciences, Physiology, Physics, Biochemistry, Genetics etc. Psychology as a discipline and as a profession is one of the creations of the culture of thought (Daniel N. Robinson, 1995). If we study any subject we can see that the intelligence, personality, motivation, interest, aptitude and the attitude of the eminent persons who have contributed to that area are the main basis for originating theories in each of that subject. We study the persons making history and contributing new additions, study the character of the persons and find a reflection of their psychological traits in their theories, then we are arriving at the relationship of Psychology to other disciplines. In total, Psychology is the most important discipline connecting the other fields and it is psychologist's duty to find the relation between the theories of other disciplines with Psychology. Studying this relationship is of utmost importance especially in the contexts of modern physicists turning towards Philosophy and Psychology for solving nature's puzzles.

The distinguishing feature of Psychology is its focus on the behavior of organisms and their adjustment to the world around them. (Norman. L. Munn & others, 1967). In order to understand this, we have to know all other disciplines and Psychology is also considered as an offspring of all such subjects. In order to get an inference in any branch of Psychology we have to know the stimuli, which are physical, biological and social in nature. Psychology, especially, has helped in the study of human behavior in relation to the environment resulting in a better adjustment and adequate development of the individual for happy and contended life (Mangal.S.K, 1997).

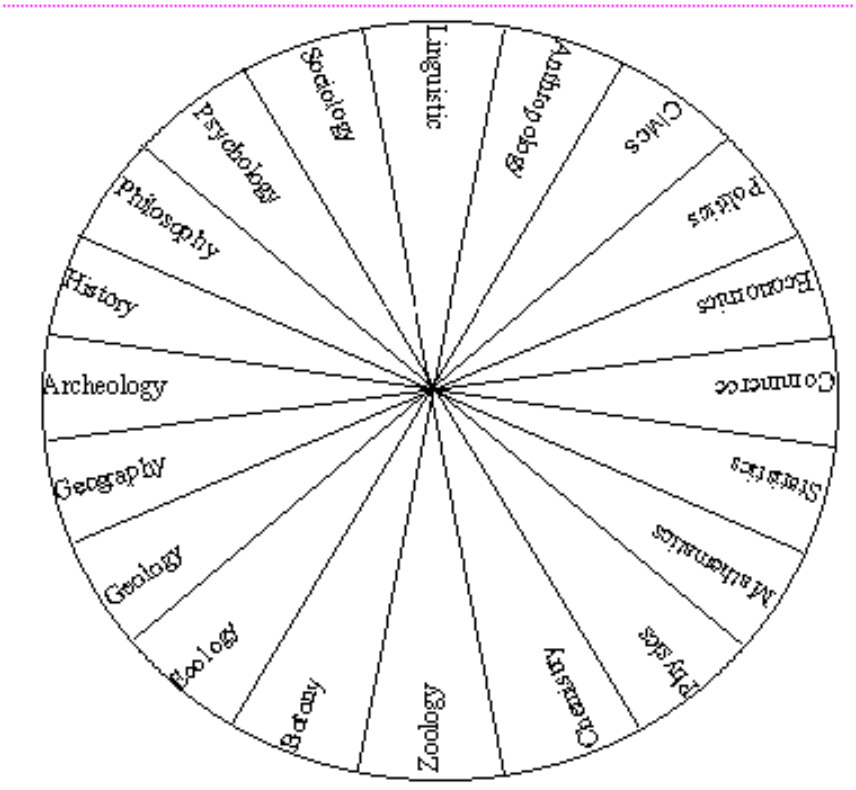

Diagram 1

Interdisciplinary relations are profound also with the subjects like Philosophy, Mathematics, Statistics etc, but is in lesser degree compared to Psychology. In the case of Philosophy, all theories in any subject may have some philosophy in it. As far as Mathematics and Statistics are concerned, all subjects use it for calculations and making inferences. The relation is one- sided, similarities and common fields of interest etc. are less compared to Psychology to that subjects. Mathematics and Statistics are more related to Physics Chemistry, Economics and Commerce.

On going through the above circle (diagram-1) containing all-important disciplines, adjacent segments represent subjects which are more related. Starting from Botany we can see that Botany and Zoology are more alike and are having common fields like Microbiology, Molecular Biology, Genetics etc. Chemistry is related to Zoology through Biochemistry. On the other hand Chemistry is related to Physics through Physical Chemistry which deals atomic theories. Physics and Mathematics are more identical having common fields like Mechanics, Astronomy etc. Mathematics and Statistics are twins, the boundary between them is very narrow. Mathematics and Statistics are common tools to all Social sciences, Biological sciences and Physical sciences. We may give a place to Commerce near to Statistics, for every commercial activity Statistics is required. We have hitherto discussed science stream. Through Commerce we may go to arts subjects without breaking the continuity. Commerce and Economics go together dealing market and money matter. Economics and

Political science are very much-related topics. Political science is related to Civics, Anthropology, Linguistics, Sociology etc. dealing men in-groups. Psychology is connected to Sociology both having a common branch Social Psychology. Psychology and Philosophy are connected, without studying the earlier philosophers we cannot start the study of Psychology. Philosophy and human history are interrelated. History, Archeology, Geography etc are well connected. Geography dealing the outer part of the earth and Geology dealing the inner part of the earth are like two sides of a coin. We are coming back to science stream, where Geology is considered as a science subject. Geography and Geology are related to Ecology in the study of environment. Ecology is well connected to Botany and Zoology. Finally we reach the starting point of Botany without a break and without losing continuity. Even distantly placed subjects in the diagram are also closely related like Physics and Geography through Meteorology and Zoology, Anthropology and Archeology in the fossil studies.

In the above topics we considered Psychology, Anthropology and Geography as arts subjects. Some Universities treat them as science subjects also. The professional courses like Medicine, Engineering, Chartered /Cost Accountancies, Management studies, Law etc. all take theories from various disciplines, for their development and application. Medical field use the inferences from Zoology, Botany, Chemistry, Physics etc at the same time also take into consideration of Psychology, because treatment is on human being. Engineering develops from the theories

formulated by Physics, Chemistry, Ecology Geology, Zoology, Botany, Geography etc also take in to consideration of Psychology since the products are for human use and the process of production are run by human beings. Law is framed from the knowledge from Civics, Sociology, Political Science, History, Economics, Geography etc. while Accountancy gets its stuff from Mathematics Statistics Commerce and Economics. Management is related to every stream. These all are related to Psychology as per the above analogy that all are for human beings and run by human beings.

We may check the relation of Psychology with other disciplines from the above diagram. The subjects in the circle are marked in such a way that similar subjects are in proximity and we will not get a break if we are starting from any segment to a full circle and reaching the same place. Again we start from Botany to find relation with Psychology. Plants with its proximity give coolness and oxygen and also give food to us. The good atmosphere of greenery gives us pleasant mood. Food choice is also having impact upon human character. Usually vegetarian food elicits a calm nature. Considering Zoology, domestic animals are our friends and their proximity has a bearing upon human behavior. In the matter of food also we depend upon them. The branches Physiology, Genetics etc are determinants in many branches of Psychology like Physiological Psychology. Personality, Cognitive Psychology, Developmental Psychology, Abnormal and Clinical Psychology. Then we take Chemistry,

the relevance is especially in the impact of drugs in our body chemistry and subsequent Change in behavior. Coming to Physics the relation is more profound. The Perceptual Psychology is dependent upon physical stimuli. Mathematics comes in the Psychometry, in preparing and scoring the psychological tests. In most research works the entire population is studied by taking samples, for this process Statistics is a must. As far as Commerce and Economics are concerned, in marketing strategies application of Psychology is remarkable. Political science, Civics, Anthropology, Linguistics, Sociology etc are all dealing formation and behavior of groups is so well connected to Psychology, since group behavior is a function of individual behavior. Psychology is an offspring of Philosophy and other sciences. Since Psychology originated in 19th century only, the earlier philosophical thoughts were adopted to Psychology. History and Archeology are dealing individual and collective activities of man and so Psychology is having a crucial role. Geography, Geology and Ecology are related to Psychology through their influence on the human behavior in environment.

On the foregoing it is construed that Psychology is the most suitable subject to evaluate the major theories of other fields and we can find a possible connection to psychological theories. In fact all theories in all spectrum of knowledge are mental phenomena. We also study the chronology and the background in the formation of theories. For this purpose we go through the major theories in Philosophy, Physical sciences,

Biological sciences Medical sciences, Social sciences and study the psychological processes behind its formation and impact of it in the formation of major theories in Psychology.

2. THE FOUNDATION OF EASTERN AND WESTERN PHILOSOPHY RELEVANT TO THE STUDY

Man began to search the meaning of life, boundary of universe starting of the time and universe from time immemorial. He could not get a clear picture even now. Whenever we imagine the boundary of universe the question of beyond that will swallow us. Then arrived at the conclusion that space will be infinite. Similar is the case of time. When we imagine that universe started at a fixed time in the past, automatically what is before that will encounter us. Then the vital question in front of us is before and after our life, whether there is any existence, or life is purely temporary phenomena ends with death. Answering these types of basic questions is a puzzle in all times and the matters are beyond the scope of our comprehension and are under the curtain of mystery. Philosophy deals such topics.

The philosophy of mind is the philosophical study of subjects of experience – what they are, how they can exist, and how they are related to the rest of creation. It is also inextricably involved with metaphysical issues, metaphysics – which has traditionally been held to be the root of all philosophy - is the systematic investigation of the most fundamental structure of reality. (Lowe .E.J, 2000)

Philosophers put forward their own vision about life and universe and testing the veracity of it is beyond the scope of the subject. Some of the issues tackled by philosophers are philosophical in character. Examples of these are problems about universals, the justification of induction, the ontological argument for the existence of a God or about the general notion of identity. (Paterson. R.W.K, 1995) Scientists in various streams try to find the meaning of philosophical concepts. Ancient man originated from apes in the stream of evolution might have taken some time to develop the brain for asking these types of questions. An ape cannot ask such questions. So we need not search for the capacity of other animals to ask such questions, which are lower to apes. The philosophical problems dealing with ultimate existence is in reality the problem of the one and the many; it is the problem of creation and of individuation; it is also the problem of the meaning of life and existence. (Shanti Joshi, 1992)

DUALISM

Ancient people tried to solve these problems by creating a God. Then omnipotent God is the custodian of the universe, will decide all things. Our fates are determined by His mercy. Worshipping Him and doing good things is a route to get His mercy. The cause of the universe and our life is God. These types of thought ie; placing a God, we may call it as *dwaita* or dualism, God and the Universe. *Dwaita* or dualism means

perceiving in to two. In this stream of thought God is at the fulcrum of everything.

Now we consider what are the questions threatening to this belief or thought. First of all is where is God, who has seen Him? If any one claims to have seen Him, we as students of science cannot take it in to account unless proved or seen by us. The second question is why He has created the universe. Believers consider God as a perfect entity. Then how can He get satisfaction with our world of miseries. How can He justify the cruelties of His own creation on another. See our living system. Most of the animals and plants are born to be preys for others. Can God justify the pains experienced by His own creation in an uncertain world. The believers are equating pain with their own sin. A sin is an unfavorable act done to others. Then what is a sin done by a poor deer caught which experiences pain by a lion as lion having digestive systems not fit for eating vegetables has been born for doing sin only. Since God is considered as a perfect entity and we cannot see a sin done by a particular living thing, then some of the believers are accounting it as the sin done in former births. The concept of rebirth also satisfies man's urge for permanency in the world. Why God is playing upon us by throwing in to a world of uncertainty. Then some may arrive at a conclusion that God is not perfect. If He is perfect, the urge for creation of a world, human beings, animals, plants etc. will not come to his

mind. So much so different people believe in God or Gods in different forms and names. This together with the followers of great men and prophets resulted in the formation of different religions in the world. Besides it the natural calamities, diseases, poverty, attack from others, accidents and all type of miseries, make him to believe in a God. Logical thinking of seeing a driving force behind the life and universe also comes to rescue God.

Some people believe in one God and others in many Gods and the rest are non-believers. We cannot say when belief in God started. Archeologists establish that in neanderthal man's caves and in cromagnon man's caves; there are evidences of food given to the dead people. Whether this may be due to some faith or may be due to some affection to the deceased is not known. If we search in religions also we cannot get a correct picture of when the belief started. Today we see the following major religions in the world Hindu, Budha, Jaina, Sikh, Christian, Islam, Jew, Parsi, Confucian, Tao, Shinto etc. The oldest of them Hindu is about 5000 years old. Before that there existed primitive religions. Some examples are Ainu, Assyrian Arabian, Dravida, Eagian, Greek, Roman, German, Phinician Babilonian, Scandinavian, Slav etc. Besides a God, some religions see heaven and hell for accommodating the souls after death and others see rebirths after death.

MATERIALISM

When belief in God started, immediately there were people who could not accept a God or any external force. We do not know exactly the time when belief in God started, so also we do not know when materialism started. Materialism does not see an external force or God. According to materialism the world has not been created and run by anybody. It is running as per the laws of force and energy and no external force is required, for its existence and movement. Materialism is getting inferences from science and claims to be most scientific. We can certainly say that first originated is dualism and then denying the existence of God developed materialism. They perceived the motion of the planets and stars by its own-tendency and this is far before the origination of Newton's Law of Gravitation. Then the question; “who created the world?”, Nobody, it is there. Who is running the universe is also nobody, it is running by its own tendencies. Materialism is ready to accommodate the developments of science. Then what is the meaning of life. Is there anything before and after the life. Materialism sees nothing. Life of any living thing is purely a temporary phenomena and it starts by birth and ends by death. Before birth and after death, no existence in any form can be accounted and there is nothing like soul. Before taking birth the materials are inherited from parents and in the course of living acquire more materials from food, water

and air, and after death the balance of materials will be the same as we possessed. God has not created us and the fates are not controlled by sins done by us. It is quite accidental, nobody is answerable to God, since not existing. We will not have immortality as per the view of materialism. After death our relation to the world ends. There is no evidence for a rebirth or life in heaven or hell after death.

MONISM

We have seen two types of thoughts in Philosophy. The third is *adwaita*, a monistic thinking. The persons who were not satisfied by dualism or materialism gradually developed the thought of this monism. It started in India in the end of *vedic* era ie; about 3000 years back. The *Upanishads* are the authoritative texts in revealing this vision, which comes after Vedas.

What is this monism. It is not ready to give place to a God to control the world, at the same time not ready to accept materialism. The old *rishis* in India originated this. As per the materialism our existence is a temporary phenomena and ends it by death. They want immortality and also they are not ready to see a supreme power like God. At the same time they are not ready to give away the concept of rebirth, since they wanted to be immortal in any form. Kapila started this type of thinking earlier. He sees nature and

purusha are the two entities behind the universe. Each living thing is the manifestation of each *purusha, purusha* are infinite, it is pure. Nature is composed of three qualities known as g*unas; sathva, rajas* and *tamas.* S*athva* is pure, *rajas* is coloured and *tamas* is dark. In the beginning of a *kalpa* all the world is united in one and nature starts its play by creating the world by union of three *gunas. Purusha* is all powerful like God. The qualities attributed to God is also fit for *purusha.* I and you all are *purushas.* Aim of the life is to identify ourselves with *purusha* and escape from ignorance and rebirth cycle. Actually *purusha* is passively watching the play and not involving in it. But it is our duty to realize that we are *purushas* and escape from the bondage of life, death, rebirth cycle. In the last of the *kalpa* all will be again same one and then there will be no universe. *Purusha* and nature are again in a balanced state. This will repeat forever.

We do not know the time of *Kapila* exactly. It is thought to be before the *vedic* era. *Upanishads* are the last of *Vedas. Vedas* are full of hymns and prayers to God. There were references in the *Upanishads* about *Kapila* and his philosophy *Sankhyam.* What is *adwaita* propagated by the *Upanishads?* The vision got the starting boost from *Samkhyam,* and is almost similar to it. The difference is in the case of *purusha.* As per *Samkhyam* for each living thing, each *purusha* is there. So there is

innumerable number of *purushas*. Actually *Samkhyam* is derived from *samkhya* which means numbers. Then so much *purushas* having infinite power like God exists. But in *adwaita pururshа* is replaced by *brahmam* and it is one and unique. The universe is the manifestation of *brahmam.* The power behind us and all living things are *brahmam.* Individually we denote it as *atma* and this *atma* is *brahmam* or *parabrahmam*. Soul may be equated to *atma* and since all *atmas* are one and supreme, there is no difference between any living organisms. The universe is the manifestation of *brahmam.* Like *purusha. brahmam* is not interested in any play. *Brahmam* in the beginning of a *kalpa* is in a balanced state with the nature. Nature's balance loses, that is the balance between three *gunas* loses the creation of the universe starts. *Brahmam* is not interested and involved in this play. We are actually omnipotent all pervasive *brahmam,* but destined to take birth in the forms of plants, animals and lastly attain the form of human being. We are in a circle of birth rebirth as *Samkhyam* told already. Aim of life is to identify self with *brahmam* and liberate from the bondage of life, death, and rebirth cycle. Realising it will give all knowledge and is known as *moksha,* or liberation from the bondage.

What are the ways for attaining this state. Actually this thought is for attaining the power of God. In monistic view there is no God existing. By practicing and acquiring knowledge we know the mystery of the

universe and reach the state of God. Actually we are God. Four paths have been demarcated for achieving this goal.

1. Devotional Path or *Bhakti Yoga*

Imagine a God with forms and start worshipping Him. This is devotional path. The worship is not for making the imaginary God great but for developing our mind through fixing at a point and concentration of feelings and thoughts. Then avoiding the concept of God from the mind is a must for further development. The God concept is just like a rubber bladder in the study of swimming. It is often confused with the supreme God of dualism. The God concept is used only in the initial stage. Final stage is identify oneself as *brahman.*

2. Action Path or *Karma Yoga*

The path is advising to do good things to everybody and see others as ourselves. Perceiving the world in a divided way ie; I, you, others etc. will give sorrow. All are *brahman,* through work and thought identify self with *brahman.*

3. Knowledge Path or *Jnana Yoga*

This path is advising to acquire knowledge by reading, thinking, introspection etc, ultimate aim is the same.

4. Yogapath – *Rajayoga*

Deep meditation, yoga which includes *pranayama* are prescribed by this path. We attain inner knowledge, when devoting to meditation. Mind will be free from, selfish and evil thoughts. The aim is achieved by this.

In the above four paths any one, two, three or four may be taken at a time. That is we can adopt it simultaneously. The last stage is considered as knowing everything in the universe. No doubt remains. The final stage is extreme happiness and we get the bliss and beatitude that cannot be explained. Then we will be escaped from the uncertainty of life. *Adwaita* considers that the knowledge bringing by science is nothing and incomparable to the knowledge acquiring through the above paths. We attain the stage of God. The process of this becoming God proposed by the monism is more lucrative than seeing the God proposed by dualism. As per monism all are interrelated. There is no separation between a worm and a man. Basic reality behind it is one. But a worm needs more births in other forms to get a human birth and then realise the matter. Otherwise, we come through a number of lives in the form of microorganisms, plants, animals etc. and attained human state. After getting human birth only one can attain the supreme knowledge through the paths noted above and liberate the soul from the births, rebirths and play. Fate is created by our own acts or *karmas.* Good acts to others are rewarded and bad acts are punished as same as the view of dualism.

EASTERN AND WESTERN PHILOSOPHIES – A COMPARISION

Eastern Philosophy

Eastern Philosophy is mainly Indian and Chinese thoughts and the philosophy put forward by the semitic religions. Indian philosophy written in *Vedas* and *Upanishads* at about 3500 years back is considered as one of the oldest philosophies in the world. As we have already seen it started with a dualistic approach. The *vedas* are comprising of the pictures of daily life of that period and rituals, hymns and prayers of God. The materialism also came in the same era, ie; at the time of the first *Veda Rikveda,* as a protest against God. Brihaspati is the first proponent of materialism as evidenced by the manuscripts. Materialism might have come very long back when the concept of God started. But as far as written documents are concerned *Vedas* for dualism and Brihaspati for materialism may be considered as the oldest proponents. The third thought of monism has been originated in *Upanishads* by *rishis.* These were all started in India. As we know Kapila may be considered as the man who paved the way for the origination of monistic thinking and *Upanishads,* since he has been referred in the *Upanishads.* (Gouch.A.E,1994)

Vedas are four in numbers. *Rik, Yajus, Sama* and *Adharwa.* After *Vedas* so many *Brahmanas* were written. This is also like *Vedas*

comprising prayers. Then come so many *Aranyakas.* *Aranyam* means forest and it came from sages in solitude of forest, contains signs of monistic thinking. Lastly came a number of more than 200 *Upanishads* written by *rishis,* purely of monistic tradition. These happened in a period between 2500 years to 3000 years back. In total, dualism came first, materialism second and monism third. Brihaspati also has followers. The Charvakas are the examples and they lived in 600 BC.

Budha and Jaina also lived in 600 BC. Their thoughts are also monistic with slight difference in the use of terminology. As per *adwaita* the force behind a living thing is *atma* and it is the same as *brahman, parabrahma* etc. There is a concept of soul equated with *atma* and without this, the concept of rebirth and identification of a person cannot be explained. Buddha is not ready to consider the concept of soul and consider it as a stream of thought only. His terminology about liberation is *nirvana.* Rest are the same. Jaina considers the existence of so many *atmas.* Both are aiming of liberation from bondage of birth-rebirth cycle. Buddha's path is moderate and practical while Jaina's path is extreme and hard.

After Buddha and Jaina philosophies there came *Vysheshika Darshana. Darshana* is philosophy. Kanada who lived in 600 BC is considered as the proponent. He foresees that all the materials are made of

indivisible minute particles known as *kanas* (atoms). His thoughts are also monistic in nature.

Then came *Nyaya Darshana.* The proponent of *Nyaya Darhsana,* Goutama also lived in 600 BC. His vision about world is that it originated from earth, water, air, fire and sky. He stresses upon logical arguments. His philosophy also belongs to monistic tradition.

Then comes *Poorva Meemamsa.* Gemini, who lived in 600 BC is the proponent and gives stress to rituals and prayers of Vedas and Brahmanas. But it is not for God's mercy. It only emphasizes the devotional and action paths of monism that we can develop our mind utilizing the concept of God without believing the existence of God. This belongs to monistic tradition.

Yoga Darshana is the next and Patanjali who lived in 400 BC is its proponent. He has only compiled the methods and practice of yoga and meditation and its achievements and results. Naturally this is monistic.

Then comes *Uthara Meemamsa.* It is the *Vedanta.* Badarayana who lived between 400 BC and 200 AD is the proponent. He compiled the thoughts of *Upanishads.* So it is monism.

Then comes the eminent personality Sri. Sankaracharya lived in 800 AD. He is a forerunner of *adwaita*. His contribution is the concept of *maya.*

He says that the world is an illusion or *maya*. His views are *Upanishad's* views. Actually the concept of *maya* is dormant in the *Upanishads*, since *brahmam* is only the ultimate reality. He stresses the need for escape from the illusionary world.

Ramanuja's (1100 AD) *vishistadwaitham* is a vision in between dualism and monism. Madhua (1300 AD) is a dualist and his philosophy is known as *dwaitham* itself. Aravindo, Sri. Ramakrishna Paramhamsa, Swami Vivekananda and Sree Ramana are proponents of monism, whereas Mahatma Gandhi is a dualist and Jawharlal Nehru an agnosticist who all lived in 20th century.

Now we consider Chinese thoughts. Confucius lived in the 6th century BC is a believer in God and so a dualist. Laotze the founder of Taoism lived in the same period. This is a monistic thought influenced by *adwaita* from India, since cultural exchanges were there at that time. We can see the concepts of yoga, meditation and liberation etc. in Tao thought.

The philosophy of Semitic religions Jewish (1800 BC), Parsi (650 BC) Christian (0 BC) Islam (600 AD) originated in the Persian Gulf are dualistic in nature. The tradition is belief in single God and heaven and hell. In Indian religions Hinduism considered as oldest in the world

consists of all beliefs, Buddha and Jaina religions are monistic while Sikh is dualistic.

Western Philosophy

The western Philosophy started in Greece. Thales sees water as the basic thing in the world, whereas Anaximandes sees air, Pythagores sees numbers (All 600 BC). Parmanadise stresses upon the static nature of the universe whereas Heracletus stresses upon motion. Then comes Empidocleus who see matter, water, air and fire are the building blocks of the universe. Then comes Democritus (400 BC) with his atomic theory. Matter is composed of minute indivisible atoms. Hitherto all philosophers discussed about universe. Socrates (469 – 399 BC) began to discuss humanity, morality and man's relation with the universe. Plato (427-347 BC) is the proponent of idealism. His philosophy is more psychological. He stresses upon inner knowledge and says that we cannot understand the universe through senses. Aristotle (384-322 BC) is considered as the father of all sciences. The Greek philosophers are dualists whereas Epicures (341 – 270 BC) is purely a materialist.

The mediaeval philosophers belong to all over Europe. St. Ansalam (1033 – 1109) Thomas Acquinas (1225-1274) are prominent among them and they are dualists. Their belief in God is strong.

The modern era in western philosophy starts with Rene Descartes (1596 – 1650) a French philosopher. He was a mathematician and founder of a new branch in Mathematics known as Analytic Geometry a method of using Algebra in the solution of Geometrical problems. He was a great dualist. Mind body dualism is his contribution.

Then comes Spinotza (1632-1677) from Portugal. His thoughts are monistic. He is also interested in Mathematics like Descartes and started studying Philosophy using mathematical methods. He is not ready to give a position to God. The ultimate reality is infinite, immortal and all pervasive like the *brahman* concept of *adwaita,* which are difficult to explain.

Leibniz (1646 – 1716) born in Germany is a pluralist, in the sense that according to him the ultimate reality is innumerable. His concept is known as monodology. Monads are *atmas* and are independent. God is the king of monads. So his philosophy is dualistic. Leibniz is also a mathematician who originated Calculus independently, a method used in the study of moving particles. But Newton also did it independently slightly before him and the credit went to Newton. Then these philosophers Descartes, Spinotza and Leibniz are known as rationalists.

After the rationalists the empiricists came. The main outlook is that knowledge is derived from experience and mental processes done out of it.

Their affinity is more towards Physics than Mathematics. John Locke (1632 – 1704),from England, George Berckley (1685 – 1753) from Ireland, and David Hume (1711-1766)from Scotland, are the prominent persons. The empiricists are dualists, God has crucial role in their philosophies.

Then comes Immanual Kant (1724 – 1804) a German also a dualist believed in God, soul etc. His philosophy is Agnosticism. According to this, we can never know the ultimate reality of the universe. But Hegel (1770-1831) also a German is not ready to accept this. He says that we can know the truth. He is also a dualist. His method is dialectical method. Opposite forces in its struggle result in a balanced state and then begin to transform to new forces which will be in opposite again and restart the struggle. This will continue forever. Our mental process is working like this and through this we move to God. But Karl Marx (1818-1883) again a German could not digest Hegel's idealism. He is opposing the dualism and is a materialist. He extended the concept of dialectics to the universe and society in a materialistic platform and is known as dialectical materialism. In the physical world the opposite forces are like positive and negative charges and in social world it is like exploiters and exploited classes.

Lastly we discuss the twentieth century Philosophy. Existentialism tries to rescue man from the Hegelian Idealism, where individual is forgotten and from Marxian ideology where individual is invisible in the

society. Existentialism stresses upon the existence of each individual. Soren Kierkegure, a Danish philosopher in this sect is a dualist and Jean Paul Satre (1905 – 1980) a French philosopher also in this sect is a materialist. Burtnand Russell (1872-1970) from England a mathematician who sees importance of science in Philosophy, is a materialist. Pragmatism sees importance of practical benefits in philosophical thinking, William James and John Dewey are the exponents of pragmatism.

In total we see that there are three types of basically different perceptions about the universe. That is dualism, materialism and monism. The other thoughts are either a mixture of them or stand in between them. First thought is existence of God, that is dualism, denial of it leads to materialism and then monism. This is the chronology of thoughts. In a nutshell it is like this. 'God, No God, I am God'. On a comparison of eastern and western philosophies it is seen that eastern philosophers are more towards monism while western philosophers are more towards dualism. Materialism is less in both streams.

3. THE INFLUENCE OF PHYSICAL THEORIES

Now let us talk about the physical world. Naturally Physics is the basic subject. A little Chemistry and very little bit of Geology and Geography also come in the study of physical world. Philosophy deals with man's relation with the universe, while Psychology deals with the mental process in the relation with the world. The world is physical, biological and social in nature.

Man is puzzled with the unknown world surrounding him. The puzzles are still persisting in one or another form. In studying the heavens, we are debarred from all senses except sight. (Bertrand Russel, 2002) The development of technology is not a topic of this study. We want to study the theories of Physics, which are giving new inferences. In this study the equations dimensions, experiments etc. have been avoided as far as possible. The scientist is concerned primarily with establishing cause and effect relationship which will help him understand the significance of the phenomena he observes. (Ann Neel, 1977)

Let us look into the history of science. The earth is seen flat everywhere. The concept of earth as a sphere is well developed in the Greek tradition. The earlier belief was that the planets and stars are revolving the earth as apparent to our eyes. Aryabhata (500 BC) an Indian

put forward the hypothesis of revolving of earth around the sun. Aristarcus (300 BC) from Greece also supported the same. But the scientific world at that period could not accept this and the earthocentric view continued. It was in its climax during Ptolemy who lived in the first century in Greece. The belief continued upto Coper Nicus (1473-1543) from Poland who put forward the theory of solar system with proofs of mathematical calculations of deviations of other planets with the earth, and all the other planets are rotating itself and revolving the sun in circular paths. Later it is apparent by Galeleo Gelili (1564-1642) an Italian with his invention of telescope. Then it is more developed by Johan Kepler (1571-1630) a German with his laws of planetary motion. According to him the paths of the planets are slightly elliptical than circular.

Then emerges Sir. Isaac Newton (1642-1727) from England. He is the proponent of law of gravitation and laws of motion. All the matter, planets, stars etc. attract each other. This force is termed as gravitational force and is proportional to the mass of the body and inversely proportional to the square of the distance between them. The attraction of bigger bodies will be more. The revolution of planets around the sun is the result of mutual attraction. Even though the paths are different they are in a single plane and this is due to mutual attraction between the planets. Newton's First law of motion says that external force is required to change a body in

its motion or rest. The second law is that the rate of change of momentum is proportional to the resultant force applied and is in the direction of the force. Momentum is the product of mass and velocity. The third law is for every action there is an equal and opposite reaction.

Besides it Newton developed a theory in the propagation of light ie; corpuscular theory of light. Light consists of small particles travels in a straight line, whereas Christian Hygens (|1629-1695) a Dutch scientist proposed wave theory of light ie; light travels in waves. Rene Descartes (1596-1650) from France proposed the particle nature of light even earlier.

Mechanics, Light, Heat, Sound, Properties of matter are the branches of Physics developed at that time. The Work done is the product of force into distance moved by the force in the direction of the force. Energy is the capacity for doing work. The fact of sunlight consists of seven colours was discovered by Newton by his prism experiments. When we rotate Newton's colour disc of seven colours fastly we see white light. If white light is passed through a prism it is split in to seven colours due to refraction. Beyond red and violet we cannot see. In the case of sound we can hear sound waves most often between the frequencies of 20 Hertz and 20,000 Hertz. Newton's era may be considered as the classical period of Physics. Newton was a great mathematician and a physicist.

Let us consider the period after Newton. James Watt (1736-1819) from Scotland invented steam engine. It led to a series of inventions and also Industrial Revolution. The study and conversion of various types of energy in to other forms developed. Heat, light sound, electrical, mechanical, magnetic etc. are different forms of energy and one form of energy can be converted in to another. In transformation, total energy is conserved; that means energy can neither be created nor be destroyed.

The concept of atoms and molecules came in the end of 17th century. Robert Hook studied the molecular nature of air. The study of magnetism and electricity also started at that time. Thales in 500 BC knew the attractive property of amber when it rubbed with cotton. The minute part of every substance in the world including our body are atoms. John Dalton (1766-1844) a British scientist is the beginner of the modern atomic theory. Atoms are invisible and can be observed and studied with only by powerful microscope. In the centre of an atom there is a nucleus containing protons with positive charge and neutrons with neutral charge and these are in motion inside the nucleus. The positive charge of a proton and negative charge of an electron are equal and opposite in nature and so attracts each other. Electrons revolve around the nucleus due to this attractive force. Same charges repel each other. When we rub a comb with shirt, the shirt will lose some electrons and comb will get it. Then comb is negatively

charged and shirt is positively charged and so attract each other, and also attract other tiny particles. Charles Coulomb (1736-1806) a French scientist studied the electric charges. Benjamin Franklin (1706-1790) from USA studied the principle behind lightning. It is the discharge of electricity in oppositely charged clouds. Electricity is the flow of electrons from negative to positive particle and Christian Oersted (1777-1851) from Denmark studied the magnetic properties of electricity. In the atoms of magnets, electrons are very loosely configurated and accumulated in one pole. It is termed as south pole and the other is north pole. The basis of electricity and magnetism are the same. This led Michel Faradey (1791-1867) from England to invent generator and motor. When the metal wire kept in a magnetic field is rotated by water falls or by any other force then electricity is induced in the wire. This is the principle of generator and reverse process is happened in the motor.

All the matter in the world including our body are made of elements and compounds. Hydrogen and oxygen are elements and two atoms of hydrogen and one atom of oxygen combine to form a water molecule, a compound. There are 118 elements so far discovered out of which 98 are natural and 20 are artificial. Hydrogen is having one proton, one electron and no neutron. Lithium with 3 each. The number of neutrons will vary in higher elements, for eg. Sodiam IIp, IIe & 12n and chlorine 17 p, 17e & 18

n. Compounds will not have the properties of its elements. Water is not having the properties of hydrogen and oxygen. In an atom the electrons are orbiting around the nucleus in different paths known as shells. The number of electrons in the outermost shell is the basic criteria for chemical reaction and forming compound. When the outer shell is having 8 electrons in an atom then the elements are chemically inactive and do not form molecules or compounds. The inert gases like neon, argon and krypton are the examples. The elements which are not having 8 electrons in the outershell attain that position either by donating or sharing electrons and form either molecules of the same element or compounds of different elements.

The physical properties of a substance is determined by the configuration of atoms and molecules. In a solid state the freedom of movement of atoms and molecules are limited. When we heat solids, the atoms will vibrate more and move apart and melt into liquid and then boil into gas. In liquids the freedom is more and in gas it is maximum. Conduction is the mode of transfer of heat in solids and convection is in liquids and gases while radiation is in vacuum. Metals are good conductors of heat and electricity since electrons are free in their atoms.

James Clerk Maxwell (1831-1879) from England is the greatest theoretician after Newton. He proposed electro magnetic wave theory of light. Light waves can travel in vacuum where the sound waves cannot.

Light waves are transverse that means the particles of the medium vibrate perpendicular to the direction of propagation whereas the sound waves are longitudinal, particles of the medium vibrate in the direction of propagation. Both corpuscular theory and electro magnetic wave theory can explain reflection and refraction, while diffraction, interference, polarisation etc can be explained only by wave theory. In this era electricity and magnetism developed drastically. His theory united electricity and magnetism.

The visible spectrum is from violet to red. The invisible waves below the wavelength of violet are ultra violet, x-ray, γ-ray, cosmic ray etc. and above red are infrared microwaves, TV and radio waves etc. The frequency is the number of waves emitted by a source per second and the wavelength is the distance between two crests or two troughs of a wave.

Another important phenomena to be discussed is Doppler effect. Christian Doppler (1803-1853) an Austrian astronomer is the proponent of it. Imagine a train coming towards us, then the frequency of sound will be increasing. This is because we will get more sound waves of different wavelengths. The frequency decreases when it goes away from us, we will get lesser waves, because shorter waves will not reach us, otherwise finished. When we throw a stone in the pond the number of waves reaching a nearby point will be more compared to the number of waves reaching at

distant point. Some shorter waves will be finished in between the two points and will not reach the farther point. In the observation of stars Doppler found more red shift in the spectrum that means the colours of lesser wavelengths are finished, and this will necessarily imply that most stars are going away from us. This observation is having far-reaching consequences in cosmology.

In twentieth century Nuclear Physics, Cosmology, Electronics etc developed immensely. Quantum theory and relativity theory are major achievements. Marx Planck (1858-1947) a German physicist is the originator of quantum theory in 1900, later developed by so many scientists. According to quantum theory matter is composed of a large number of vibrating particles with different frequencies and these particles radiate energy continuously, but only in terms of discrete quanta. Light is not emitted continuously but intermittently by indivisible amounts of radiant energy called photons. The mass of a photon is nearly zero and having no charge. Quantum theory treats light as both particle and wave and can explain all properties of light including Compton effect and photo electric effect which cannot be explained by corpuscular theory and electromagnetic wave theory.

Henry Bequeral (1852-1908) from France discovered radioactivity in 1896. The elements of higher atomic mass like uranium, thorium, and

plutonium etc. are unstable in nature. The nucleus of the atoms of the above elements disintegrates in to lower elements like lead by emitting radiation spontaneously. The radiation consists of α particles ie; 2 protons and 2 neutrons, β particles ie; electrons, and γ rays ie; photons. Ernest Rutherford (1871 – 1937) from Newzeland bombarded the nucleus of nitrogen atom with α particles and transformed it in to oxygen and hydrogen, with emission of radiations.

The electrons in the atoms spin themselves and revolve around the nucleus in different fixed paths known as quantum paths, otherwise it will radiate energy and as a loss of energy fall in to the nucleus. Danish physicist Neel Bohr's (1885 – 1962) planetary model in circular paths has been modified later to elliptical paths like planets but with all possible angles, ie; they are not in a plane as planets.

Quantum theory established the dual nature of light ie; wave and particle. Louis De Bougle (1892 – 1987) from France proposed the dual nature of particles also. As a symmetry of nature, he suggested that like radiation including light, having dual nature, all the matter is in motion and have a wave form. Later it has been established experimentally the wave nature of electrons, protons, neutrons etc which are at the same time particles and waves like light. Then comes German physicist Werner Hysenberg (1901 – 1976) with his uncertainty principle originated in 1927.

When we measure subatomic particle like an electron we will not get their velocity and position exactly at a time. When we send light to see them, light rays containing photons collide with them and lose or gain some energy and it affects the electron's velocity. The measured velocity will not be accurate. For precision we use low energy light rays then its wavelength will be larger, then the position of electrons will be less accurate at least up to the length of the wave. We cannot measure the position and velocity of a subatomic particle simultaneously with precision. This is the uncertainty principle. Then comes the concept of antiparticle by Paul Dirac (1902 – 1984) born in England. For every particle there is an antiparticle having equal mass and opposite charge. Antiproton, antielectron known as positron are examples. When matter and antimatter collide they annihilate mutually and the result will be energy only. Murray Gelman an Austrian physicist discovered that protons and neutrons are made up of 6 types of particles known as quarks. S.N. Bose, an Indian Scientist has contributed in the search of inner part of the atoms and E.C.G Sudarsan another Indian Scientist predicted particles moving faster than light.

The nuclear fission is the principle underlying atom bomb and nuclear fusion is the principle behind hydrogen bomb. The study of radioactivity and artificial transmutation ended in fission. In radioactivity, natural or artificial, the nucleus is only chipped off. When uranium nucleus

is bombarded by fast moving neutrons it splits in to two almost equal parts and results in the formation of antimony and niobium with releasing a lot of energy. This was discovered by German radio chemist Otto Hahn in 1939. This is nuclear fission. The opposite process of combining or fusing two lighter nuclei into a stable and heavier nucleus is termed as nuclear fusion. A large amount of energy is released in this process also. This can only be started in very high temperature of 30 million ^{o}K. When 4 hydrogen atoms fuses we will get one helium atom and energy. This can be done with other elements also. This is the source of energy in stars.

Albert Einstein (1879 – 1955) born in Germany is the prominent personality who revolutionised Physics and Philosophy with his Relativity theories. His equation about energy $E = mc^2$ is very famous, where m is the mass of the particle and c is the velocity of light ie; 3 lakhs kms per second. Matter can be converted in to energy and vice versa, as matter is another form of energy. In the fission and fusion process the energy released is equal to the loss of mass in the resultant particles. In 1905 Einstein postulated his special theory of relativity. First of all we may familiarise with the concept of relativity. When one man throws an orange outside from a train he sees it going backward and falls, while an observer outside sees it going in the direction of the train and falls on the ground. This is a subjective experience of perception of a thing in two systems, one

moving and the other stationary. Then consider a person A walking at 10 km per hour in southern direction and a person B walking at 10 km per hour in the northern direction meets at a point P. A car moving at the velocity of 50 km per hour towards south crosses the point P., After one hour the car will be at 50 km south of P, person A will be 10 km south of P and person B will be 10 km north of P. The distance of the car to person A will be 40 km and the person B will be 60 km. That is the relative velocity also. The relative velocity of the car with respect to A is 40 km/hr while that with respect to B is 60 km/hr. The strange fact observed in Michelson Morly experiment on light conducted in 1881 is that velocity of light is independent of the motion of the observer. They found that light coming in the direction of rotation of earth and opposite to the direction of rotation of earth is having the same velocity of 3,00,000 km/sec. This is a special property attributed to light which is the stimulus that covers more than 80% of our sensory perception. Another property of light is that no particle can exceed the velocity of light, that is velocity of light is the maximum velocity in the world that can be acquired. In our experiment if the car moves in the speed of light and persons A and B walk at 10 km per second, after one second the relative velocity of car to A and B will be same as the velocity of light. That is after one second the car will be 3 lakhs km distant from both A and B, and that is impossible since they are 20 km apart. Here

lies the crux of the relativity theory. The person A will experience a time less than one second and person B will experience more than one second and if an observer stands at P will experience one second in the observation of the car. In otherwise if we travel in the car in the velocity of light we will not experience any time compared to others. Then paths of travel also seem to be contracted known as Lawrence contraction. The mass of the particle moving in the velocity of light will be infinite. This is the special theory of relativity. The general theory of relativity formulated by Einstein in 1915 sees space and time as curved. That means space and time are related and it is curved. The curvature is the reason for gravitational attraction.

Now we look at the cosmos. Our sun is a star, the planets are rotating and revolving it. Sun rotates itself in 25 days and revolve around the galaxial centre in the time of 24 crores of years. Millions of galaxies are in the space. Some galaxies are moving away from us even in the speed of light. The nearest star to our solar system is α century at about 4.25 light-years distant while farthest noticed may be about 12.5 billion light years.

The stars are taking birth in the interstellar space by uniting hydrogen molecules. Rarely some molecules of the other elements also will be there. Due to gravitational attraction they come close together and get heated by the pressure. If temperature rises to 30 million ^{o}K and above,

fusion of hydrogen starts and becomes helium and emit energy in the form of heat, light etc. Again if temperature shoots up, the fusion of higher elements also take place. If the mass of the star is below the Chandrasekhar Limit of 1.44 times of sun it will become red giant then white dwarf and lastly all the process stops and becomes black dwarf. Subramanian Chandrasekhar (1910 - 1995) an Indian scientist discovered this. They cannot go on with the fusion of higher elements. If the mass is between 1.44 and 3 times of sun, it becomes a neutron star and above 3 m it will become a black hole. The explosions of star take place when the mass is above 8m and shed away some mass and the process is known as supernova. In a black hole all the matter come to a single point known as singularity and even light will not escape form it. Millions of years are the lifetime of a star.

As discovered earlier from the Doppler effect, Edwin Hubble (1889-1959) from USA proposed the expansion of the universe with the rate of expansion shown by equations. Then emerged two hypothesis about the universe. George Gamow (1904-1968) a Russian scientist proposed that the cosmos is the result of explosion of a cosmic egg. This is known as big bang theory. Fred Hoyle form England and others proposed steady state theory. According to this theory there is no big bang explosion and in the space evolved after expansion, new stars were created from energy.

Scientific world accepted big bang theory, since later experiments and observations are in accordance with that. Alexander Friedman another Russian scientist already proposed 3 models of universe in 1922. If the total gravitational force of all matter is more than the force of expansion, then contraction will start and after some time a big crunch will happen and the universe again converges to a point. If it is equal, the cosmos will be in a steady state and if the force is less than it, it will go on expanding. Since the mass of total matter in the world could not be estimated, which model will be the ultimate, cannot be determined.

Let us consider the starting of the cosmos. It is estimated to be 1370 crores of years back. When we look in to the outer space we see them in the past. If we see a star 1000 light years distant, that means the light has taken 1000 years to reach us. We see the star as it existed 1000 years back. In this way we can study the history and mystery of the universe. We cannot say exactly the state of the universe in the beginning of big bang. The universe is converged to a single point, temperature may be infinite. After the big bang explosion quarks and antiquarks were created and destroyed, protons, neutrons, electrons and neutrinos were created, since the number of particles were slightly more than antiparticles. Neutrino is a massless, chargeless tiny particle. The protons and neutrons combined to form nucleus. Then the age of the universe is one minute. The nucleus

attracted electrons and formed hydrogen and helium atoms. Then started the birth of stars and planets. The higher elements are fused in stars especially having the mass over the Chandrasekhar limit, which will only attain the required temperature.

Lastly consider our earth. It is quiet logical to think that all the planets in the solar system might have been formed as a result of supernova explosion in a nearby star. Geological configuration does not favour an explosion from sun since sun contains 70% hydrogen and 28% helium and all other elements come to 2% only, whereas earth contains all heavier elements and metals extensively. The sun's age is estimated to be 500 crores of years while earth's is 460 crores of years. After the formation of earth. comets, meteors, asteroids etc. fell on the earth intermittently and these also became part of it and the mass of the earth increased. It was very hot and gradually cooled down. Interior of the earth is still very hot and moltan. Wegner (1880-1930) a German geologist proposed the continental drift theory. In the earlier period all the continents were one and united. Then it divided and moved apart. The nature of edges of continents indicates it. eg. South America and Africa. The fossils of similar animals and plants are another evidence.

In total we see that in Newton's era theories were developed on gravitational force. Afterwards comes electro magnetic wave theory on the

second force known as electro magnetic force. Then only came to know about the two nuclear forces, weak and strong forces. Weak force is the basic force for radioactivity. Strong force holds protons and neutrons in a nucleus. Gravitational force and electromagnetic force act in infinite distance, whereas nuclear forces act in a very minute distance in nucleus. Electro magnetic force is 10^{39} times stronger than gravitational force. Strong nuclear force is 100 times stronger than electro magnetic force. Weak force lies between electro magnetic and gravitational forces. It is 10^{28} times stronger than gravitational force. Totally there are four forces in the world. Any type of energy is the result of action of these forces.

4. BIOLOGICAL THEORIES AND THE EVOLUTION OF LIFE

The areas of enquiry here we consider are Zoology and Botany. Genetics and Physiology come naturally as its parts and then comes Ecology. From microorganisms like virus, bacteria, algae, fungi, protozoa to animals and plants come under the domain of Biology. Biology started in India, China and Greece along with Medical Science centuries back. Aristotle (384 – 322 BC) is considered the father of Zoology whereas Theofrastes (372-287 BC) is considered the father of Botany. Aristotle started to classify the animals and studied the reproductive process in them.

It is a revolution in the field of Biology when Leeuwenhoek (1632-1723) from Holland invented microscope similar to telescope invented by Galelieo Galeeli. Then Robert Hook (1635 – 1703) from England discovered that the basic part of all living things from microorganisms to plants and animals is a cell. Our body is made up of minute cells. We will naturally compare with an atom the basic part of matter with a cell. The cell is made up of elements like carbon, hydrogen, oxygen etc. So the utmost basic parts of our body are atoms of the elements in the cell. The cells do the basic functions of the living organism. Human body comprises of about 50 trillions of cells. The cell is having a nucleus in the middle surrounded by protoplasm a liquid. Bacteria and virus are not having a nucleus in the cell. The protoplasm is composed of

undifferentiated granular materials called the cytoplasm. Cell wall and plasma membrane are the outer boundary of a cell. Cell wall in plants are strong, made up of cellulose. The power house of the cell is mitochordria, small particles lying in the cytoplasm, where the food with the help of oxygen is degenerated into carbon dioxide, water and energy. This energy is stored in ATP molecules (adenosine triphosphate). The body building house in a cell is ribosome which also is small particles lying in the cytoplasm, where the body particles are made. The body particles are proteins made out of aminoacids. Golgi bodies in the cytoplasm are storage house of proteins, enzymes etc. Lysosomes scattered in the cytoplasm split chemicals by the enzymes. In plants the cell of the leaves contains chloroplasts containing chlorophyll. So that cells can make food by combining water, carbon dioxide and sunlight. The cell of plants and animals use this food for energy. The process is reverse of it. Similarly empty spaces in cytoplasm known as vacuoles are found in plant cells for storing food and also waste. In animals wastes are expunged by excretory organs. When the vacuoles in plant cells are filled, we see saps ie; the waste flowing out through some parts of the plants. Plants get water and minerals from the soil and carbon dioxide form air.

Caroles Lineyas (1707-1778) a Sweedish biologist is the man behind the modern classification of plants and animals. Species, Genus,

Family, Order, Class, Phylum and Kingdom are the orders for classification. For example if we take tiger, the scientific name is panthera tigris. Tiger is a species. It is included in the genus panthera. Lion, leopard etc. come under this genus, cats and cheeta in a different genus are also related to this genus. There comes the concept of family. These come in one family known as felide. The family of dog, fox, wolf etc. are canede family and are related. These are carnivorous animals and so come to one order known as carnivora. Man, apes, elephants, cows etc. and this carnivora are mammals. Then all come in the class of mammals. Fishes, amphibians, reptiles, birds and these mammals are all having vertebra. So all come in the phylum vertebrata. These are all animals and so kingdom is animal kingdom. The other is plant kingdom. Virus, bacteria, protozoa etc. are micro organisms and in the later classification come to the Kingdom of protisans. Bacteria had been considered in the plant kingdom, protozoa in animal kingdom, whereas, virus showing both the properties of a living thing when existing in living bodies and showing properties of pure chemicals when it is out of living cells, was kept out of both kingdoms .Now the latest classification goes to five nos, monera consisting of bacteria, protista consisting of other micro organisms like algae and protozoa, fungi consisting of yeast to mushroom, animals and plants. The plant kingdom is having the capacity for making food self. Animal

kingdom is depending on the plant kingdom. Man's species is homosapean, genus name is homo, family name is hominoideu and order is primate the class- mammal, phylum – vertebrata and kingdom- animal.

Now we go to the revolutionary concept in Biology that is evolution. Charles Darwin (1809 – 1882) from England is the prominent proponent behind this. Actually Darwin's grandfather Erasmus Darwin originated the idea. Lamarck (1744 – 1829) from France proposed a theory of evolution. He showed an example of antelope, which by its neck exercise could elongate the neck and get the leaves of plants from higher plants. Gradually its next generation got little big higher neck by acquiring the properties of the parents. Lamarck could not explain how this is happening and so scientific world rejected it. Then Darwin by his observation in domestic animals and through his famous expedition to Galagapose island near South America proposed a theory of evolution based on natural selection. In domestic animals we select good ones nurture them more carefully and also mate them more frequently than the others. So the next generation will be more big and strong in the case of horses, bulls etc. or more milk yielding in the case of cows, goats etc. In the case of sheeps, it is more wool yielding. Gradually these become another sub species and after so many generations become another species. The difference is apparent in the case of wild sheep and domestic sheep.

He also thought that the different types of dogs, alsation, pomeranian, doberman etc. come from common origin of wolf. If man can do by selection, nature is doing it without direction. So the vast variety of animals came from protozoa and plants came from algae. The evolution is going on for ever. An amphibian axoloti is a living specimen of evolution. In frogs there is another type having tail. This is happened when the larva of a frog which is usually having tail and gills, instead of giving up the tail and gills and developing lungs and crossing the larva state and going out of water, continues in the water in larva state and completes its life to the end. The reproductive organs also grow and they reproduce the next generation. This is tailed frog, it becomes another species. In frogs now it is not taking place. This process is now going on in axoloti. Some of its larvas started to continue its life in water, while the usual practice is going out of water and live as amphibians. The new species evolved will be pure aquatic animal, instead of amphibian.

These are all demonstrated phenomena. More experiments were conducted to testify Darwin's theory. The similarity in the bones of forearms is an evidence of relationship between the animals. One bone from shoulder to elbow and then up to the hand, two parallel bones and five branches of bones in the fingers of the hand. This pattern is same in all the animals higher than fishes that is mammals, birds, amphibians, reptiles

etc. This shows a common origin. Second evidence is unwanted and unused organs in the human body. The appendices in lower vegetarian animals are used to digest hard cellulose. Men are not eating the hard part of vegetables and appendix is still in the stomach without any use. Tail is an another example. In fishes it is used for swimming especially in changing direction, in land animals use is less, just to run the flies. Birds also want it, for changing direction in flying, monkies also use it, on trees. The humans are not having it outside and the residue is only lying inside the body at the posterior of the vertebra. Third evidence is the similarity in blood serum. Similarity is profound in apes with man. Fourth is hemoglobin in the blood. Man's difference with gorilla in hemoglobin is only one amino acid, with rhesus monkey is four amino acids, that with horse is 15, kangaroo-27, chicken - 35, carp fish - 71; This test cannot be extended to crabs, butterflies, cockroaches, and other insects which are not having hemoglobin. The fifth test is cytochrome–c, it is an enzyme in the cell for metabolism. There is no difference in the structure between man and all apes. The difference between man and rhesus monkey is only one amino acid. Man and kangaroo -10, man and tuna fish – 21, man and yeast -40. The sixth is the similarity of genes. The result is the same, chimpanzee is more related to man than gorilla, then orangutan and last gibbon in apes.

How does natural selection work. Here we have to know the concept of survival of the fittest. In the competition for living, the most adapted to the environment will succeed. The deers which are fast runners will escape capture by predate animals. Then they will have more facility for living and mating, so the next generation will be good runners. This will go on. Poor runners will be finished off fastly. Similarly the flesh-eating animals which also have good running capacity and powerful nails and teeth will get food and will survive more. Consider another more profound example in nature. The insects eating green parts of the plants will have green colour. The other coloured will be eaten by birds or animals more easily. Similarly insects eating dry parts of the plants will have brown colour. The more competent male of a species will have more chances to get a mate and also vice-versa. The growing difference leads to a sub-species and then species. A species is determined by the sexual intercourse between male and female. Indian elephants and African elephants are separate species; of course they are not having chances to mate. If we mate horse and donkey being separate species offsprings mules will not have reproductive capacity. Naturally animals of separate species will not mate. The crows which are purely black coloured, and black with slight ash colour in the neck are two species.

Darwin's observation led to a thought revolution. Hitherto it is believed that life is a creation of God. Though Darwin could not explain the first seed of life, he had the concept that life might have started from matter. He could not explain how it is. The later developments were beautifully explained by him. Stanley Miller of Chicago University in 1953 answered this with his famous experiment. In his device he passed electric current (substitute for lightning) through methane, ammonia, water and hydrogen which are the constituents of early atmosphere of the earth. He conducted the experiment for a week, finally a blood colour is seen in the water. He got amino acids and urea, the basic constituents of living things. Protein, the body's main constituent is composed of amino acids. The experiments were repeated by other scientists all over the world. Syril Ponnamperuma of Sri Lanka used ultraviolet rays instead of electricity and got sugar and parts of nucleic acids in addition to amino acids and urea. It is observed that the constituents of nucleic acid will form nucleic acid in the clay in the presence of nickel and zinc and amino acids will combine to form protein in the clay in the presence of copper. The wet land near the oceans are typical of this. Molecules of protein and nucleic acid will form a biocompound and will dissolve in sea water. Russian scientist Oparin found that in some of the biocompounds the nucleic acid have spherical form under a cover of protein. These are called co-aservates. These co-

aservates get energy from biocompounds dissolved in the seawater by chemical dissociation. In other words biocompounds are its food. Now a living thing is ready to be evolved from nonliving matters i.e. chemicals. Co-aservates are not considered as living things.

Then evolved living organism is a unicellular organism having a protein cover and inside, a drop of protein made cytoplasm and DNA molecule in the middle. There will be no nucleus. The structure of viroid is most simple, that is only a molecule of nucleic acid RNA. Virus is having RNA with a protein cover. These are all parasites, showing the properties of living organism when they enter in the cells of plants and animals, and pure chemicals when they are out of living cells. We cannot say virus or viroid as first living organism since it has life only in other living cells. Fossils are very scarcely obtained in the case of these. The first organism lived by eating other biocompounds. Then scarcity of these led some of them to start photosynthesis. These are all bacteria, and since having no nucleus in the cell, and are known as prokaryotes. Since we do not know more about virus and viroids, it is considered that the bacteria are the only living organism lived in the earth after the origin of life at about 350 crores of years back that is 110 crores of years after the birth of earth.

The determination of the age of the earth and fossils are accurate using radiometric method. It is based on radioactivity. When uranium 238

decays, half of it becomes lead in a time span of 451 crores of years. This is half life of that element. If in a rock we see half part lead and half part uranium, then it can be inferred to be originated 451 crores of years back. Similarly the half life of potassium 40 is 128 crores of years and that of carbon 14 is 5730 years. The age of earth inferred from the testing of rocks by this method is about 460 crores of years.

The bacteria had originated 350 crores of years ago and continued as the only living thing in the same state for 200 crores of years. The fossil studies indicate like that. About 150 crores of years back some bacteria were evolved with a nucleus in the cell. Some of the bacteria having trained photosynthesis for energy might have transformed into algae, and eating dead cells turned to fungus, and eating chemicals into protozoa. The organism having a nucleus in the cell is known as eukaryotes. These micro organisms are reproducing by cell division method. When these unicellular organisms are not separated and continued in a united state even after cell division, form a single organism of more than one cell. Then there is a multicellular organism evolved and this is at about 100 crores of years back, happened in water.

First we should study the stream of evolution of plant kingdom. The micro organisms like algae are classified as thalophytes. When sea water went back some of these thalophytes adapted to the land and lived in the

land. It is known as bryophytes. They are also not having roots and they exchange water from the surroundings. This had happened at about 60 crores of years back. Some of them transformed into plants having roots, known as trachiophytes at about 44 crores of years back. Afterwards the evolution was drastic. Seeded plants came 35 crores of years back. The evolution of fungi, the dead cell eaters have very short story to say and came up to mushrooms.

In the animal kingdom protozoa began to unite and evolved multicellular creatures like sponge at about 100 crores years back. The bond between the cells are weak and flexible. Each cell takes the food separately. At about 60 crores of years back various types of invertebrate animals evolved in water. Fishes originated at 50 crores of years back. At about 35 crores of years back the land and flying insects developed. Since fishes happened to be in oxygenless marshy places, some of them adapted to breathing by acquiring lungs. The lungfishes are the basis to further evolution. Some of them became amphibians and others reptiles. About 22 crores of years ago the giant reptiles dinosaurs conquered the earth. Some reptiles at about 18 crores of years back acquired wings and started the history of birds. Archeoprix is the example. Same time some reptiles became mammals like small rats. Dinosaurs were extinct about 7 crores of years back. Platipus is an egg laying mammal. Kangaroo is having bags in

the abdomen for growing kids. Whales are water mammals, while bats are the only flying mammal. The primates like lemurs, etc. were evolved 7.5 crores of years back. Monkies evolved 4 crores years back. Dryopithecus a type of tailless monkey originated about 2 crores years back is the common ancestor of man and apes. Australopithecus is the ancient man originated about 50 lakhs of years ago. The homosapiens that is man, evolved 4 lakhs of years back and the modern man evolved 40,000 years back.

History of science continued. Gregar Mendel (1822-1884) a Check scientist and the founder of genetics observed that certain garden peas plants of yellow seeds and green seeds were cross polinated, the result was all yellow seeds. But the next generation was 75% yellow and 25% green. He put forward the hypothesis of dominant and recessive genetic factors. The genetic factor of yellow seed is dominant while that of green is recessive. Consider the experiment of Guinea pigs. If a black and white are mated the offsprings will be black. The offsprings will get genetic factor bw, another offspring of the same type of another family also have bw. When they mate the kids will be bb, bw, wb or ww. Since b is dominant $3/4^{th}$ will be black and $1/4^{th}$ will be white. This observation had led to the beginning of Genetics. Hugo Devris (1848 – 1935) from Holland found that any change occurred in a species is due to gene mutation. He saw prim roses are having multisized offsprings at a time. Mutation is a sudden

change; some cows in Paraguay have taken birth without horns. In Brazil same type of cows were born with horns of unusual length. These were not gradual processes as Darwin told but were all sudden jumps.

The laws of heredity and the mutations are all derived from observational facts. The inner configuration of nucleus is more opened. The nucleus consists of chromosomes, and cytoplasm and the genes are lying in the chromosomes surrounded by cytoplasm. DNA and protein are the nucleods. Gene is a giant molecule of DNA. Morgan observed in fruitflies that mutation or sudden change occuring to the genes are during the cell division, and it is due to physical or chemical stimuli. Watson and Crick in 1953 discovered the structure of DNA molecule which is double hellix of deoxyribose sugar and phosphate with nitrogenous bases in pair forms steps of the double hellix ladder. The nitrogen bases are Adenin (A), Thymine (T), Citosine (C), Guanine (G).

The cell divisions are of three types. Amitosis is the cell division process in unicellular organisms, like virus, bacteria, protozoa etc. In this cell division, nucleic materials elongate first and divide into two, followed by division of cytoplasm and result in two separate cells, and also separate into two organisms. This is also the method of reproduction of the above micro organisms. The other process mitosis is more complicated and the pairs of chromosomes double first and split. In total cell is divided into

two. This is occurring in all multicellular organisms and is the basis of growth. The third one is meiosis. In sexually reproducing organisms gametes are produced as a result of meiosis. Gametes contain only half of the number of chromosomes. The division results in cells getting half of chromosomes containing genes. Another half will get from the opposite sex by mating. Gene mutation is due to a change occurring in the combination of nitrogen bases in the gene at the time of cell division. The nitrogen bases are the factors behind the characteristics, of a living thing. Chromosome mutation is the change in the number of chromosomes at the time of cell division. All types of radiations and presence of some chemicals in the food such as aluminium chloride, coppersulphate cause mutation. Muller conducted artificial mutations in houseflies by x-rays. All mutations have no specific direction and so evolution has no specific direction. We see it as development. Genetics is an essential field for Psychology. Physiological Psychology, Personality, Abnormal and Clinical Psychology, Learning, Developmental Psychology etc. depend upon Genetics.

Ivan Pavlov (1849 – 1936) from Russia is a prominent biologist and his study of conditioned reflex in dogs paved the way for study of Learning in Psychology. Jagadeesh Chandra Bose (1858 – 1937) from India an eminent person in Biology observed the behavior of plants using

instruments devised by him. The plants are like animals and are having feelings of pains, pleasures and emotions etc. Har Gobind Ghurana (1922-2011) also an Indian scientist synthesized a gene in the laboratory by using chemicals and this is considered as another remarkable achievement in Biology.

The systems biology is a final aspect to mention. The systems thinking had been formulated by organismic biologists, gestalt psychologists, philosophers and ecologists. The new thinking was also supported by the revolutionary discoveries in quantum physics. Living systems are integrated whole whose properties cannot be reduced to smaller parts. Austrian biologist Ludwig Von Bertalanffy is the forerunner in this concept and formulated General Systems Theory in 1940.

Although this pattern of thinking has been started by many scientists in various fields, Bertalanffy enlarged his framework and attempted to combine various concepts of systems thinking and organismic biology into a formal theory of living systems. Detailed experimental studies of cells had made it clear that the metabolism of a living cell combines order and activity in a way that cannot be described by mechanistic science. It involves thousands of chemical reactions, all taking place simultaneously to transform the cell's nutrients synthesize its basic structures and eliminate waste products. Metabolism is a continued, complex and highly organised

activity. System means a configuration of parts connected and joined together by a web of relationships. The primer group defines system as a family of relationship among the members acting as a whole. Von Bertalanffy defined system as elements in standing relationship.

The emphasis with systems theory shifts from parts to the organisation of parts, recognising interaction of the parts are not static and content but dynamic processes. The shift was from absolute and universal authoritative principles and knowledge to relative and general conceptual and perceptual knowledge. Mechanistic thinking was particularly criticised, especially the industrial-age mechanistic metaphor of the mind from interpretation of Newtonian mechanics. The area brings together principles and concepts from ontology, philosophy, sociology, political science, psychology, economics, etc. among others. Systems theory thus serves as a bridge for interdisciplinary dialogue between autonomous areas of study as well as within the area of systems science itself. This new thinking can be supported by the revolutionary discoveries in quantum physics in the realm of atoms and subatomic particles.

Living systems are integrated whole, whose properties cannot be reduced to those smaller parts. This systemic properties are properties of the whole, which none of the parts have. They arise from the organising relations of the parts, i.e., from a configuration of ordered relationships that

is characteristic of that particular class of organisms or systems. Systemic properties are destroyed when a system is dissected into isolated elements. Systems theory shows that living system cannot be understood by analysing, the properties of the parts that are not intrinsic properties, but can be understood only within the content of the larger whole.

The shift from the parts to the whole can be seen as a shift from objects to relationships i.e., this is a figure/ground shift. In the systems view, the objects themselves are networks of relationships, embedded in larger networks. The metaphor of knowledge as a building is being replaced by that of the network. As we perceive reality as a network of relationships, our description too forms an interconnected networks of concepts and models in which there are no foundations. The material world is seen as dynamic web of interrelated events. As Einstein told "It was as if the ground had been pulled out from under one, with no firm foundation to be seen anywhere, upon which one could have built.

When this approach is applied to science as a whole, it implies that physics can no longer be seen as the most fundamental level of science. Since there are no foundations in the network, the phenomena described by physics are not anymore fundamental than those described by biology or psychology. They belong to different systems levels, but none of these levels is any more fundamental than others.

Another important implication of the view of reality as an inseparable network of relationships concerns the traditional concepts of scientific objectivity. In the Cartesian paradigm, scientific descriptions are believed to be objective, i.e., independent of the human observer and the process of knowing. The new paradigm implies that epistemology- understanding of the process of knowing has to be included explicitly in the description of natural phenomena. If we look at our environment we can realise it. For example; when we see a network of relationships between leaves, twigs, branches and a trunk we call it a tree. We will not see the roots and in a forest the roots of all trees are interconnected and form a dense underground network in which there are no precise boundaries between individual trees. In short what we call a tree depends on our perceptions. In the words of Heisenberg "What we observe is not nature itself, but nature exposed to our method of questioning". The systems thinking involving a shift from objective to epistemic science, to a framework in which epistemology- the method of questioning-becomes an integral part of scientific theories.

Living organisms are open systems that cannot be described by classical thermodynamics. We call such systems open because they need to feed a continued flux of matter and energy from their environment to stay alive. Classical thermodynamics and its second law are not competent

to describe open systems. The closed systems are progressing from order to disorder, while living thing i.e., the open systems are in the reverse i.e. from disorder to order. However in the 1940s the mathematical techniques required for expansion of thermodynamics are not available at the time of formation of General Systems Theory, but in the 1970s, it was the great contribution by Ilya Prigongin to revaluate the second law of thermodynamics to resolve the dilemma, by using new mathematics.

Detailed study of ecosystems over the past decades has shown quite clearly that most relationships between living organisms are essentially co-operative ones, characterised by coexistence and interdependence, and symbiotic in various degrees. Although there is competition, it usually takes place within a wider context of co-operation, so that the larger system is kept in balance. Even predator-prey relationships that are destructive for the immediate prey are generally beneficent for both species. This insight is in sharp contrast to the views of social Darwinists, who saw life exclusively in terms of competition, struggle and destruction. Such a view has no scientific justification because it fails to perceive the integrative and co-operative principles that are essential outputs of the ways in which living systems organise themselves at all levels.

5. THE EMERGENCE AND DEVELOPMENT OF MEDICAL SYSTEMS

Health is a condition that undergoes constant change - an alternating state of feeling well or ill, which is subject to a variety of factors. (Jaggi O.P, 1998). Ayurveda, siddha, unani, allopathy, homoeopathy, nature cure, etc. come under this section.

AYURVEDA

Ayurveda is a traditional health care system, originated in India considered to be as old as Vedas which originated 3500 years back. Charaka (probably 800 BC) compiled Charaka Samhita a text of the philosophy of ayurveda describing causes, symptoms and cure of diseases. Sushruta (500 BC) was a great surgeon. Sushruta Samhita describes numerous surgical operations including obstructions in the intestines, removing bladder stones, removal of cataract, replacing external parts of body etc. Liquor is given as anesthesia in the operations.

According to Indian philosophy everything in the world is composed of five elements earth, water, fire, and ether, so human body also. There are three doshas in the body, vata, pitta and kapha. When their proportion is in equilibrium, one remains healthy, while those in whom any one of the three doshas predominates the equilibrium loses and then they are subjected to disease. In the treatment ayurvedic physician tries to

control the imbalances through appropriate medicines and diet. Examination of pulse is one of the important parts of the physical examination. If pulse is slow like gait of a pigeon it indicates dominance of kapha, if it is just like hopping of a frog it indicates dominance of pitta and if it is zig-zag like the writhing of a snake it indicates dominance of vata. Though the vata is equated to gas, pitta with fire and kapha with liquid when taking literary meanings, this has no scientific basis as there is no evidence that the changes of these in the body and so remains simply as concepts. Even though attempts have been made to associate with different chemical constituents of blood and body, no plausible results achieved so far. Ayurvedic drugs are made out of plants, animals and minerals.

SIDHA

Sidha system of medicines originated in South India is based largely on ayurvedic concepts and originated after Ayurveda. The philosophy is also thridosha principle. Drugs are made out of minerals and metals.

ALLOPATHY

Hippocrates (460-330 BC) born in Greece is considered the father of allopathy. He evolved the theory of the equilibrium of four humours; blood, phlegm, yellow bile, and black bile in the human body for health. This also has no scientific basis as thridoshas in ayurveda. Allopathy is not

using this concept now and it is modern medicine, using laboratory testing, radiation, surgery etc. Its theory is that contagious diseases are caused by germs like virus, bacteria, fungi, protozoa and worms and the other diseases are caused by organic defects or malnutrition. Organic defects may be genetic or later happened. As far as contagious diseases are concerned the white corpuscles in the blood attacks the germs by producing an antibody when they enter in the body. If they succeed health will be preserved or otherwise body will fall into diseases. Anyhow for proper health the germs and worms shall be expelled from the body by medicines. Medicines or surgery treats the non-contagious diseases. Bacteria is the cause for the diseases like cholera, tuberculosis, tetanus, typhoid, plague, leprosy etc., virus is the cause for chickenpox, smallpox, polio, rabies, aids etc., protozoa in amebiasis, malaria etc and worms in filaria. The allopathic medicines are prepared from plants, animals, chemicals etc.

UNANI

Unani originated in Persia at about 800 AD. Al Razi is the forerunner in the field. The philosophy is Hippocrate's theory of four humours. Restoration of the equilibrium of humours is the treatment. Pulse noting is one of the main methods to detect the predominance of a humour. The drugs are mostly made out of chemicals.

HOMOEOPATHY

Samuel Hahnemann (1755 – 1843) a German physician is the originator of homoeopathy. Hahnemann engaged in the practice of allopathic medicine, observed that quinine a medicine against malaria is having the capacity to induce the same effects of malaria in a healthy man. He has taken it himself and experienced the symptoms of malaria. From this he concluded that ‘simila similibus curentur’ which indicates that a medicine producing the symptoms of a disease in a healthy person is the remedy for that disease. Homoeopathy finds that the diseases are the disturbance of the whole mind and body. This is a holistic approach. The human body is functioning by vital force. Disease means disorderly functioning of the vital force. The vital force has the inherent capacity to set itself right without medical help. The role of medicine is to help the vital force. Homoeopathy is treating the man as a whole and not the disease. Knowing the symptoms minutely is an important thing. Personality and mental states are taken into account. Ten persons coming with tuberculosis may require 10 different remedies. Homoeopathic remedies are diluted forms of natural substances. One drop of the original medicinal substance is added to 99 drops (1:99) of pure ethyl alcohol and the mixture is well shaken. Take one drop of the mixture and add again 99 drops of ethyl alcohol. This is repeated 30 times. Then sugar granules are

immersed in the final mixture. These granules are the medicines, 30 is usually considered as the lowest potency. For higher potencies of 100 or 200 the process is repeated 100 or 200 times. The medicinal substance in the final medicine prepared will be marginal and microscopic, and is believed; still it works out. The theory is that a small help is given to the vital force. In allopathy higher potency is having the medicinal substance maximum, whereas in homoeopathy it is minimum. Prescribing higher potency means very small help to the vital force and is given rarely. According to homoeopathy “doctors are not the scavengers of the germs from the body”. When vital force deteriorates then only germs come. Recouping the vital force is important and vaccination, surgery, radiation etc are out of its paths.

However homoeopathy is rarely recommended for emergency situations and conditions which require surgery. Medicines are prepared from plants, animals and chemicals.

NATUROPATHY

Naturopathy is a combination of variety of natural therapeutics and method of healing. The curative properties of nature’s elements the sun, air, earth and water are employed as natural curatives. The disease symptom is a self purifying effect by the body to heal itself. As in

homoeopathy when the vital force of the body deteriorates, disease starts. The germs are not the cause of disease, but the result of deterioration. The toxins enter the body either through food, water or air or through radiation or malnutrition and also physical and psychological deviation from harmony with the nature are the root causes for the diminishing of vital force. This is also a holistic treatment considering man as a whole. No drugs are applied. Drugs suppress disease symptom that is not cure. Fresh air, sun shine, use of unboiled water, eating most often uncooked food such as raw vegetables, fruits, nuts, cereals etc or eating raw and cooked vegetarian food are the mode of preserving the body healthy. This was started in India and spread over to the ancient civilised countries Egypt, Greece, Rome etc. The basic principle of nature cure is that all healing comes from within the body itself. The type of controls help the process. Since this is of an Indian origin, yoga and meditation are also included in the control. Breathing exercises are recommended not only in asthma cases but also in all cases, skin treatment through air, water and sun is prescribed in skin disease. Dieting is prescribed in stomach aches. Physical exercises are also included in nature cure. Sun-baths are employed in so many chronic diseases. According to naturopathy, eating uncooked food and drinking cold water and abstaining from all masalas, nonvegetarian food, milk, salt, sugar, tea, coffee, smoking, drinking etc, will result in the cure

of all diseases including cancer, heart diseases etc. Water should be pure, non chlorinated and unboiled. Uncooked vegetarian food and water containing air and useful microbes are essential for body. Besides it raw fruits, vegetables, nuts, cereals etc. are living cells and if we eat it they will do the work of healing. If boiled, 80% of the nourishment lose from the food. So in the nature cure we need only 20% of the quantity of food that we take normally. In addition to this, yoga and meditation will help relaxation and enhance the cure process.

6. THE MAJOR SYSTEMS IN SOCIAL THINKING

In this chapter, History, Archeology, Economics, Sociology, Linguistics, Anthropology, Civics, Political Science, Commerce and Geography, are considered not separately but in an integrated way. We saw in physical sciences the formation of earth 460 crores of years back and in biological sciences the origin of life 350 crores years back. The aim of any kind of study, analysis or research is basically a probe into the issues like the human existence, human experiences and human expectations. All the sciences including the social sciences deal with these aspects in some details (Madhusmita Misra & Srinibas Pathi, 1998)

The earth burning at the time of formation gradually cooled down. Interior is still moltan rocks and metals and innermost core is a solid under immense pressure. There was only one continent surrounded by ocean up to 20 crores of years back. Then landmasses of some continents Africa, South America, Antarctica and Australia splitted and moved southwards and formed Godwana Land and the landmasses of Asia, Europe and North America moved little north and named as Laurasia. Then gradually about 13 crores of years back North America separated from Laurasia and moved west. South America, Africa and Australia separated from Godwana Land and stood with the other continents as seen today. A piece of land moved separately from Antarctica to Lourasia that is India and hit with the Asia.

On the impact of this, Himalaya has been formed. These processes are completed by 7 crores of years back. But the Indian sub continent is still going north and so Himalaya is growing high. This drifting of continents is due to inner geological activities. Various geographical and climatic changes happened on the earth from its formation. Lot of ice ages were also occurred due to decrease of sunlight either by shading of the sun by the dust particles formed by the falling of meteors etc. or by any other reasons.

In the biological evolution we can see the formation of animals starting from chemicals to bacteria, protozoa and to other plants and animals. In the mammals some of the mouse like creatures which are fruit eaters and insect eaters turned into treeshrews, lemurs and tarsiers ie the Prosimians at about 7.5 crores years back, 4 crores of years back monkies evolved and 2 crores of years back tailless monkies ie; dryopithecus common ancestor of apes and man evolved and from which, 50 lakhs of years back ancient man australopithecus evolved. The genus 'Homo' started from here, and began to walk in two legs. In the ape stage both crawling and walking are common. About 25 lakhs of years back homohabilis evolved. 15 lakh of years back homoerectus evolved and 4 lakhs of years back our species homosapiens evolved. The earlier species of homo genus were extinct from the earth subsequently. In each stage of evolution the

volume of the brain is increasing. Increase of brain volume together with other characteristics are the factors behind the classification. The volume of the brain of ancient man australopithecus was 450 CC, that of homohabilis was 750 CC, and that of homoerectus was 900 cc and that of homosapiens comes to 1400 CC. Intelligence is also increasing accordingly.

The homosapiens evolved 4 lakhs years back are considered as neanderthal man. They are the same species of us, but the difference is in culture. They were cave inhabitants. 40,000 years back modern man cromagnon came, also belong to homosapians and lived in caves.

Let us consider the history of man from 50 lakhs years back. The fossils near to that period were only received from Africa. It is considered that ancient man evolved first in Africa and gradually migrated to Asia and Europe. They lived on trees. They ate fruits, vegetables and also flesh. They used natural things like twigs of a tree and stones for hunting animals. Action done by the hands and carrying of food collected, might have forced the ancient man to walk in two legs. The use of language started in ancient man with the development of brain and throat organs, whereas apes cannot use language but make sounds and gestures.

The stone age starts from 25 lakhs of years back, ie the time of homohabilis. The main change noticed is that they used sharpened stones

for hunting. They lived in the shade of stones and trees. The homoerectus evolved 15 lakhs of years back lived in caves. In the homosapiens the neanderthals and cromagnons also lived in caves. The cromagnon are more beauty oriented, the cave pictures are the evidences. The cromagnon man lived up to 12,000 years back. The period between 12,000 years back and 10,000 years back termed as middle stone age and between 10,000 years back end 6000 years back as modern stone age. The period between 6000 years back and 4000 years back is known as bronze age and then after 4000 years back as iron age

The next thing is how the human races were formed. The man originated in Africa moved to Asia and Europe only at the stage of homoerectus ie 15 lakhs of years back and lived in different climatic conditions. The fossil studies indicate like that. The melanin causing black colour in the skin preventing the body from ultra violet rays were retained in the tropical regions of Africa and Asia. But those migrated to North Asia and Europe gradually lost it due to scarce sunlight. The other bodily changes also came due to other different climatic conditions, and geographical factors. The difference gradually grown to the formation of three primary races caucasoid with white color mangoloid-yellow and negroid -black as originated in the three continents - Europe, Asia and Africa. In the borders of the continents the mix can also be seen. The races

are not pure as conceived by many since they are of a common origin in Africa and also mixing were done in all periods. The spreading of man in America and Australia occurred later and are considered after the time of origination of cromagnon man ie 40,000 years back. At that time world passed through an ice age up to 12,000 years back, In the ice age the sea was frozen and it is thought that Asia was connected to Australia through the Islands in Indian ocean and to America near Alaska. It is considered that people from North Asia migrated to North America and gradually year by year they reached up to the tip of South America. The primitive race of America the red indians are red in color belongs to mangoloid group. Since migration is from North Asia, mostly their features are mangolian. Similarly the primitive race of Australia the australoids might have migrated from South Asia primarily from India and are brown coloured people resembling dravidas of India. They are classified as caucasoid even though Indian sub continent is a mixture of all the three primary races, but caucasoid features are predominant. Apart from the colour of the skin the other important characteristics is in hair. Caucasoids are having wavy hairs, mangoloids straight and negroids wooly. Some anthropologists are classifying the races as five, giving separate status to races of America and Australia, red indians and australoids. But most anthropologists are considering the three races caucasoid, mangoloid and negroid with the

inclusion of americans in mangoloid and australoids in caucasoid since their separation is below 40,000 years back, compared to the separation of three primary races happened in the period of nearly 15 lakhs of years. The people in the same race also varies in different countries and places due to climatic and other geographical conditions. Later people from Europe migrated to all continents, and people of America and Australia came with more caucasoid populations.

Cromagnon man lived up to 12,000 years back, little is known about them and that was the end of the ice age also. Then we consider the most modern history of man. 10,000 years back started agriculture. It will be more convenient to use the concepts of Karl Marx, who is the most prominent personality in social science, for studying the social aspects. He sees primitive communism in earlier societies of man. Everybody collects food, share it and eat and no possession of land, food or materials. After agriculture started 10,000 years back some had to work. Gradually powerful men became dictators to carry out the work by the poor people and they became masters and poor workers became slaves. This is the starting of slavery and was more glaring in Europe. Asia differ to some extent, and in India the caste system was prevalent with the dominance of upper caste people. When the depressed slaves retorted against the system

and the possession of land started, the social system gradually turned to feudalism.

The first sign of feudalism was reported in Egypt 2500 BC. King and feudal lords are the owners of the land. They will give the land to peasants temporarily for farming and in return the farmers are bound to give some crops to the feudal lords. Then came democracy, it is termed by Karl Marx as capitalism. As a result of industrial revolution the onset of factories began, new cities evolved, the peasants gradually turned to workers in the factories. Gradually feudalism also began to lose its power. The first sign of democracy in a limited sense was reported in Greece 600BC. But it came in the world only in eighteenth century. In Marx's view the majority people are getting more freedom in each stage. Workers in the capitalism are more free than peasants in the feudalism and they are more free than the slaves in the slavery system. Marx emphasizes the necessity of socialism in which all are equal and ownership of everything goes to the state and then to communism, in which apart from the situation of socialism, one's remuneration will not be based on the work done but should be based on one's needs. The transition to socialism, in Russia, China and other countries had happened in a feudalist set up as a consequence of revolution against the ruling Kings. It has not happened in a democratic set up as Marx predicted. Marx is a revolutionary who sees a

classless society with full freedom and equality and also emphasizes the need of rulerless society in final stage.

Evolution is still going on in human beings. From ape to man height, volume of brain etc are increasing whereas decrease is noticed in the size of mouth and teeth, in each stage. Reduction of number of teeth is another factor. In the text books we studied that man has 32 teeth but now it is observed that 30% of the population are not having 32 teeth. In the matter of races the people of North Africa, South America, West Asia, India, etc are mixed in races.

The human civilization started in riversides like Indus, Nile, Yufratis, Tygris etc. The ancient civilized countries are India, Egypt, Iran, Iraq and China. Then it spreaded to Greece, Rome etc. Later advancement is in European countries and now in USA. Continent-wise, it is first Asia then Africa, Europe, North America. Then we can say that it may go to South America and Australia. As far as origination of man is considered Africa is the starting point, 50 lakhs of years back. The migration to Europe and Asia occurred 15 lakhs of years back at the homoerectus stage and to North America, South America and Australia, 40,000 years back in cromagnon stage. So any achievement of man can be tied to Africa or Asia. The different parts of world and people are still in different ages. We may see some primitive people in stone age now also.

7. THE EVOLUTION OF PSYCHOLOGICAL THOUGHTS

Psychology originated in nineteenth century inheriting from Philosophy and stimulated by the experimental achievements in Physics and Physiology. The relationship of Psychology with all other subjects has already been discussed. Social Sciences also contributed to its development. Relationship with Medical Sciences is through abnormal and clinical Psychology. Actually in order to study Psychology, sufficient knowledge in all other subjects is a must. Mathematics and Statistics are also used for psychometry and research study by sample drawing. There is no other branch of knowledge with this high degree of relationship with other subjects. Our aim of study is for finding the psychological processes and chronology of origination of theories in other fields and the relation of that theories with the major school of thoughts in Psychology. For this purpose we are discussing the three major theories in Psychology; psychoanalytic theory, behaviorism and gestaltism. We may look for the characteristics of each theory. While it may be instructive to the scientists to bring conflicting predictions to bear upon his findings, it is frustrating indeed to try to digest and comprehend the body of psychological theory when at times the language and concepts of one system seem completely foreign to another. (Ann Neel, 1977).

PSYCHOANALYTIC THEORY

This school of thought started in 1893 by Sigmond Freud (1856 – 1939) born in Austria. Freud's theory was the product of the intellectual and social climate in which he grew up. The basic intent of any act is to maximize pleasure and minimize pain, oriented towards hedonism. Behaviour is guided by the pleasure principle and has its origin in the id, the seat of all desires. But in reality we cannot go with the tune of id, we have to adjust with the society and surroundings. The process of control, planning and conforming to reality is known as ego. The activities of us are modified by moral values or super ego. For the most part, Freud's principles described events which take place outside the awareness of the individual, they are unconscious processes. Awareness is the distinguishing factor of conscious activity. Absence of awareness is the criterion of unconscious forces. In between them, there is a preconscious level. Id is composed of various biological urges and desires in primitive uncivilised state. Ego is the part of personality which seek to find realistic outlets for the id impulses at the same time keeping the person out of trouble with his environment and avoiding painful experiences. It is the self control, decision maker and judge, while super ego is the conscience.

The id is in the unconscious level of the mind, the mind is considered as the totality of thoughts, feelings, emotions etc. A part of

superego also lies in the unconscious level, because many social values are learned before the child could understand and verbalise about them. The ego, the functioning part necessarily should be conscious but little part is lying in preconscious level. The superego lies in all the three levels.

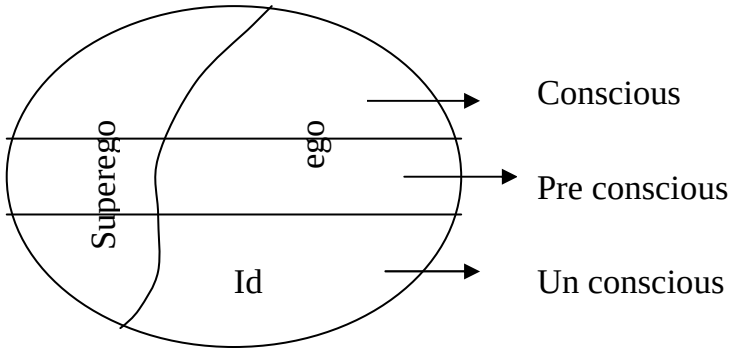

Diagram 2

The id is the biological part of the mind, ego the psychological part and superego the social part.

The development of personality takes place through a number of stages in the childhood. Oral stage concentrating oral activities and eating, followed by anal stage, a period of socialization of bowel and bladder habits and then phallic stage, of infantile love relationship with the parent of opposite sex. The genital stage is the adolescence period.

Freud's theory is giving stress to basic natural instincts especially sexual impulses. The concept of defense mechanism is his contribution. Ego the functioning part of the mind has to satisfy the impulses of id and

the convictions of superego which are in opposite. This naturally leads to conflicts. The compensation is found in the defense mechanisms. The failures and frustrations in execution may bring injury to our ego and cause anxiety and feelings of inferiority. In such moments we do not like to face the reality by accepting our shortcomings and failures, but resort to certain mechanisms defending our inadequacies. The mechanisms are called defense mechanisms. The important defense mechanisms are as follows.

1) Repression - Anxiety producing and unfulfilled wishes are pushed down to the level of unconscious mind in order to forget it.

2) Regression - Behaving in a manner more appropriate to earlier happier periods of life for protecting oneself from the threatening situations of the present.

3) Isolation -Protect one’s self by cutting off from unacceptable situation.

4) Withdrawal -Withdrawing from the unpleasant realities.

5) Day Dreaming - Instead of facing unpleasant realities the individual tries to seek satisfaction by roaming through fantasies and imaginations

6) Negativism - Aggressive withdrawal like refusal to eat, listen, speak, work etc.

7) Displacement - Transferring or displacing the point of frustration to another situation or object, and relieving oneself from frustration.

8) Rationalization - Justifying one's unjustified behavior by giving socially acceptable reasons.

9) Reaction formation - Striving to behave in ways that are sharply in contrast with the ways he tends to behave for protecting one's self-esteem.

10) Compensation - Covering the deficiency in one field by exhibiting strength in another.

11) Projection - Attributing one's weaknesses in another person.

12) Sympathism - Trying to derive satisfaction by seeking sympathy from others for one's own failure.

13) Denial of reality - Escaping from the noxious stimuli by the denial of its existence.

14) Sublimation - Way out through some outlets like literary or artistic work, from the aversive thoughts.

When one cannot protect the self, using the defense mechanisms may be prone to abnormal behavior.

Freud was a medical practitioner. He used free association and dream analysis for getting clues for the underlying causes of behavior disorder. Freud also used hypnotic suggestions in treatment in the beginning of his career. He developed his theory from clinical experiences. This school of thought was later developed by so many other psychologists by their own styles and made deviations from Freud.

BEHAVIORISM

John B. Watson (1878 – 1958) from USA is the leading light of behaviorism., originated in 1907. He perceived the human organism as a stimulus-response machine. Behavior could be broken down in to simple S.R units or reflexes. He believed that there was a physiological basis for these simple units but he focused on what individual do in a given situation. He kept out the mentalistic concepts like mind, consciousness etc and defined Psychology as the study of behavior overt or covert animal or human, and the environment in which that behavior occurred. Most of his inferences were received from experiments with animals. All behavior including thinking and feeling, could be studied as sensory motor phenomena. Certain mechanical aspects of the body were given at birth,

but most traits and talents were developed as the result of environmental influences. He reduced all learning to conditioning, behavior was established as a result of repetition, personality as a combination of manual, visceral and verbal habits.

In behaviorist's views there is no mind body problem since there is no concept as mind. Mind he reduced to behavior and behavior to body. Everything mental was actually physical. It followed from this that there could be no such thing as consciousness. It is merely a mentalistic invention applied to behavioral phenomena. Instincts are treated as prenatal learning. Emotions are the product of implicit behaviors preparatory to certain course of action. Later many psychologists worked in this school of thought and made deviations by their own style.

The basic assumption in behaviorism underlying abnormal behavior is that it grows out of maladaptive or defective learning. Therapy in turn, becomes an attempt to provide corrective learning experiences. As far as origin of defective learning is concerned, it is traced either in classical conditioning as advocated by Pavlov or in operant conditioning as explained by Skinner. Counter conditioning, desensitization methods, aversive conditioning, modelling, positive reinforcement etc are the methods to cure.

GESTALT PSYCHOLOGY

Gestalt Psychology developed in Germany in 1912 under the leadership of Max Wertheimer, Kurt Koffka and Wolfgang Kohler. The German word gestalt means as form or configuration. The term wholistic is also applied to this because of the emphasis on the whole person or the whole situation in which he adjusts. It is against the reductionist approach, since its concept is, whole is more than its parts taken separately. Gestaltism originated from the observations in perceptual Psychology and thinking. Phi-phenomenon is an example. This also accounts for the apparent movement in motion pictures. This is due to the interaction among the neural processes within the brain. The role of intuition is also crucial in Gestalt theory as elucidated by the experiment of apes using stool and stick to get the banana hanging form the ceiling.

Patterning is developed by studies of perceptual organizations, but they have broader implications and have been generalized to many aspects of behavior especially to thinking and learning. The organizational principles are Figure-Ground relationships, Law of similarity, Law of proximity Law of Good Figure and Law of closure.

Figure-Ground:- If we read a book we see the words but not watch the space between them. If we are asked to estimate the space between them, then we will not see the words. Then figures and grounds are reversed.

Law of similarity:- Grouping of the similar things in a picture.

Law of proximity:- Tending to group the proximal figures.

Law of good figure:- Perceiving a good pattern.

Law of closure:- Figure which is incomplete is perceived as a complete figure.

For gestaltists thinking is a process of appreciation for relationship in the perceptual field. Thought is synonymous with insight. It is an integrated reaction to the whole situation. Behavior is governed by this. The field in which the person operates is a psychophysical one in that both internal and external forces are active. The person perceives and interprets the field in which he functions on the basis of his past experience and the relationship he is capable of perceiving at the moment. If the perception is inaccurate it leads to abnormality.

Gestalt Psychology has given a method in therapy. Many psychologists came with similar views. Lewin’s field theory, Maslow’s humanistic theory are in holistic tradition. Carl Roger’s Client centered therapy, Rational emotive therapy etc are in the tradition of Gestaltism.

8. RELEVANCE OF THE STUDY

Psychological theories are either empirical or based on insightful speculation. A thorough analysis of the emergence of such theories and its antecedents, chronological evolutions and the situations prevailing at the emergence of such theories are not systematically studied. The present study attempts to study the same. Psychology emerged in the latter 19th Century as an offspring of philosophy, sociology, genetics, physiology, physics etc., is the most proximate subject to all the disciplines of the knowledge. We start with eastern and western thoughts in philosophy which stands for psychology at that time. Actually the psychological factors of fear, anxiety, threat to existence, fulfilment of needs and desires, for getting more happiness and mental peace, wishful thinking of permanentship in the world after death etc., led the human mind to create a God for protection and mercy in the uncertain misery world. This type of thought is dualism, where God is in the fulcrum of all events, infact is a psychological phenomena in philosophy. Some people with their rational thinking could not digest the existence of a God and psychological traits such as dislike of intervention of a great force like God in the human life, begging mercy from him, and revolutionary attitude against the power concentration and the ownership of the entire universe attached to the God, paved the way for materialism, denying the existence of the God. Again

some people could not accept dualism on the reasons stated above and also materialism with its mechanical framework and views of temporary existence of life in the world up to death. Their psychological inertia wants to become a God itself and set the philosophical view of monism that each living thing is actually God and all the universe is an illusion and manifestation of our self only. If we realise our real potential, through meditation or shaping the mind in such a way, shedding the ego, escaping from the limitation of self and perceiving the entire world as self, we become immortal and liberate from the boundary of life, death, rebirth etc. and know everything. We have discussed the three major visions in philosophy and any other vision is only a mixture of these three. Before the birth of psychology in the latter 19th century philosophy had dealt such things and now transpersonal psychology deals such subject as spiritualism, and Abraham Maslow with his humanistic psychology is the prominent person in this line of advancement in psychology. Thus we find that actually psychology is the creator of philosophy.

The study aims to find out any similarity of major theories in the physical science like Newton's laws, electromagnetic wave theory, relativity/ quantum theories with the three major philosophical visions and observe the chronology in the evolution of these theories. The same is done in the biological science in the case of Aristotelian views, Darwin's theory

and systems theory and ayurveda, allopathy and homeopathy in the medical science and primitive communism, slavery, feudalism, communism, democracy etc., in the social world. Then the study attempts to find the patterning from this and find out any similarity in the evolution of major schools of thought in psychology such as psychoanalytic theory, behaviorism, and gestaltism. In total, find out the chronology of evolution of major theories in all the spectrum of knowledge and classify the major theories in all discipline including psychology on the basis of similarity as dualistic, materialistic and monistic, is the purpose of this study.

Apart from this, the study aims to test the acceptability of major theories in all the disciplines; philosophy, physical science, biological science, medical science, social science and psychology, in the light of observed facts and generally accepted deduced theories. In the modern physics the importance of mind is more stressed by its style of perceiving the physical objects, and all the theories in all disciplines which come last are giving importance to mind, some scientists are viewing that the science is moving towards psychology. The dilemma of conflicting inferences of major schools of thoughts in psychology can be resolved to the extent possible, is also to be discussed in the study. A true cognitive picture of life and universe is actually a subject matter of perceptual psychology, transpersonal psychology, cognitive psychology etc., and this need not be

spared to philosophy, physics or biology only. This will help us to get a correct picture of the world and tackling the problems facing us in daily life. Philosophy of science a branch of philosophy, is a fascinating field of the present study. Philosophers and scientists have contributed to develop it, and psychologists cannot remain as bystanders in the advancement.

Aim

1. To examine the content and chronology of evolution of concepts in various disciplines of knowledge in relation to major theories in psychology.

2. To find out the similarity between all spectrum of knowledge and its influence on psychological theories.

3. To evaluate major theories in psychology with respect to theories in other fields and assess their general acceptability.

CHAPTER II

REVIEW OF RELATED STUDIES

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REVIEW OF RELATED STUDIES

This study is purely theoretical in nature and comprising all fields of knowledge, it is difficult to get such a work done by the psychologists alone. Mostly mathematicians and physicists conducted studies on cosmology in relation to philosophy and psychology that may be relevant as review for this study. In this chapter we may study the works of great personalities like George Gamow, Carl Sagan, Stephen Hawking and Fritjof Capra.

George Gamow (1904 – 1968) from Russia is a giant in Astronomy. He is the proponent of big bang theory of universe. He predicted that the life in earth will be ended due to the tremendous heat radiated when sun becomes a red giant in the transition of its end to black dwarf to be happened within 500 crores of years. This is opposite to the existing belief that the life will be ended due to the severe cold as a result of extinguishing of fire in the sun and it becomes a black dwarf. He also involved in Biochemistry and made some contributions. His famous Book '123 ..... α 'studies Cosmology through the world of Mathematics, Physics, Chemistry and Biology.

As far as Psychology is concerned, the fact of human mind's inefficiency for imagining the four dimensional universe of length, breadth, height and time as Einstein seen has been elaborated in his work. We are three dimensional creatures seeing time as independent and separate. In this book he is illustrating the difficulty of two dimensional creatures in a three dimensional world as we see. In the universe some galaxies are vanishing from us, nearly in the speed of light. We should have to take the relative nature of space and time in the calculation and imagination of universe. Here our mind is experiencing difficulties in the imagination of a four dimensional world. His study is purely scientific and he is not sticking to any philosophical view such as dualism, materialism or monism.

Carl Sagan is a great American scientist (1934 – 1996) who associated with the expedition of viking to mars. In his famous book 'cosmos' he is seeking the cosmic truth through Physics, Chemistry and Biology. The philosophical and psychological aspects were discussed in the chapter 'The Edge of For ever'. He confronts the questions like what were the conditions existing at the time of big bang, what was before that. How does the cosmic egg explode to a large universe. In many cultures it is customary to answer that God created the universe out of nothing. Then where God comes from. If God has always existed why should be applied it to the universe and saved the universe to be existed always without a big

bang. He also says that in the myths, the Hindu religion is the only one believes that the cosmos itself undergoes an infinite number of deaths and rebirths. It is the only religion in which the time scales correspond, no doubt by accident, to those of modern scientific cosmology. A *brahma day* is 864 crores of years and 100 Brahma years is the life of the universe. Then the universe dissolves with Him for another Brahma century. After it again He creates the universe, dissolves it and the game goes for ever.

Now scientists are looking the fate of the universe. They are trying to estimate the mass of the all matter in the universe. It is not easy to get it. If mass exceeds a critical level, then the gravitational pull will be more than the expanding force and then the universe will be contracted and converged to a point with a big crunch. Since the mass of the universe could not be estimated we cannot say big crunch will come or the universe will expand for ever. If expansion stops and universe begin to contracts Carl Sagan suspects that the laws of nature will be reversed and whether time will flow backwards, and the life starts with death and ends with birth.

In the search of the centre and edges of the universe, Sagan uses the concept of dimensions as seen in Gamow's study. Sagan sees our universe as a 4 dimensional hypersphere. As a 2 d creature lives on the surface of the earth cannot see any edges on it, and cannot imagine the centre of the earth like so we cannot see a boundary and centre in the universe, as a 3d

creature, then only a 4 d creature can understand the universe. He guess that black holes in the universe provide a way to penetrate a fourth physical dimension.

Stephen.W. Hawking from England is an eminent mathematician and physicist and an authority in cosmology. Through his famous book ‘A Brief History of Time; he is discussing the black holes and origin and fate of universe. The black hole is an immense contraction of a star in to a single point known as singularity. Even light cannot escape from this. In the starting of the universe about 1370 crores of years back, the universe was a singularity converged at a point of infinite density and infinite temperature.

The singularity obeys no laws of physics or nature and it is difficult to define its stage. Then it exploded ie big bang. Energy transformed to matter in the creation of universe, and he foresees that the universe will end with a big crunch and again converge to singularity. This is repeated forever and sees no particular starting and ending. He says that then there is no role for a creator as the universe exists all time.

The time concept is also discussed in this book. The real time is 4^{th} dimensional time lying with Space-Time, and having no past, present and future. Since we are 3 dimensional creatures perceiving the time in

conventional habits, we are not using the real time. The time which is not real is real to us, and the real time is out of our perception. We are having 3 arrows of time in front of us. One is related to the second law of thermodynamics, second is our psychological arrow of time, and third is the cosmological arrow of time. The second law of thermodynamics states that in the passage of time entropy increases. That means in the passage of time disorder in the world increases and order decreases. The psychological arrow of time is the time perceived by us. The cosmological arrow of time is in the direction of expansion of the universe now and it will be reversed when contraction starts. If it happens, Hawking suspects that the other two arrows of time also will be reversed. Then life starts from death, get younger in the passage of time and ends in mother's uterus.

Fritjot Capra from Austria is an eminent physicist who wrote a number of popular books in Cosmology. The main works taken for the study are 'The Tao of physics', 'The Turning point' and 'The Web of life'. Unlike the earlier scientists who have pursued three or four subjects, Capra studied the cosmology through almost all subjects like Physics, Mathematics, Biology, Ecology, Chemistry, Medical Sciences, Economics, Anthropology, Philosophy, Psychology etc. In the 'Tao of physics', he is seeing parallels between modern physics; quantum and relativity theories to eastern mysticism and sees Newtonian physics and Maxwell's electro

magnetic theory as mechanical in the tradition of Rene Descartes' dualism, of mind and body. The early Greek philosophers are scientists and social scientists also. Rene Descartes, Leibniz, Bertrand Russell etc are philosophers and mathematicians. So many philosophers and scientists attempted to find relation between Science and Philosophy. According to Capra, relativity theory sees time as not an independent entity flowing from the past to the future and space and time are relative and quantum theory's observation that subatomic particles show the dual nature of wave and particle and their existence cannot be confirmed at a place at a time inside the atoms, and they are only showing tendencies of existence, it is equal to the *adwait*a philosophy that all the world is a creation of mind.

In the book 'The Turning Point' he sees that in the medical sciences the western medicine allopathy is classified as reductionistic cartesian mechanistic model where as Indian, Chinese, Persian medical systems and homeopathy are holistic in approach, having an integrated outlook. In Biology he sees all models including Darwin's theory of evolution as reductionistic and mechanical, the systems biology sees the nature as whole, giving more importance to cooperation and interdependence among the living organisms than competition. In a separate chapter for psychology in the book, he sees gestalt psychology, humanistic psychology of Maslow and functional psychology of William James as holistic while

psychoanalysis and behaviorism as reductionistic and mechanical. In Economics, he sees all the theories of Adam Smith, Ricardo, Karl Marx and Keynes as cartesian reductionistic while the system view about Economics is perceived as holistic.

Through his book ‘The Web of Life’ the same views are elaborated and emphasized. He has discussed more about the similarities between the thought systems, especially modern science with eastern philosophy through his works. He favours for a monistic philosophy and classifies the modern physics, gestalt psychology, humanistic psychology, functional psychology systems theory, homoeopathy and all eastern system of medicines, in monistic tradition and all other theories in cartesian mechanistic reductionistic tradition.

On a review of related studies Gamow has not advocated for a particular Philosophy but simply and scientifically discussing cosmology in his humorous style. Carl Sagan and Stephen Hawking denies the existence of a God. Fritjoff Capra is in the side of monism and classified some theories in monism.

The studies and observations conducted and views and visions put forward by psychologists, philosophers and other scientists in the domain

of philosophy of science, perception of time, consciousness etc., are some way relevant to the present topic and are also compiled as review.

Philosophy of Science

The philosophy of science is concerned with the assumptions, foundations, and implications of science. The field is defined by an interest in one set of a traditional problem or an interest in central or foundational concern in science. In addition to these central problems for science as a whole, many philosophers of science consider these problems as they apply to particular science (eg: Philosophy of biology or philosophy of physics). Some philosophers of science also use contemporary results in science to draw philosophical morals. Although most practitioners are philosophers, several prominent scientists also have contributed to the field and still do. Philosophers of science focus on metaphysical, epistemic and semantic aspects of science.

Karl Popper contended that the central question in the philosophy of science was distinguishing science from nonscience. Early attempts by the logical positivists grounded science in observation while non-science (eg. metaphysics) was non-observational and hence nonsense.

Two central question about science are (1) what are the aims of science (2) how ought one to interpret the results of science? Scientific

realists claim that science aims at truth and that one ought to regard scientific theories as true, approximately true, or likely true. Conversely scientific antirealists are instrumentalists argued that science does not aim (or at least does not succeed) of truth and that we should not regard scientific theories as true. Some antirealists claim that scientific theories aim at being instrumentally useful and should only be regarded as useful, but not true description of the world. More radical antirealists like Thomas Kuhn and Paul Feyarabend have argued that scientific theories do not even succeed at this goal, and that later, more accurate scientific theories are not typically approximately true as popper contended.

In addition to addressing the general question regarding science and induction, many philosophers of science are occupied by investigating philosophical or foundational problem in particular science. The late 20th and early 21st century has seen a rise in the number of practitioners of philosophy of a particular science.

Philosophy of physics is the study of the fundamental, philosophical question underlying modern physics, the study of matter and energy and how they interact. The main question concerns the nature of space and time, atoms and atomism, also the predictions of cosmology, the results of the interpretation of quantum mechanics, the foundations of statistical mechanics, causality, determinism and the nature of physical laws.

Classically, several of these questions were studied as part of metaphysics (for example, those about causality, determinism and space and time).

Jeffrey Bub explores the transition from classical to quantum mechanics. This transition produces two mysteries. First, how should we understand the notion of state in a non-Boolean quantum world? Second, how should we understand non-local effect, when a system seems to know instantaneously about measurements performed on a distant system? But concentrates on the issue of the entangled state, and raises the exciting prospect that in recent work in quantum computation we may see the beginning of how core conceptual questions can be solved.

Philosophy of biology deals with epistemological, metaphysical and ethical issues in the biological and biomedical sciences. Although philosophers of science and philosophers generally have long been interested in biology (eg: Aristotle, Descartes and even Kant), philosophy of biology only emerged as an independent field of philosophy in the 1960s and 1970s. Philosophers of science then began paying increasing attention to developments in biology from the rise of Neo Darwinism in 1930, and 1940s to the discovery of the structure of DNA in 1953 to more recent advances in genetic engineering. Other key ideas such as the reduction of all life process to biochemical reaction as well as the incorporation of psychology into a broader neuroscience are also to be noted.

Robert Brandon and Alex Roserberg detail some points of interaction between philosophy of biology and biology (especially evolutionary biology) over the last twenty five years. Many of the issues, such as the nature of probability, the semantic view of theories and reductionism, are of broad interest to all philosophers of science, while others, such as debate over the units of selection, or the nature of fitness, are non local. Looking ahead, they predict significant developments in the philosophical study of developmental biology and of ecology.

Philosophy of psychology refers to issues at the theoretical foundations of modern psychology. Some of these issues are epistemological concern about the methodology of psychological investigation. Other issues in philosophy of psychology are philosophical questions about the nature of mind, brain and cognition, and are perhaps more commonly thought of as part of cognitive science or philosophy of mind. Philosophy of psychology also closely monitors contemporary work conducted in cognitive neuroscience, evolutionary psychology and artificial intelligence, questioning what they can and cannot explain in psychology.

Philosophy of psychology is a relatively young field, due to the fact that psychology only became a discipline of its own in the 1800s. Philosophy of mind, by contrast has been a well-established discipline

since before psychology was a field of study at all. It is concerned with questions about the very notion of mind, the quality of experience, and particular issues like the debate between dualism and monism.

John Camphell traces some key developments in the field of mind from the second part of the twentieth century. From a vast field, Campbell selects five themes: mental causation and psychological explanation, the rise of functionalism, Content, concepts and consciousness; our way of knowing about other minds and personal identity through time.

Perception of Time

In Western cultures time is usually conceived as linear, the past and the future separated from the present. But the conception of time and the attitude to the past and the future is and was different in many other cultures, past and present. There exists a comprehensive literature on this, for recent reviews reference can be made to Gell (1992), Munn (1992), Vatsyayan (1996) and Withrow (1988). In the following, some specific examples of time concepts will be given.

Nakamura (1991) emphasizes that the Indian conception of time is very different from that in the West. Time is conceived *statically* rather than dynamically. It is recognized in India that the things of this world are always moving and changing, but the substance of things is seen as

basically unchanging, its underlying reality unaffected by the ceaseless flux. The Indian directs our attention not to the flow of water but to the river itself, the unchanging universal. Nakamura thinks that the static conception of time permeates Indian thought. Other authors use the word *"timelessness"* instead of "static time", for example Mahadevan (1992) who writes that timeless Brahman is the source of all orders of creation and that time is the channel through which it is possible to return to this source. Through meditation on time, one gets beyond time to the Eternal Absolute Gell (1992), quoting Geertz describe Balinese time as "a motionless present, a vectorless now". He thinks that this does not mean that the Balinese are living in a different kind of time from ourselves, but that they refuse to regard as salient, certain aspects of temporal reality which we regard as much more important, such as the cumulative effects of historical time.

Hall and Hall (1990) write about monochronic and *polychronic* time. Monochromic time corresponds with paying attention to and doing only one thing at a time, while polychromic time corresponds with being involved in many things at once. The cultures of the United States, Switzerland Germany, and Scandinavia adhere to monochromic time, while the Mediterranean people follow polychromic time. Like oil and

water the two systems do not mix, so for performing international business it is essential to know about the difference.

A number of time studies and psychological experiments indicate that the psychological Now is experienced with a certain temporal extension and therefore differs from the physical moment or point of time, which is regarded as infinitesimal with zero duration

Thus the psychologist Rubin (1934) performed experiments with "two very short sound stimuli in the outer physical world succeeding one another". When the interval between the two sound stimuli was short, a fifth a second (in physical time), Rubin's immediate experience was:

“Quite contrary to our general notion of time, the experience does not occur that one of the sounds is present and that the other belongs either to the just expected future or to the immediate past. Either both of them are past or both of them are future or both of them have the character of being present, although they are experienced as a succession”.

Whitehead (1920) thinks that "the ultimate terminus of awareness is a duration with temporal thickness" and that "the present is a wavering breadth of boundary" between the extremes of memory and anticipation. Denbigh (1981) thinks that the "spacious present" (or "perceptual present") gives to temporal awareness a certain degree of "spread", and he quotes

William James for asserting that the perceptual present is not like a knife edge, but more like a saddle-back. More recently Varela (1999) has stated that "the very mode of appearance of nowness is in the form of extension, and to speak of a now-point obscures this fact". Hayward (1987) writes about relations between the sciences and Buddhism, and he states that conscious experience occurs as series of moments of finite duration.

The philosopher Henri Bergson (1980) studied the immediate experience of successions, and found that such experiences, for instance the notes of a melody penetrate each other and form a whole. He contended that the time of science and of daily life is an abstraction from these immediate experiences. It is found that Bergson's views correspond well with the description of the content of the Now by Gurwitsch and Arvidson, Also Buddhist and other Indian psychologists have found that physical time is an "abstraction", a "construction" or a "conceptual fabrication" (Hayward 1987, Mahadevan, 1992). Nicholas of Cusa (15^{th} century) held similar views of the Now: "All time is comprised in the present or 'now', time is only a methodological arrangement of the present. The past and the future, in consequence, are the development of the present" (Perry 1971).

The Ontology of Consciousness

In the English scientific and philosophic literature the term "consciousness" is used with several very different meanings. Here are some examples showing the span of the variation:

"Consciousness is a neurological system like any other, with functions such as the long term direction of behavior" (Bridgeman 1980).

"Consciousness is best regarded as an aspect of the system's behaviour, the latter admitting of both overt and covert dimensions". (Cotterill 2001).

"Consciousness is information" (Goldberg 1996).

The universe is fundamentally a great mind. Consciousness is seen as primary, and matter as a projection of consciousness (Orme-Johnson, Zimmerman and Hawkins 1997).

Wuthnow (1976) proposes that consciousness may be defined "as the ongoing process of constructing reality out of symbols and experience". This is an example of functionalism which in general views consciousness as a brain process or mode of functioning (Velmans 1990). Wuthnow also thinks that consciousness "needs to be recognized as not simply a

psychological phenomenon, but as a process linked in important ways to the functioning of society".

"The most important thing about consciousness is that it's a social attribute" (Freeman and Burns 1996).

Brown (1977) thinks that "consciousness is a manifestation of both the achieved cognitive level and the full series of cognitive levels at a given moment in psychological time".

At a study week on brain and conscious experience the Vatican Academy of Science expressed this view: "As to the further meaning of the term ‘consciousness’, the study week intends that it strictly designates the psycho physiological concept of perceptual capacity, of awareness of perception, and the ability to act and react accordingly". (Uttal 1978)

"An *awareness of awareness* of self and environment in time" is suggested as a definition of consciousness by Strehler (1991).

The dominant ontology of the western scientific culture is materialist realism which assumes that, what scientific theories describe is a material world existing independent of human consciousness and cognition. This view had proved useful and productive within a certain, large domain of the study of nature, but it has been contested by many philosophers (Knight 2001; Randrup 1997), and a number of scientific

findings made in the 20th century have been difficult to accommodate in this ontology. Thus cognitive neuropsychology assumed from the beginning, like all biology, the existence of an external world independent of the human observer. The studies in this discipline led, however, to the conflicting result, that all our cognitions, including the assumption of an external world, must depend on the cognitive apparatus in our brain. The same contradiction has emerged in the discipline evolutionary epistemology (the study of cognition in the context of biological evolution) and has been discussed within this discipline, during later years in the journal Evolution and Cognition. Other examples of contradictions and problems consequential to the assumption of a material world "out there" are found within the disciplines second order cybernetics, statistics, and physics, (Randrup 1997). Doubts about the materialist ontology (or realism) have been expressed by various physicists. Thus Laszlo (1996) writes: "As of today the mainstream theorists of the quantum world have not succeeded in giving unambiguous answer to the question, 'what is matter?" And Barrow (1988) states: "It appears that science is best done by believing that realism is true, even if in fact it isn't". The newer theories involving super strings and super membranes have made the doubts still more disturbing. These theoretical entities, extremely small, are believed to be fundamental constituents of matter, but direct effects of them cannot be

assessed experimentally, and the belief in their existence rests on the usefulness of the theories in which they are embedded. They may therefore be conceived as heuristic theoretical concepts rather than pieces of matter, and the super string theories have been regarded as mathematical philosophy rather than physics (Brown 1991, Nathan 2000).

A clear and radical position was taken by Lindsay and Margenau (1949) who begin their book "Foundations of Physics" with the statement: "Physics is concerned with certain portion of human experience". This expresses an idealist conception of physics, and at the same time an extension of the usual conceptions of consciousness to embrace also the domain of physics. These authors find that the belief in a real material world behind our sense perceptions may tend to encourage too close adherence to reasonably successful physical theories with too small allowance for their necessary revision to meet the demands of new experience.

The mind-body or mind-brain problem is now often called "the hard problem", meaning that it is hard to understand how a material brain can produce consciousness. The hardness of the problem is a direct implication of the materialist ontology, and that therefore the problem cannot be "solved" as long as this ontology is applied. Materialist realism is the problem. Very recently Marshall (2001) has expressed similar views on

the hardness of the mind-brain problem. With the idealist ontology the mind-brain relations are relations between conscious experiences (observations) constituting the material brain (here seen as a heuristic concept) and other conscious experiences. It is readily understood that such relations are possible, and they can be studied in detail by comparing the results from neurophysiology and from attention to conscious experiences.

According to Wallace (1999) the following declaration is attributed to the Buddha himself: "All phenomena are preceded by the mind. When the mind is comprehended, all phenomena are comprehended". It is interesting to compare this declaration with the intent of contemporary physicists to construct a "theory of everything" on a materialist basis.

Jung has written comprehensively about the collective unconscious. This might be regarded as something different from collective conscious experience, but the Jungian analyst Bernstein writes "the collective unconscious which clearly implies a collective conscious" (Bernstein 1992), and Bernstein (2000) has reported examples of directly felt collective conscious experiences. Likewise Young-Eisendrath and Hill (1992) think that Jung's later theory of archetypes and self is a constructivist model of subjectivity that accounts for the collective or shared organization of affective-imaginal life. Constructivism they think

reveals the impossibility of mental separatism and recognizes the shared nature of mental processes that arise within an interpersonal field.

In the literature several authors have discussed collective memory. Thus Bryld and Warring (1998) have written a book about the Danish collective memory of the German occupation 1940-1945. They describe the formation of this collective memory during the years after the war, influenced by the need of the Danish people to regard themselves as resistant heroes and not as collaborators. Halbwachs (1975) has written a comprehensive general treatise about the social frames of memory. He argues that the notion of individual memory is insufficient and needs to be supplemented by group memory. Halbwachs employs terms such as "collective perception", "collective representations", "collective experience", "collective reflections", "collective thought", and "collective memories".

Sorenson (1998) has studied indigenous people living in isolated enclaves around the world more or less "untouched" by dominant, conquering cultures. In these people he found a state of mind which he calls *Preconquest Consciousness*. One of the characteristics of this consciousness is an empathetic, integrative, intuitive rapport between individuals. Sorenson found their way of life to be simultaneously individualistic and collective, each person constantly enlivening the others

by a ceaseless, spirited, individualistic input into a unified at-oneness. He felt strongly that this way of life was very different from the ways of western cultures, he was used to, and even difficult to describe in the English language. The difference was also clearly seen in some cases where a rapid collapse of preconquest consciousness (sometimes within one week) occurred after contact with dominant cultures.

CHAPTER III

METHODOLOGY

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METHODOLOGY

The term methodology defines how one will go about studying any phenomenon. It comprises a preference for certain methods among the many available, a theory of scientific knowledge, a range of solution and a systematic sequence of procedural steps to be followed (Silverman, 2006). A qualitative descriptive research method is adopted for the study, wherein the theoretical paradigm, perspective, research strategies, and methods of analysis are carefully planned. The chapter ends with the way interpretation and evaluation of the research is executed.

Qualitative research is a field of inquiry in its own right. It crosscuts disciplines, fields and subject matters. Therefore the present study which addresses philosophy, physical science, biological science, medical science, social science and psychology on the basis of their conception of formulating theories can best be designed only on qualitative research method.

Qualitative research has separated and distinguished histories in psychology, medical science, history, education, social work, organisational studies, anthropology and sociology. These separate and multiple uses and meanings of the methods of qualitative research make it

difficult for scholars to agree on any essential definition of the field, for it is never just one thing. Denzin and Lincoln (2005) borrow Nelson *et al's* (1992) definition of QR in cultural studies here:

"Qualitative research is an interdisciplinary, trans disciplinary and sometimes counter disciplinary field. It crosscuts the humanities and the social, biological and physical sciences. Qualitative research is many things at the same time. It is multi paradigmatic in focus. Its practitioners are sensitive to the value of the multi method approach. They are committed to the naturalistic perspective and to the interpretive understanding of human experience. At the same time, the field is inherently political and shaped by multiple ethical and political positions".

The present research attempts to link theoretical perspectives of natural sciences with that of social sciences. Natural sciences which follow the scientific, positivist, naturalistic paradigm, are analysed with the interpretive, constructionist paradigm of social sciences through qualitative research method.

Theoretical Paradigm of the Research

A complex, interconnected, family of terms, concepts, and assumptions surround the term qualitative research. These include the traditions associated with foundationalism, positivism, post

foundationalism, post positivism, and the many qualitative research perspectives, and/or methods connected to cultural and interpretive studies.

A strong and clear theoretical perspective, which is a set of assumptions about the nature of reality and scientific knowledge, is necessary in designing qualitative research. As Martin O'Brie (1993, cited from Silverman, 2006) says: "... we can see social theory as a sort of kaleidoscope by shifting theoretical perspective the world under investigation also changes shape".

In choosing the research design and analytical processes, it is essential to be able to identify which of the epistemological traditions the researcher has chosen to work within. It will give the researcher a more in-depth perspective of their influences on qualitative research the researcher seeks to justify the research choice.

Research Strategies

In undertaking qualitative research, apart from deciding the research questions and identifying preferred epistemological traditions, research strategies need to be planned. The research strategies comprise:

- Research design
- Sampling

- Methods of data collection
- Designing field work strategies and materials

Research Design

A good research design is clearly defined, with coherence between research questions and methods, which will generate valid and reliable data and which can be achieved within the available resources. But social research always involves an element of the unknown and qualitative research offers the particular advantage of flexibility. In practice, the relationship between study design, theory and data collection are iterative, and each should inform and be informed by others. Research design is therefore not a discrete stage but a continuing process.

Grbich (2007) suggests that a good qualitative research design needs to identify and address a few issues. They are frames and framing, the position and power of the researcher, the position of the reader and research design approaches. A frame is provided by the specialist disciplines we are attached to, which gives a set of frames in terms of the theories, concepts and models which have gained explanatory dominance. I have adapted intertextual frame which are interpretive frames, I am partial to or dominated by from the discipline of psychology.

Constructivist interpretive and postmodern approaches have been identified on which the research design would be built.

As the research question was intended to study and understand the concepts of formulation of major theories in all disciplines of knowledge, a post modern research design gives scope for the inclusion of the researcher's own bias and judgment in the interpretation. The research design can also incorporate a comparative approach because multiple views about the destiny of man, universe, life, illness, social pattern, behaviour are derived from different disciplines of knowledge, a comparative dimension of reality will bring out the similarities, differences and contradictions between these different theoretical perspectives on life and universe.

Sampling

A good research design always comprises of good sampling. Qualitative research samples are small for good reasons. There is a point of diminishing return where increasing the sample size no longer contributes to the evidence. The sample does not need to be large enough to support statements of prevalence or incidence, since these are not the concern of qualitative research. It is impossible to do justice to the richness of the data yielded if the sample is large scale. But their small

scale only works if good purposive or theoretical sampling has taken place (Ritchie & Lewis, 2003).

Qualitative research studies use non-probability samples, the most robust approaches to which are criterion based on purposive sampling and theoretical sampling. The latter one is adopted for the present research.

Theoretical Sampling

Theoretical sampling is a particular kind of purposive sampling in which the researcher samples incidents, people or units on the basis of their potential contribution to the development and testing of theoretical constructs. The process is iterative: the researcher picks an initial sample, analyses the data, and then selects a further sample in order to refine his or her emerging categories and theories. This process is continued until the researcher reaches 'data saturation' or a point when new insights would be obtained from expanding the sample further (Ritchie & Lewis, 2003).

Theoretical sampling is undertaken for the present research because the research objectives are of theoretical purpose and theoretical relevance. Strauss and Corbin (1998, cited from Ritchie & Lewis, 2003) suggest that different sampling strategies be adopted at different stages of a research project. Initially, while categories are being identified and named, sampling is open and unstructured. As theory develops and categories are

integrated along dimensional levels then sampling becomes more purposive and discriminating in order to maximize opportunities for comparative analysis.

Methods of Data Collection

The third aspect of research strategy is the choice of data collection methods. These decisions flow from the research questions, but they may also be influenced by the context, structure and timing of research.

The data collection methods followed in this research are textual analysis, and general observation.

Textual Analysis

Textual analysis is considered as naturally occurring data collection method as it will provide first hand information to the researcher about the subject matter. The original texts of all systems of knowledge analysed to describe the research phenomenon in its context in which the research issue is located and how the system relates to it.

General Observation

General observation is an important method in all sciences. It provides an understanding of issues in the research concern.

Designing field work Strategies and Materials

Despite the use of the term ‘unstructured data collection’, any qualitative research study requires some early consideration of the structure and content of data collection. The degree to which subject coverage and order can be specified in advance will vary, depending on the objectives of the research and the nature of data required.

The data collection is structured based on the research questions framed. It begins with textual analysis in order to get a mental picture about how different systems of knowledge theoretically place their concepts. Textual analysis makes the researcher familiarize with the issues and debates about the subject matter, the nature of researches in the field, the kind of critical studies and perspective.

Field notes were prepared which provide an opportunity to record what researchers see outside. The researchers do not stick rigidly to any stand but employs a flexible approach.

Nature of Analysis/Interpretation

Analyzing and interpreting the findings from a qualitative research is a challenging and exciting phase. It requires a mix of creativity and systematic searching, a blend of inspiration and diligent detection. There are many different traditions and approaches for analyzing qualitative data

which vary with epistemological assumptions about the nature of the qualitative enquiry, the status of researcher's accounts and the main focus and aims of the analytic process (Ritchie & Lewis, 2004).

Several writers have distinguished between analytical approaches according to their primary aims and focus. The present research follows three different contexts of interpretation given by Kvale (1996, cited from Ritchie & Lewis, 2004).

a. Self understanding where the researcher attempts to formulate in condensed form what the participants themselves mean and understand;

b. Critical common sense understanding where the researcher used general knowledge about the context of statements to place them in a wider arena; and

c. Theoretical understanding where the interpretation is placed in broader theoretical perspective.

Based on the above mentioned contexts, an analytic hierarchy is planned which comprises a series of 'viewing' platforms, each of which involves different analytical tasks, enabling the researcher to gain an overview and make sense of the data. Miles & Huberman (1994, cited

from Ritchie & Lewis, 2004) describe qualitative analysis as a process of moving up a step on the abstraction ladder.

For analysis, interpretation and formulation of findings, firstly the three major basic thought processes in Philosophy ie dualism, materialism and monism are compared. The psychological processes behind the origination of these theories, the situations prevailing at the time of evolving these views and chronology of it are compared. Then these aspects behind the origination of Newton’s laws, electromagnetic wave theory, quantum and relativity theories are to be compared. In Biology these aspects with respect to pre Darwin biology, Darwin's theory of evolution and systems biology are compared. In Medical Sciences these aspects with respect to ayurveda, allopathy and homoeopathy are compared. In the Social sciences the sociopolitical situations in the primitive society, slavery, feudalism, socialism, democracy etc. are compared and the psychological experiences, motivations attitudes of an individual in these systems are compared. The driving force and the chronology of the evolution of these systems are also compared. Then the situations, psychological processes and the chronology of origination of the three major schools of thoughts in psychology i.e. psychoanalytic theory, behaviourism and gestaltism are compared.

In the comparison of theories in each field the possibility and extension of validity of each theory to the observed and scientifically accepted facts are also discussed. How the psychological processes involved in the formation of theories in all other fields have related in the formation of major theories in Psychology are discussed. The nature and similarities of theories of other disciplines with respect to the major schools of Psychology are found out.

The following are the aims of the study.

1) Find the psychological situations involved in the evolution of theories in all fields of knowledge, in order to get an inference in the style and chronology of evolution of theories in Psychology in the context of theoretical evolutions in Philosophy and other scientific disciplines.

2) Compare the major theories in different fields of knowledge and evaluate their similarities in line with psychological and philosophical theories, and finally arrive at the antecedents and situations in the evolution of major theories in Psychology and classify them.

3) To find the general acceptability of each theory in each discipline, in the light of scientifically accepted truths, and observed facts.

1. Contents used- Theories and visions in each discipline.

2. Method used- Textual analysis and general observation from the field.

3. Tools utilized- Theoretical sampling

4. Results derived

a. Chronology- By comparing the period of origination of theories and visions in all disciplines except social science where period of spreading of socio political system is considered.

b. Classification- By comparing the similarities of theories and visions in all spectrum of knowledge.

c. General acceptance

i) Philosophy, Physics and Biology- Scientific evidence is taken into consideration for determining general acceptance.

ii) Medical Science and Psychology- General observation from the field in the application of each system/theory is considered.

iii) Social Science- Opting by more people and nations is considered.

CHAPTER IV

RESULTS AND DISCUSSION

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At first the study considers the evolution of three basic philosophical concepts and discuss the main characteristics of their philosophical outlooks. Man came to earth at about 50 lakhs of years back as a result of evolution of some members of the species of tailless monkies i.e., dryopithecus, evolved 2 crores of years back, the common ancestor of the man and apes. We can say that the dryopithecus or any ape cannot ask such questions as who created the world or what is the destiny of us or where is the boundary of universe, because brain has not been developed to ask such questions. Then we need not go back to the lower animals. Gradually man began to ask such questions, but we do not know when exactly started this type of thinking in the history of 50 lakhs of years of man. In order to tackle these types of questions posed before him, he created a God and this stream of philosophy is termed as dualism.

What are the basic features of dualism, or what are the qualities attributed to God. The God or any force like that is

1. The creator of the world.
2. Omnipotent Controller of the World.
3. Everlasting

4. External

5. Unknown

The ancient man created a creator behind the world, who is all powerful controller of the world. Man sees all living things in the world die at a time and life is a short term enterprise. So he considered God as an everlasting entity. Before birth we were with him and after death we will be with him. The God is an external entity as far as universe is concerned and unknown also.

Materialism came in human thoughts when some people could not digest the existence of God. They could not conceive the situation of begging mercy from God, in our life and after death also. Nobody could perceive God and they could not meet a person who saw God. Rational thinking also paved the way for evolving materialism. We can say that after dualism only, materialism came and we do not know exactly the time of formation of it as as dualism.

We may discuss what are the basic characteristics of materialism. No external force like God is necessary to run the world. The laws of force and energy that determine the motion of the world, no creator is mandatory. By its own tendency all the universe evolved and denies the physical and psychological existence of a God. If God is a perfect person

why should he create an uncertain misery world. They see that the human destiny is happened to be only by chance and accidental factors. In real life people are struggling without a differentiation of whether they have committed sin or not. No external force is required to explain the laws of nature. This is in conformity with science. Life is purely a temporary phenomena which starts with birth and ends with death.

Monistic thinking started in India at about 3000 years back, Kapila gave the seed to it in the vedic era and gradually through the rishis, as evidenced by Upanishads which came out after Vedas, developed into a complete vision. People who are not ready to accept the supremacy of God and at the same time not satisfied by the materialistic view of short term life determined by the nature, proposed the monistic vision guaranteeing immortality. According to this view, all living things are possessing infinite energy and is really a God itself, but we do not know our full potentialities because of illusion. Like dualism, monism also viewed that our action or karma determines our fate and sin will follow us. We have to realise our real self, then we know all the universe and will get out of the bondage of birth and rebirth cycle. That means the souls which are immortal liberate from the illusion of life.

Let us discuss what are the fundamentals of this vision. In dualism the focus is God, while in materialism there is no focus. In monism the

focus is the self. Actually we are not taking birth, living and go to death and again get rebirth. These and the entire universe are illusion created by the mind. Extreme importance is given to the mind. There is no difference between I and others, self and the universe, mind and the body, and the whole world is in a cosmic web of relationship, there is no separation and the entire world including all living things is a manifestation of our self. Doing good action to others, developing the self through reading, thinking, devotion, yoga, meditation, etc. we are progressing to realise the real self and know the universe and our destiny. If we stand in a room with mirrors fixed we see infinite number of our own images. All the, universe is like this, the image of our self. If we realise the self then we are God, all living things are really God, know everything, get liberation from all the bondages and will be in a state of bliss and beatitude termed as *moksha* or *nirvana*. Each living thing is in the path of this *moksha*.

Dualism sees a permanentship in the world before birth and after death either with God or by rebirth preached by different religions, anyhow the controller is God, and seeing God is the final aim. Materialism sees no permanentship in the world and life is purely temporary phenomena and one time enterprise having no controller. There is no final aim but live happily as far as possible is the only thing one can do. Monism sees permanentship in the world through birth rebirth continuum, where our self

is the controller. Realising the self as all powerful entity as God and getting liberation is the final aim.

Now let us go to the physical world and laws and theories of physics. Descartes with his model of dualism started the way of physics. Newton's first law of motion says that external force is required to change a body in its motion or rest. This is similar to the view of dualism that God an external force is controlling the universe and is the driving force behind all. The second law says that the rate of change of momentum is proportional to the force applied and is in the direction of force. This is similar to the interaction of the great force God in our day to day life. The third law says that for every action there is an equal and opposite reaction. This is very similar to the theological view of sin that is rebounding on the action committed by the persons. In Newton's period out of the four basic forces viz; gravitational force, electromagnetic force, weak nuclear force and strong nuclear force, the doors were opened only in the case of gravitational force. It has the quality of attraction only, and the entire universe is run by this force. The satellites rotate and revolve the planets and these around the sun and the solar system and similar systems around the centre of galaxy are due to this force of attraction. This is analogous to the views of dualism that all events are around God. Newton's laws and the inferences attained about the physical world during that era show a

striking similarity to dualism. Newton's theories and inventions helped the development of technology.

After Newton's era the atoms, molecules and inner side of the matter were more opened. Theories and utilisation of the second force i.e., electromagnetic force became more profound. Same electric charges repel and opposite charges attract. Unlike gravitational force which is an attractive force only, here there is two properties displayed; i.e., attraction and repulsion. Properties and theories in respect of this force is more like materialism. The interplay between the charges accounts for the force experienced and no external force is required to explain. James Clark Maxwell is the prominent person in this period, and his electromagnetic wave theory explains that light is electromagnetic in nature and travels as waves. It could explain more properties of light like diffraction, interference, polarisation, etc. which cannot be explained by Newton's corpuscular theory of light. Drastic changes in the world came as a result of the invention of electricity.

The things in the physical world have been revolutionised after the origination of relativity and quantum theories. Let us discuss relativity theory first. Matter and energy are same and can be converted into each other. Time is not an independent entity that is flowing uniformly but it is relative and depends upon the motion of the observer. When we travel in

the speed of light our mass increases and time flows slowly compared to others and path seems to be contracted. This leads to the inference that when a young man goes out of earth in the speed of light and after some years come to earth he will be still young, while others on the earth get aged. In total, space and time are relative phenomena experienced by each individual according to his state of motion. The biological rhythm of the body will also be tuned according to the experience of the time. Time is not independent but is varying, depending upon the motion of the person. Then we can discuss the inferences given by quantum theory. Light is a particle and at the same time wave also radiating energy called photons. We cannot imagine a thing, particle and wave at the same time, one is matter and other is energy. The basic building blocks of all the living and non living matter i.e., the proton, neutron and electron are both particles and waves. Quantum theory can explain all the properties of light. After the dual nature of matter and light, another thing that perplexes us is the uncertainty principle. We cannot precisely measure the position and velocity of a subatomic particle with precision. We have to use light for seeing a particle and the photons of the light interacts with the subatomic particles and change either its position or velocity depending upon the wavelength of the light used by us to see it. That means we cannot get a clear picture where the subatomic particle lies, and at the same time what is

the velocity of it. The particle's existence in a particular point in a subatomic region is uncertain, but we can calculate only the probability of existence. In total observation influences the particle. Another inference of quantum theory is the relationship of the subatomic particles once united. If we separate them into more distance and we measure a change in one particle, then it will be reflected in the distant particle also. This elucidates a cosmic web of relationship of all particles. When we consider relativity theory and quantum theory it is seen that time, space, matter etc. are not independent physical entities, but dependant upon the observer and his motion. This also leads to the conclusion that the properties of the parts are not intrinsic and separate but are within the context of whole.

The inferences attained from the above theories are very much similar to the vision put forward by monism. The entire universe is a creation of mind, there is no absolute time, space, matter, etc. The sense organs are deceiving us. Applying Freudian terms, it can be seen that denial of reality and wishful thinking of immortality without the risk of uncertainty, they viewed the world accordingly and put forward the beautiful concept of liberation. Anyhow similarities have come to this extent that, time and world is a creation of mind in monistic view, while time and world change according to the observer and the velocity in which he remains as per the relativity theory and quantum theory of physics. The

modern physics opened the door to nuclear forces, the weak and strong force. Weak force is behind radioactivity of conversion of radioactive elements like uranium, radium, thorium, etc. into other elements by emission of rays, while the strong force binds the nuclear particles protons and neutrons in the nucleus. The strong force is attractive in certain distance and at the same time repulsive in close distance which holds the nuclear particles together and avoids collision. The complexity of nature is more intriguing like monism when we go deep into nucleus or travel near or same speed of light.

Now let us examine the area of Biology, man can only believe that the life and universe is a creation by God up to the era of Darwin. Aristotle was the eminent person in the pre Darwin era who started to classify the animals and studied the reproductive process in them. The view prevalent at that time was dualism compared to the other visions of philosophy.

The entire domain of biology has been revolutionised with the concept of evolution proposed and observed by Charles Darwin. From the nonliving matter the five kingdoms of living things were evolved 1) the monera which consists of bacteria only 2) the protista consisting of photosynthetic unicellular organisms like algae, and nonphotosynthetic unicellular organisms like protozoa. 3) the fungi varying from the unicellular yeast to multicellular mushrooms 4) the plants and 5) the

animals. The virus and viroids which show living character inside the cell and are crystalline chemicals outside the cell are out of the classification of living things. Similarly lichens which are a united form of algae and fungi are out of the classification. Both living things and matter are made of elements consisting of proton, neutron, electron, etc. The living things are having the following properties. (1) birth and death (2) metabolism and growth (3) reproductive capacity (4) thinking, feeling and emotion and (5) movements. Darwin could not explain the beginning of the life but he had the concept that life might have started from matter converting to living things under special circumstances. Later Stanly Miller with his experiment showed some light in the matter that when he passed electricity through the mixture of elements replica to that of early atmosphere of earth, he got the constituents of DNA and protein which are the basic building blocks. Then evolved microorganisms from the matter grew and divided into several and the mutation occurred in the genes caused further evolution into various living things. Then sexual reproduction started in the higher animals and plants when the mutation occurring in the genes at the time of formation of sperms and eggs caused the evolution in to the wide variety of animals, plants and man. The mutation is occurring due to various types of physical or chemical stimuli present at the time of cell division. Out of the newly evolved species, natural selection determines who is to be survived as per

the survival of the fittest norms explained by Darwin. The boundary between a living thing and non living matter is thin when we observe virus and viroids which are true chemicals outside the cells and grow and divide inside a cell. It is quite logical to think that living organisms were evolved from matter and there is no need of a God to account for, biology is purely materialistic in this era.

After Darwin the crucial thinking in the field of biology is put forward by systems theory. According to this, living systems are integrated wholes whose properties cannot be reduced to those of smaller parts. Their essential or systemic properties of the whole, which none of the parts have. They arise from the organising relation of the parts, i.e., from a configuration of ordered relationships that is characteristic of that particular class of organisms or systems. Systemic properties are destroyed when a system is dissected into isolated elements.

The focus has been turned from dualistic paradigm and Darwin's Competitive world to an integrated, whole world. So it opened the cooperative, mutually beneficial, symbiotic relationships in the living world. Darwin's theory focus upon the behaviour of competition, struggle and destruction in the animal world for their survival, collection of food by killing and eating the flesh of other animals, advances the survival of the fittest theory, while systems theory adds that there are lot of symbiotic

relationships between the living organisms in the world. In the micro world the litchens are one example. Litchens are a united form of algae and fungi. Algae prepare food for fungi and fungi provide shelter and absorb minerals and water for algae. So close is the relationship and they live as a single organism. There are a number of bacteria living in our body which help us in the digestion, etc. In the macro world we can see a lot of examples. The coexistence of man and all domestic animals and wild animals like elephant also. Ants providing shelter and food to an insect secreting a fluid, and drink it as we use cows. The cows and birds, where birds eat the insects from cow's body giving relief from its itching, small fishes travel on the body of large fishes are the examples of cooperative and symbiotic relationships. It goes to unimaginative extent also, when we see a crocodile bird cleans the teeth of a crocodile by eating wastes from it and giving relief to the crocodiles, while crocodiles at any time do not eat the bird.

Systems theory sees that living system cannot be understood by analysis in parts. The approach is more dynamic and accommodates all types of relationships in the living world. It give a place to mental events like love, affection, etc. in the animal world. The view is resembling the monistic view of life and universe. So we can say that the systems view is monistic.

In medical science medical systems applying medicines are taken and we may discuss first the oldest medical system i.e., Ayurveda originated in India. The basic philosophy is that the balance of three *doshas* in the body, *vata*, *pitta* and *kapha* are intact one is healthy, when their equilibrium breaks the person is prone to illness. We cannot locate these *doshas* anywhere in the body, there is no proof of its balance since non-existent, the philosophy remains as concepts only. The view of unknown forces control the body is very similar to the view of unknown God control the universe including our body also. So we can classify ayurveda as dualistic. Anyhow its philosophy is in doubt, however the system worked out and gave results.

Allopathy also started with the same type of philosophy of ayurveda where equilibrium is in respect of four humours such as blood, phlegm, yellow bile and black bile as proposed by Hippocrates. This has no scientific basis and allopathy has deviated from this philosophy, and now using all modern equipments for diagnosis and treatment, day by day it is becoming more reductionistic and for each organ and part of the body there are specialists to treat.

As far as allopathy is concerned diseases are caused either by external agencies like virus, bacteria, fungus, protozoa, worms, etc. or by organic defects or from accidents. In the case of infectious diseases the

treatment is applying medicines and killing or chasing out the germs or worms causing the disease. When the white corpuscles in the blood starts attacking the germs by producing an antibody, cannot succeed the body will be under disease. Medicines help the process of killing the germs, the action is a struggle for expulsion and is similar to the Darwinian theory of survival where struggle is for food, attacking is common in both. The treatment in the case of organic defects and accidental cases is reductionistic where specialists are treating each part of the body separately. Surgery is done to remove a defective part while other medical systems try to accommodate the organs by applying medicines. The body is considered as more like machines except in psycho physiological disorders like migraine headache, peptic ulcer, cardiac problem, blood pressure etc., where the psychological factors such as anxiety, tension, fear, depression etc. are accounted for. When we compare the philosophical views, it is close to materialism. All events can be explained by the process materialising in the body and interaction of the body with the environment. The view is more mechanical and allopathy propagates a materialistic philosophy.

Let us examine homoeopathy which views that the diseases are caused by the disturbance of whole mind and body, is a holistic approach. It is considered that the tension arising from such feelings like unending

jealousy, unresolved fear, suppressed anger, unattainable wild wishes, maladjusted personality traits, perpetual uneasy negative thoughts are the factors weakening the vital force of the body, and the deterioration of the vital force is the cause all diseases. The vital force is considered as the integrated strength of the whole body in its overall functioning. The outlook is treating the person as a whole and not in parts where mind and body is one and so there is no specialists as in allopathy for each part of the body. For eg. Eye specialist, ENT specialist, neurologist, cardiologist, etc. The thrust is on the mind and personality of the person in the diagnosis and treatment. The role of medicine is marginal and is in terms of small helps to the weakened vital force to restore its original strength. In other systems higher potency of medicines means it contains larger amount of medicinal substances or highly concentrated, but in homeopathy higher potency means less amount of medicinal substances, more diluted to the extent that it is questionable whether it contains any medicinal substance after the process of repeated dilution. Applying higher potency means giving a small help to the vital force, as the intensity of disease is increasing.

Let us compare the concepts of homeopathy with that of philosophy. The vital force is the force of the whole body, while disturbances of the mind is the root cause of the weakening of the vital force, the view in effect is that the diseases are the creation of the mind. This is in parallel to the

concept of monism that the entire world is a creation of the mind. The holistic approach of mind and body as a whole apart from the dualistic or materialistic approach, it resembles the monistic view of the entire universe as one and the same. Homeopathy is not treating the diseases but is treating the persons. We may remember Hahneman's famous words in this context that “Doctors are not scavengers of germs”.

Now we can go to social sciences and study the socio economic political set ups in various time in the history of man. In the long run of 50 lakhs of years of the period from the evolution of the genus homo, little is known about the social life upto the starting of agriculture about 10,000 years back. The social set up is termed as primitive communism by Karl Marx. Like apes they collect food singly or collectively and each is free from bonded work since there was no agriculture and construction of house etc. Still we cannot assume equality is preserved in this set up, since there may be strong men robbing the food from the weak. There will not be family concept of one spouse, sex will be with multi mates without any restriction, man's selfishness and power variation will determine the matters like consumption of food and doing sex. We see quarrels for food, sex and for leadership in ape societies, the same would have been the scenario of the ancient man's social set up.

Gradually at about 10,000 years back man started agriculture. Somebody have to do such work as ploughing the land, putting the seed and plants, growing it and harvesting, etc., the powerful men became the masters to carry out the works by weak men, the slaves, we see the system has turned to slavery. In the dichotomy of masters and slaves, the masters having the upper hand determine the things, enjoyed life while the poor slaves destined to do work and get little food for survival and also got tortured by the masters. The depressed slaves were in the path of agitation against the set up coupled with the onset of possession of land started, gradually the system turned from slavery to feudalism, and first sign was reported 4500 years back in Egypt. Here the dominant persons possessed the land and the strongest of them became a king of a particular region to rule others. The feudal lords lend the land to the poor farmers for agriculture and in return get a part of the crops to them and the king is the ruler. In this system the poor farmers struggled to do all works, were in agitation while the feudal lords and the king enjoyed the life. The farmers in this set up enjoyed more freedom than the slaves, the socio economic political set up is progressing as far as equality and happiness to all are concerned.

We may compare the socio economic political systems in such type of society with philosophical concepts. In all the set ups from the primitive

communism, slavery to feudalism and in any type of class society or the society under any autocratic rule there is a dichotomy of powerful and weak citizens. The dual character is evident and the common people are having no role in the selection of rulers. The laws itself is for maintaining such system. We can compare the dualistic approach like God and universe, mind and body etc. to this, we can say that these set ups are dualistic.

The struggle between the suppressed, oppressed, depressed class and the ruling class is started from time immemorial and is continuing in every society where inequality and concentration of power persists. This is inevitable to escape from their miseries. The industrial revolution and scientific and technical innovations changed the face of the society and the society gradually changed to capitalism as termed by Karl Marx. The owners of the industries and land enjoyed the life while the workers have to satisfy with meagre earnings. In fact it is a democratic set up. Marx predicted that dissatisfied workers will fight against the system and capture power and set up socialism, where all are workers and everybody have equal earnings and all land and buildings will be owned by state. Gradually it will turn to communism where wages will be for each man's necessity but not based on the quantum of work done by him. In socialism all are workers in principle and rulers are workers or their representatives.

But in communism administrative machinery will collapse and everybody live happily with equality.

The doctrine of Marxism is having a philosophy called dialectical materialism. It depicts that all the physical, biological and social phenomena are progressing by the union and war of opposite forces. Positive and negative charges, predators and preys, the exploiting and exploited people etc. are examples. Another hypothesis is that change in quantity results in change in quality, for eg. change of heat causes different states of matter such as solid, liquid and gas. Third is that, in the struggle between opposing forces that is termed as thesis and antithesis, the end product will be another, termed as synthesis. Again it will turn to bipolar forces and it will continue. The examples are, in the slavery system after a long struggle between the masters and slaves the result gradually went to another system, feudalism and from which after agitation resulted capitalism, or socialism.

When we compare with these philosophical views, we can see that its name itself is dialectical materialism. It denies the existence of God or other unknown forces. The whole Marxism came in 19th century is a doctrine theorising the response against any type of exploitation and the philosophy gets its energy from the physical laws prevalent at that time, especially the concepts in electricity and magnetism, since the interplay

between the opposite charges in electricity and opposite poles in magnetism were the vital topics at that time. This leads to the concepts of opposing forces or dialects in dialectical materialism.

The pitfalls in the set up led to setbacks to communism in the world and turned to democratic system which has been called as capitalism by Marx. He has not given place to psychology in his doctrine. After attaining equality he considered that most problems will be over. Exploitation, hunger for power, selfishness, cruel attitude etc. are in atleast some people's mind in all time. The intelligent and stronger people in any system try to exploit and dominate others. We can see it in the animal world and the seed is in this philosophy also. After the synthesis of a new system, again it turn to bipolar thesis and antithesis. Applying this to what happened in the socialist countries, we can see that in the label of common people and workers, in most places the power hungered selfish people capture power and with the support of party leaders they turn to a ruler class enjoying undue privileges and the ordinary people lie where they are, forms another class. In the set up there is no way to call back from their position. As far as the motivation of the people are concerned, it lowers because their remuneration does not alter whether they worked hard or not, where everything is under the ownership of the state. For society's welfare most people do not work hard as is seen in many public sector enterprises.

Marx has forgotten to account the psychological factors of the human mind.

As far as democracy is concerned, freedom is an important thing in a democratic set up; and in principle each individual is important, equal before laws, having equal chances, and with his voting capacity can elect the rulers, and can call back. Even though there is wide gap between the haves and have-nots in a democratic set up, the people are enjoying with the freedom it gives and that is why contrary to Marx's prediction that the revolution will take place in a capitalistic society, it happened in the feudalistic countries, people will not opt for another system having lesser freedom, that is why more countries are turning towards democracy where individual freedom is high, giving high dignity and equal position to each individual. We can say that it is parallel to monism where each one is God. We may classify the democracy in the monistic tradition.

Lastly in the domain of psychology we can examine what is happening and can try to find connection between major theories with the philosophical streams. The importance given to unconscious mind where most of the mental events are taking place, the impulses of which are playing and shaping the behaviour of the man we can see resemblance of psychoanalytic theory with dualism. In the place of unconscious mind there is unknown God. According to Freud the most significant aspects of

mental life are below the surface and inaccessible to the individual except through the special technique of psychoanalysis, such as free association and dream interpretation. Since the roots of all manifested behaviour lie in the realm of unconscious mind, the pivotal role attributed to it is comparable to the cardinal role bestowed upon the God. As per dualism the man destined to live upon the mercy of the God, while according to psychoanalytic theory man is a slave of unconscious mind. We can classify it as dualistic.

Now we turn to behaviourism which considers human organism as a stimulus-response machine. Here the place of unconscious mind is nowhere and even consciousness is almost out of purview. All behaviour including thinking, feeling, etc. are considered as sensory motor phenomena. All learning are occurring through classical and operant conditioning and personality is considered as a combination of habits. There is no place for inheritance and genetic factors, while most traits and talents are developed as a result of interaction with the environment. Instincts are treated as prenatal learning. There is no unconscious mind to control, the learning and behaviour of man is accounted with the interaction of man with the environment. This is too mechanical and is similar to materialism. The abnormal behaviour is due to maladaptive

learning and therapy provides corrective learning experiences. This is a materialistic Psychology.

Finally we can go to gestalt psychology which advocates a philosophy that whole is more than the sum of parts taken separately. This is holistic since emphasis in on the whole person in the whole situation. It elucidates that whole should be considered first and that, parts have little or no meaning except with respect to their places in the whole. It gives important role to intuition and insight in learning, and accommodates all mental activities. It rescued psychology from the merciless unconscious mind and from the mechanical stimulus-response machinery. The person perceives and interprets the field, in which he functions on the basis of past experience. If the perception is not according to the reality, it leads to insanity. When we compare this philosophical vision we can see a parallelism between gestalt psychology and monism. Both give stress to the concept of whole and inseparability and are holistic and give importance to mind. We may classify gestaltism along with the monistic tradition.

We may now look for the chronology of formation of major theories in each spectrum of knowledge; and account the reasons why it is so. We do not know exactly when the concept of God started and its denial also. But we can scan the written compilations. Vedas containing prayers to

God originated in India at about 3500 years back is an evidence to dualism. After its origination as evidenced by manuscripts Brihaspati put forward materialism. The Upanishads, the documents picturising monism came at the end of Vedas, may be at about 3000 years back. The sequence is in the conceptualisation of God, No God, I am God, propagated by dualism, materialism and monism respectively. Eventhough there is no empirically accepted evidence for God, rebirth, soul liberation etc. the dualism and monism are existing in the minds in the form of faiths only, while materialism stands by the side of science. The chronology is such that the importance is shifting the focus from unknown external entity, to nowhere but interaction with surroundings and finally to the self and mind, as observed in dualism materialism and monism respectively. We can see the same way major theories evolved in all branches of knowledge. In physics it started with Rene Descartes's thinking in the early seventeenth century to Newton's era in the end of seventeenth century. Physical laws similar to dualism, such as laws of motion and forces came where thrust is on external forces or larger forces. The example in the universe is the satellites in the fold of planets, which are in the fold of stars and the stars and all are in the fold of galaxial centre, where in all, the gravitational attractive force plays the role. After the study of this only the science could go to the principles of the atoms of the matter containing electrons.

James Clerk Maxwell's electromagnetic wave theory came in the nineteenth century. The interplay between the electric charges and magnetic poles were the main topic of study, where the force between the opposite charges and poles, are due to the imbalance of electrons, and the flow of electrons is the electricity. The basis of electricity and magnetism are one and the same where accumulation and flow of electrons play the role. The physical laws cause in the field of magnetism and electricity are more similar to materialism, where there is no central or external force to account for. Electromagnetic wave theory is the major theory in this period. Then only the scientists could penetrate to the nucleus of the atoms, and twentieth century witnessed the formation of quantum and relativity theories. The importance is the way of looking the world, in the search for the subatomic particles which are the basic building blocks of the matter, and physical state of motion in the perception of space and time. The fact that the world including the observer are matter and wave at the same time, and space and time are not independent and is relative and dependent upon the velocity of the observer. These concepts are close to the monistic approach that physical entities are only tendencies to exist and are manifestation of self only because the sense organs are deceiving us. The mind which is the totality of the function of the brain is getting key roles in both. We cannot go directly into nucleus of the atoms and

formulate theories; the sequence is in the order that first between the particles, then periphery of the atoms and then only the nucleus. The sequence of advance of thought process and inferences gathered in the physical world shares the stunning similarity to the ancient man's way of thinking and the basic philosophies. The thrust is on the same way, i.e., the external force, then interplay between the forces and finally the psychological events. In biological science upto the time of Darwin it was considered that all living things are created by God. Aristotle lived 2300 years back is the notable person in the era. In the nineteenth century Darwin's theory of evolution came where no God is required for the evolution of all the living organisms. In twentieth century systems theory came subsequently and again the focus shifted to the concept of whole and mental events. In the medical science, applied systems like ayurveda originated at almost 3500 years back is stressing the balance of unknown forces in the human body. Origination of allopathy goes to Hippocratus who lived 2300 years back is not accounted with unknown forces later, and stands with the functioning of the body in the surroundings. Then came homeopathy in the nineteenth century, the focus again shifted to the whole body in the whole environment duly accommodating all psychological events. In the social world, in the set ups of slavery, feudalism, and any type of autocratic society power is concentrated on the rulers in the place of

God. In communism in theory, there will not be any rulers, focus is shifted to nowhere. In democracy the focus is shifted to each individual, in it's theoretical concepts. In practice, power hungry people in any set up can topple the systems, usually in democracy such types of damages will be easily rectified due to the freedom it vests with the people. The chronology of origination of set up is in the same sequence, starting of slavery at about 10,000 year back, the struggle against it started after some time, can be considered as a seed for communism, and the first sign of democracy was seen in Greece 2600 years back in a limited sense, because women and slaves were not having power to elect the rulers. So we talk about the spreading of each social set up, the spreading of communism was in early twentieth century and that of democracy is in late twentieth century, it is also in the same sequence. In psychology psychoanalytic theory originated in 1893, the stress is upon the unconscious mind, behaviourism in 1907 where the thrust is nowhere and gestaltism developed in 1912 and the focus is shifted to the concept of whole and mental events. Eventhough the span is very short, the chronology is preserved. In total all major theories in all fields have been evolved in the same chronological style similar to the ancient man's thought process. The chronology of events are tabulated in Table 1.

TABLE 1

Chronology of Evolution of Major Theories

Discipline	**Main Schools of thought / theories and time of origination**		
Philosophy	**Dualism**	**Materialism**	**Monism**
	3500 years back	Between 3500 years and 3000 years back	Between 3000 years and 2500 year back
Physical Science	**Newton's laws**	**Electromagnetic wave theory**	**Quantum/Relativity theories**
	17^{th} Century	19^{th} Century	20^{th} century
Biological Science	**Aristotle's Views**	**Darwin's theory**	**Systems Theory**
	2300 years back	19^{th} century	20^{th} century
Medical Science	**Ayurveda**	**Allopathy**	**Homeopathy**
	3500 year back	2300 years back	19^{th} century
Social Science	**Class Society**	**Communism**	**Democracy**
	10,000 years back	Early 20^{th} century	Late 20^{th} century
Psychology	**Psychoanalytic theory**	**Behaviourism**	**Gestaltism**
	1893	1907	1912

From the table we can see that the major theories in the field of knowledge or thought processes are progressing in the same chronology of the ancient man's way. In all the fields except social science the time of origination is taken into. In the social science the origination of the seeds were in the same style. Here the spreading or otherwise the way of

majority of people's thinking is accounted for and it also keeps the same chronology. In all the branches of knowledge the time span is wide between the major theories to the extent of centuries, but in psychology it is very thin to the extent of years, less than 15. Anyhow chronology of origination is preserved, we can summarise that human mind thinks in such a style in all time.

Now we can compare the similarities for classification of theories. The external unknown God in dualism, the external force in Newton's laws, God itself in the Aristotle's biology, the unknown three *doshas* in ayurveda, the rulers in the class societies with concentration of power, the unconscious mind in the psychoanalytic theory are similar concepts and can be classified in a group. The similarities do not imply that they are one and the same. The similarity is in the style of giving importance to the unknown or external force. In total these are dualistic in their approaches, and evolved first in its field in the search of nature's truth.

The interplay between the materials in the philosophy of materialism that between electric charges, magnetic poles, etc. in the electromagnetic wave theory, the struggle between the living organisms and surroundings for the survival in the Darwin's theory, the war against the germs in allopathy, the struggle between the opposing classes in a class society as viewed by Karl Marx, the stimulus-response interaction in the

behaviourism are showing resemblance and they are materialistic in their frameworks and evolved secondly to their respective branch of knowledge. These are too mechanical and give no importance to mind and mental factors.

The role of mind, and the concept of whole in the philosophy of monism, the style of observation and the state of motion of the observer in the perception of matter, space and time and the concept of whole in the quantum/relativity theories, the symbiotism, the concept of whole and the importance given to the mental factors in the living world by the systems theory, the concept of whole, the role of personality and mental structure in the diagnosis and treatment of diseases in homeopathy, the freedom and dignity given to each individual in a democratic set up and the concept of whole, intuition, insight and all such mental events in the psychology of gestaltism conform to a group and these are monistic in their outlooks. The overall classification is tabulated as follows.

TABLE 2

Classification of Major Theories

Discipline	**Schools of thought/theories**		
Philosophy	Dualism	Materialism	Monism
Physical Science	Newton's laws	Electromagnetic wave theory	Quantum/Relativity theories
Biological Science	Aristotle's Views	Darwin's theory	Systems Theory
Medical Science	Ayurveda	Allopathy	Homeopathy
Social Science	Class society	Communism	Democracy
Psychology	Psychoanalytic theory	Behaviourism	Gestaltism

In the table, dualism, Newton's laws, Aristotle's views, ayurveda, class society psychoanalytic theory etc. are considered to be dualistic. Materialism, electromagnetic wave theory, Darwin's theory, allopathy, communism, behaviourism are materialistic. Monism, quantum/relativity theories, systems theory, homeopathy, democracy, gestaltism are regarded monistic. This does not imply that in a group they are one and the same, their similarity is in the style and manner in the approaches for seeking nature's truth, and the inferences gathered.

Finally we examine the acceptability of each theory in the light of scientifically accepted truths and observed facts. In dualism, the existence of God is to be evidenced, or there is no proof acceptable to the scientific world, similar is the case of heaven, hell, soul, rebirth, etc. In the daily life

also we can see that pure hearted men are suffering whom we cannot attach any sin or mischief. The theology's versions that sin will follow us seem to have no base. The way of origination of life from the matter and to further evolution reveal that, life is not created by God and is accidental and finish it off without leaving anything after death. As far as observed facts are concerned, the life is a temporary phenomena at present and so dualism is not acceptable to science. Even if the existence of God is doubtful, the faith in God is a psychological way of relief in order to escape from the miserable life situations. It helps to cultivate moral values in the society, even though the crooked and fanatic followers of religion create havocs and communal wars in the society, it acts as a cheerful weapon creating fear that God will punish for evils, comes to rescue majority of people from doing mischiefs to others. The religion also helped in the development of art, literature, culture, etc. at the same time made ruins by way of exploitation by a group of religious and political leaders. On the other hand materialism, stands by the side of the science is acceptable in the light of observed facts often lacks elegance due to its mechanical framework. Imagination of a merciful omnipotent God is a joyful thing in the uncertain world, while the temple, mosque, church, etc. are the piece of art, provide calm serene atmosphere to the people and also give enjoyment by way of celebrations. On the other hand materialism rescues the man from blind

beliefs and exploitations. We may test the validity of monism. The concepts of soul and rebirth are common to dualism also. The human being is a result of evolution from matter, the neurons of the brain are also matter, which is giving the inferences of the self and world, the monistic view of the entire world including the self is a creation of mind, where mind is a totality of the function of the brain, seems to be baseless. Consider the concept of the soul behind every living thing. Virus and viroids which are living organisms when they are in a cell only and pure chemicals outside the cells, has a soul or not is a question. In the early process of formation of microorganisms from the matter, how the soul entered in there is not meaningfully accounted. Consider the way of reproduction of the unicellular microorganism, which are dividing into two and separates, when the single soul attached to this which cannot be cut. Then evolution advanced and the single cells united to form multicellular organisms and their reproduction is also in the same type of division as observed in sponge, hydra, flatworms, etc. We can cut them into two or more and they become separate living things. Accountability of soul is again questionable, since soul is treated as unique individual and cannot be split. Consider our own birth. Before becoming an embryo we were in two bodies of our parents in the form of egg and sperm. Where is the individual soul lying at that time is a question? Then at the time of

entering the body of our mother, the sperm which is half of us was in tough competition with about 20 crores of our brother sperms. What type of rebirth can be attributed to the nonvictorious sperms which are short living less than 48 hours. The accountability of soul is in doubt, we infer that the monism evolved years ago have not faced it, or the micro world was not known at that time. Since the soul is not accounted properly, the concepts of rebirth, liberation, etc. become myths only. Yoga, meditation, pranayama, etc. will give mind and body relaxation and also give power through concentration of mind, energises the body, rendering more activation. The pranayama helps to intake air through breathing to the full capacity of the lungs and supplies oxygen to every cells through blood, causing increased metabolism and release of more energy. This will not imply that through practice for a long time one can attain the power attributed to God and realise the world, and these are uncertain claims only. Any similarity of monism observed with quantum/relativity theories are superficial and is in the physical world only, and in the biological world all concepts of monism are not in accordance with the observed facts. Another innovation is in the subject of extension of life span. The recent researches reveal that in our growth in the process of cell division each cell having 2500 telomeric genes lying in the edge of chromosomes at the time of birth, each cell of human body lose 31 numbers of telomeric genes in a

year. Then at the time of natural death we will not have any telomers to spare, or otherwise finishing of telomers is the end of the life. Average life span of a man is 80 years, variation also occur. An enzyme in cancerous cells causing unusual growth of the cell can reduce the loss of telomers. When it was placed in the cells of houseflies, rats, etc. it is observed that their life span has gone to 3 or 4 times of the existing life span. Another thing is the fertilisation clinics where fertilised human embryos are kept in freezers for years. It is lying there without food, metabolism, growth, movement, etc. When we keep out of the freezers and put in to a uterus of a woman, it will grow as a child and take birth and live. These are all signifying that life is not predetermined by God. The next is, human body comprises of 50 lakhs crores of cells. Each cell is having the potential to grow a person replica to us as evidenced by clowning. Here the accountability of a unique soul attached to a person is in peril when all the cells can turn to separate human beings by clowning, replica to the original man. In total dualism and monism are not in accordance with these scientific facts. Materialism can only stand at present. In physical world Newton's laws are not valid in the macro world of outer space where particles/waves are having the speed of light and in the micro world where the subatomic particles which are waves also at the same time. But it is correct and useful in the day to day life where speed of

motion is not so high. Its view of light as tiny particles is partially correct only, since light is particles and waves at the same time. Newton's laws are partially acceptable. Then the electromagnetic wave theory which is valid in the world of electricity and magnetism, sees light as electromagnetic waves only is also partially correct since light is particle and wave, electromagnetic wave theory is partially acceptable. Quantum/ Relativity theory can explain all the observed phenomena in the physical world at present, but we do not know what will happen when new observations come. It views light as particle and wave, can explain all the properties of light. In the biological world, the pre Darwin biology which can account only God as the cause of all living things is not acceptable as stated above. Darwin's theory which sees competition, struggle, etc. forgot to see the cooperation, symbiosis etc. in the biological world. The instances of love and affection between the tamed cruel animals like lion, tiger, crocodile, etc. and man, embracing them and live together as reported and shown in TV channels are out of its purview, Darwin's theory is partially acceptable. The systems theory considering all these aspects, in addition to competition, is more acceptable. In the medical science, the theory of the balance of three doshas in ayurveda is not acceptable since these doshas are not detected. Allopathy stands by the side of the science, but forgotten to see human body and mind as whole. In homeopathy, how the mental set

up cause diseases except in psycho physiological disorders and how the more diluted medicines are effective in the diseases when intensity is high, are not explainable in theoretical level. Usually quick reliefs are happening in allopathy, especially in the case of infectious diseases where killing the germs are more effective by allopathic medicines, while it will take time in homeopathy and ayurveda for cure, but is seen as permanent cure in some diseases rather than allopathy. Sometimes in some diseases when both fails, ayurveda may succeed. Naturopathy believes that suppression of symptom is not cure. Cure is possible by the body alone for which drug is a hindrance. It views the germ theory drug theory and the calorie theory are phalacies of allopathy. In total apart from theory, in practice the three systems are partially acceptable, since no system can give guarantee in many cases. All these systems of medicine are engaged in suppressing symptoms which cannot be a permanent cure. In the social world in a class society it is acceptable to a limited sect of people only, i.e., the rulers and the upper strata. In communism though the theory is humanitarian in the concept of equality, in practical it is acceptable to a limited number of people who are enjoying power in the social set up. In democracy though the people are not fully happy, majority accepts it. Contemporary history shows that democracy's demerits are lack of drastic measures for attaining and preserving equality, lack of opportunity for immediate debar of

detrimental action committed by rulers, concentration of power by some rulers by faulty measures etc. The freedom it gives, the voting power, the right to fight against injustice, etc. are its merits. Democracy is more acceptable at present, since more nations turned towards it accepting its merits. In psychology, psychoanalytic theory analyses a certain aspect of behaviour, the unconscious processes and its role of shaping behaviour. When we think, each second we are receiving a number of stimuli, the receptor neurons carry it to the brain, but very few will come to our conscious mind. The concept is correct and it is relevant to that extent. Behaviourism says that the surroundings are having a key role in the learning and shaping of the behaviour. That is also true and is relevant to that extent. Gestaltism explains the integrated behaviour of man and it is relevant to that extent. Through the examples of therapy we can infer that each theory is relevant to its domain and so are partially correct only. Consider a situation of a mother who scolded her son in the event of low marks in an examination and the son may commit suicide. The mother cannot get free from the clutches of guilt feelings and abnormally behaves like her son, where lay man says that his spirit is in her body. Here a suggestion has to go deep in to the unconscious mind in the process of therapy. The therapy based on psychoanalytic theory may be effective to get relief from the clutches of the unconscious guilt feelings. Consider

another situation of a man's phobia towards frog, who happened to receive a few snake bites. Whenever he got this snake bite he saw a frog near the snake as the snakes were in a hurry of capturing its prey. Out of the fear and anxiety experienced and as a result of conditioning a phobia towards frogs developed in him. Here the behaviouristic approach is to correct by Systematic Desensitisation will be effective since it is a learned reaction, where we cannot attach its strings to any event in the unconscious mind. In a situation where man is totally collapsed in the overall negative situations, an integrated approach based on gestalt theory will be more effective. In these circumstances all the major theories in psychology are only partially acceptable as their efficacy is situational. We can tabulate the acceptability of major theories in all fields in the light of observed facts as follows.

TABLE 3

Various disciplines and their School of Thoughts / Theories and their Scientific Acceptability in general

Discipline	**Schools of thought / theories and their scientific acceptability**		
Philosophy	**Dualism**	**Materialism**	**Monism**
	Not acceptable	Acceptable	Not acceptable
Physical Science	**Newton's laws**	**Electromagnetic wave theory**	**Quantum/Relativity theories**
	Partially acceptable	Partially acceptable	Acceptable
Biological Science	**Aristotle's Views**	**Darwin's theory**	**Systems Theory**
	Not acceptable	Partially acceptable	Acceptable
Medical Science	**Ayurveda**	**Allopathy**	**Homeopathy**
	Partially acceptable	Partially acceptable	Partially acceptable
Social Science	**Class Society**	**Communism**	**Democracy**
	Less acceptable	Less acceptable	More acceptable
Psychology	**Psychoanalytic theory**	**Behaviourism**	**Gestaltism**
	Partially acceptable	Partially acceptable	Partially acceptable

From the table it is seen that in philosophy, materialism is acceptable to science at present as it cannot accept anything beyond observable phenomena. In physical science and biological science monistic theories are acceptable. In medical science all the systems are partially acceptable. In social science the democracy is more acceptable while in psychology all the three school of thoughts are partially

acceptable. Acceptability of any theory in any field will not mean that similar theories in other fields are acceptable. In recent times, the acceptability of quantum/relativity theories and systems theory which are monistic, lead to think some people that the monism in philosophy with all its concepts of souls, rebirth, liberation, etc. are truths, and the world is a creation of self. But at present the observed facts are not in congruent with them. In future anything may happen to the scientific advancements. Sometimes a fourth type of universal model may be the reality. The style of formation and similarities in views will not imply that they are one and the same.

Even if our life is treated as one time temporary phenomena, the boundary of universe and the beginning of time if it exists, are beyond imagination and lying in the mystery, it leads to a confusion whether they are existing in our mind only as monism has envisaged. There may be elements of truth scattering in the ancient man's thoughts, and taking it as it is not at all conducive. For example the ancient man's beliefs that it is better to lie down and sleep either in the eastern direction or in the southern direction, but they do not know why it is so and they experienced that it will give more happiness. In the light of our own experience, we can say that whenever we are in the direction of motion or force we are more pleasant. That is why in most vehicles the seats are in the direction of

motion. Here the direction of earth's rotation is from west to east, while the direction of the force of the earth's magnetic field is from north to south. So sleeping in the either direction of east or south will be more pleasant.

Another example is the fairy tales where the king detects the thieves by giving some boiled rice for chewing to all the suspected people to test them. The real thief in the fear of detection cannot do it properly, due to fear in his mind will block his physiological activities like secretion of saliva etc. This principle is used in the lie detectors in forensic science. Most illustrated example is the ancient man's way of using black magic for liberating the evil spirit from persons of dissociative reactions. Eventhough they do not know the unconscious processes involved their primitive methods succeeded because of the powerful suggestion given by the black magicians.

It is also pertinent to note that in the chronology of thought process and in the paradigm shift man is getting more freedom or otherwise the inferences of nature which give more freedom enjoyed in each field. In philosophy from God's mercy it is shifted to nowhere, but to the interplay with nature and then to self which is really controlling our own destiny. In physical science from the clutches of forces, to the interplay of forces and then to the observer who can change the observation by means of his style of observation or state of motion, the man is getting more freedom. In

biological science it shifted from God to the interplay with the environment and then to the self who can change the relationship with other living things. In medical science from the unknown forces, to the interplay with the surroundings and then to the self, where application of medicine is marginal or otherwise man is more free. In social science man is getting more freedom as the socio-economic and political set up change from slavery through feudalism, communism and to democracy. In psychology mind is getting free from the clutches of the unconscious mind, interplay with the surroundings when the paradigm shifted to the whole person. In overall analysis the man's thought processes in all the fields of knowledge are in a sequence of chronology and style and shows similarity where scientific acceptability may be temporary and may vary in the coming of new observations and interpretations.

CHAPTER V

SUMMARY AND CONCLUSION

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The present study is designed to investigate the style and chronology of origin of major theories in psychology in the context of theoretical evolution in philosophy and other scientific disciplines. The objective of the study also includes comparison of major theories in all different fields of knowledge and evaluate their similarities and accordingly classify them. The study is of purely theoretical nature and the validity of each theory in the light of observed and generally accepted scientific facts are also found out.

The following are the findings of the present investigation.

1. The chronology of evolution of major visions in philosophy are dualism, materialism and monism, major theories in physical science are Newton's laws, electromagnetic wave theory and quantum/ relativity theories, that in biological science are Aristotle's views, Darwin's theory of evolution, and systems theory. Major systems in medical science are ayurveda, allopathy and homeopathy. Major setups in social world are class society, communism and democracy and major schools of thoughts in psychology are psychoanalytic theory, behaviourism and gestaltism.

2. The classification of major theories are as follows. Dualism, Newton's laws, Aristotle's views, ayurveda, class society, psychoanalytic theory, etc. are dualistic. Materialism, electromagnetic wave theory, Darwin's theory of evolution, allopathy, communism, behaviourism, etc. are materialistic. Monism, quantum/relativity theories, systems theory, homeopathy, democracy, gestaltism, etc. are monistic.

3. Acceptability of theories at present in the light of scientifically accepted truths and observed facts are as follows. The philosophy dualism and monism are not acceptable, while materialism is acceptable. In physical science Newton's laws and electromagnetic wave theory are partially acceptable, while quantum/relativity theories are acceptable. In biological science Aristotle's views are not acceptable, Darwin's theory of evolution is partially acceptable, while systems theory is acceptable. In medical science ayurveda, allopathy and homeopathy are partially acceptable. In social science class society and communism are less acceptable, while democracy is acceptable to the majority of the people and nations. In psychology psychoanalytic theory, behaviourism and gestaltism are partially acceptable.

Scope for further research

1. Search for the identification of a new theory for comprehending the universe and its other dimensions should be done.

2. The synchronicity and interrelationship between events that may perhaps have an influence on human predicament can be proved in the light of appropriate theories in physics. Attempts can be made in these directions.

3. The personality characteristics of great theorists in various disciplines should be studied in relation to their dualistic, materialistic and monistic inclinations.

4. In the mind-matter controversy the view that mind (consciousness) is the real matter and the manifestations of the material world are only illusions or vexations of spirit should be analysed using psychological epistemology.

5. In the light of this research on theoretical thinking, possibility of an alternative theory and method for attaining social equality and preserve democracy by way of maintaining individual motivation should be sought.

Limitations of the study

1. Since the study is purely theoretical personal bias of the investigator may be a limitation to the inferences made, however the inferences were made according to the generally accepted norms of science.

2. A ready reference to all the theories could not be given in all situations, however world-renowned authors in the respective field of enquiries are referred on a first hand source and a few secondary source of reference only could be done sometimes.

3. The present study should be done by an investigator with post graduate level of knowledge in various science and social science subjects. However the present investigator had to manage with graduate level studies in sciences and P.G in Psychology and an elaborate reading in related topics. This limitation may be explicable.

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