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Concept, Nature and Importance of Child Psychology

A study of the psychology of childhood if conscientiously and intelligently pursued, provides a rich background of information about children's behaviour and psychological growth under a variety of environmental conditions. It provides information and norms of behaviour and growth for comparative purposes as well as understanding of basic psychologial process and socialisation. What then is child psychology or child development.

WHAT IS CHILD PSYCHOLOGY ?

Child development or child psychology as a field is defined as a branch of knowledge concerned with both the nature of devlopment and regulation of significant structural, functional and behavioural changes occurring in children as they advance in age and maturity. It deals with understanding the development of characteristics of children and the process through which development occurs. In most cases, emphasis is on collection of data and the methods to deal with such cases. More specifically, child psychology or child development deals with understanding of growth and development patterns and the development of various characteristics in children.

Very often two questions arise : Are development psychology and child psychology equivalent ? Can child development be regarded as an independent area of study ? Very often developmental psychology and child psychology are used synonymously. But there is a difference. Developmental psychology is that branch of knowledge which studies the behaviour and behaviour changes that occur during the entire life span *i.e.* from conception to death. Child development on the other hand, deals with growth and development of characteristics upto the age of 14 years. The second question, is it an independent science ? It is an independent science. It is concerned with the discovery of general laws in its area of special concerns as an end it itself. It is concerned with interpreting and predicting individual development. It

is also concerned with child guidance and counselling of children. This will be clearly known from the subject matter with which it deals.

NATURE — IS DEVELOPMENT CONTINUOUS ?

The concept of development presupposes that there is a continuity in development. This continuity is lawful and is observed between successive stages of an ongoing growth process and that properties of earlier phase contributes to the properties of subsequent phase. These changes are progressive.

Both the hereditary predisposition and environmental facilities contribute to the process of change. There is also reciprocal change between organism and the environment.

Child development is a natural science. The child psychologists observe, describe, measure and relate phenomena as they occur naturally in uncontrived situations. For example, parent-child relationships, assimilation of cultural values, relationship with peers over extended period of time and under variety of situations cannot be studied experimentally. It has to be based on naturalistic observations.

Ethically and practically it is undesirable to manipulate emotions, attitudes, and values among children. One cannot ask mothers to deliberately reject her children or reward and like her children according to instructions in order to study parent child relationships. Children cannot be subjected to physical frustration, deprivation with a view to studying their effects on children behaviour.

SUBJECT-MATTER OF CHILD PSYCHOLOGY

The subject matter of child psychology includes an understanding of the child from the time of conception, the principles by which hereditary traits are transmitted to children, the prenatal care of the fetus and the mother, the factors which need much attention such as meternal nutrition, disease, X-ray, drugs, etc. Knowledge of preventive care constitutes a significant dimension of study including the understanding of development of ovum, embryo and fetus.

The next area with which child psychologists are concerned is the behaviour of the Neonate, his sensitiveness and adjustment processes immediately after birth upto the end of two weeks. Sensory reception and stimulation are studied. Much attention is paid to understand the baby during early childhood and late childhood days with emphasis on childhood growth and development, factors associated with development, the contribution of early experience and critical period, role of maturation and learning, heredity and environment on development.

At the same time, how does the child acquire motor proficiency, or language proficiency ? What are the speech defects ? How language training can be given to children ? An understanding of the speech defects is also another dimension and their remediation.

Childhood emotion is another area of concentration. Development of fear, anger anxiety, love, jealousy, and laughter, their causes and coping strategies are also studied in the field of child psychology. Socialisation and social development and the extent to which family, school, peer group contribute to socialisation. The nature of traits which later on constitutes his personality. In order to shape the personality what parents should do and should not do is the basic thrust in this area of study.

Intelligence, and creativity constitute major area of study including cognitive development of children. How and to what rate cognitive growth takes place. How does the child develop logical reasoning and thinking ? Both traditional intelligence and cognitive growth are studied by the child psychologists. While studying these characteristics, they emphasize the interventions and role of early childhood experience.

Play in children constitutes another area of study for the child psychologist. The extent to which play contributes to the social intellectual development of children are the subject matter of study including theories and values of play. In this area, childhood interests are studied from a developmental point of view.

In recent years, child psychologists are also studying birth hazards, care of the baby, childhood ailments and problems and the factors which are associated with infant and meternal mortality and deviant behaviours from the point of view of value and moral development in children. Child psychology thus encompasses the prenatal, perinatal and postnatal growth and development of all the characteristics of children, the antecedents and consequences which there by provides effective guidelines for controlling and predicting behaviour among children.

PRESCIENTIFIC PERIOD IN CHILD PSYCHOLOGY

Child psychology has now become a more important and vigorous discipline in the Western world. But until 17th century there was no special emphasis on childhood as a separate phase of the life cycle. Plato became interested in the growth of the child and recognised the importance of early childhood training in the determination of the individual's aptitudes, adjustments. He emphasized child-centered education. Within a short span, child psychology has progressed much. It is worthwhile, therefore, to trace the history of such developments.

In early days, the child was not considered as a child. He was regarded

just as some living organism in transition. In the late 15th and 16th century they were considered as miniature adults. Philip Aries, a French historian has mentioned this in his writing ''Centuries of Childhood''.

The seventeenth century marked a great change in attitude toward children and their morals. Parents and teachers considered children as more lively and delicate organisms. In the Greek period the child was seen as future citizen and as a member of family. A conception that 'Spare the rod, spoil the child' was in practice then. An opposite view was gradually practised by British and other contemporary philosophers. John Locke, the British philosopher viewed the child's experience and education as determinants to his development. Rousseau, the French philosopher believed that child is endowed with an innate moral sense. The child according to him is active. He can adjust to the environment according to the abilities.

As a result of these two new ideas and attitudes, children became proper subject of study. Pestalozzi, like Rousseau emphasized the innate goodness of the child and the role of his own activity in his development. In 1774 Johann Pestalozzi published observations, he had written on the development of his three and a half year old son. For the first time, an account of sensory, motor, language, and intellectual development of the infant upto 2.5 years of age was published by Tiderman in 1787. He was his son. But nearly a century passed before any appreciable volume of work on the subject of the child appeared. For centuries, concern had been expressed for the education and proper upbringing of children starting with infancy. Some influential works in eighteenth and nineteenth centuries were : John Locke's some thoughts concerning Education (1693), Jean Jacques Rousseau's Emile (1762), Johann Pestalozzi's How Gertrude Teaches Her Children (1801) and Froebel's Education of Man (1826).

In the 19th century, the works of Charles Darwin on 'origin of species' stimulated greater interest in the study of child. Quite in line with evolutionary process series ontogenetic stages were also conceived in the development of the child. Child psychology then appeared. With Darwin the child became a part of the scientific endeavour. Darwin suggested that by observing the development of infant, one could catch a glimpse of the development of the species itself. His own notes on his infant son also drew attention to a newly emerging method of child study. In 1840, Charles Darwin started a journal on the development of his son in 1877, almost a hundred years after Pestalozzi's 1774 publication. Baby biography became an important method of child study since then.

Wilhelm Preyer, who was a physiologist originally, contributed most to baby biographies. Basing the observations on his son's mental development during the first year, Preyer wrote about development of reflexes, and

influence of learning and experience on development of behaviour. His book "The mind of the Child" is the greatest classic in the field of child development. These baby biographies inspite of their weaknesses of being subjective, prepared the groundwork for a scientific child psychology to be developed later.

Systematic study of children began towards the and of the 19th century by G. Stanley Hall (1846-1924) in United States of America. He was influenced by the idea that child is a developing organism in accordance with certain sequential stages. He devised the questionnaire method to collect data about children. He collected written responses to questionnaires from both parent and children and the papers were published in 1882 and 1883. His method of obtaining responses and analysing them was definitely superior to his predecessors. Hall observed the relationships between the child's personality characteristics and background experience. In this sense, Hall marks the beginning of scientific and systematic study of child in the United States. In fact, Hall was the fore-runner of modern psychological tests. In 1883, Dr. Hall worte a book entitled "The Content of Children's Minds" an early scientific study of the child. Hall became the President of Clark University in 1889 and made it a famous centre for child study. One of his student John Dewey, advocated educational reforms within a movement known as Progressive education. Arnold Gessel was another student, who became pediatrician and established the norms of development of children from early childhood. A third student, Lewis Terman, became a leader in the area of mental testing who later on developed the intelligence quotient as a standard index of intellectual ability. He also introduced European leaders to the American educators and hosted Sigmund Freud's only visit to the United States in 1909.

The French Scholar, Binet also devised intelligence test to measure IQ in Children although it remained until 1908 and 1911 for the revised versions to appear. This is a great contribution to mental testing especially with children. Concurrently a major effort was initiated by Watson, who experimented on the conditioning technique and its use for developing emotional response in infants. In rejecting introspection, Watson made infants and children legitimate subjects for psychological experiments.

G. Stanley Hall

During the 1920's and 1930's many psychologists got interested in child psychology. Intelligence, learning, language and thinking processes, etc. were studied with sophisticated methods. Many of the studies during this

period were normative, Studying the child was relegated to the back-ground, instead, study of individual differences became prominent. Normative data gathering was more in focus.

Lawrence Frank (1890-1968) who was a young economist gave a vigorous push to the scientific study of the child. In 1920's he became in charge of the Spelman Rockefeller Memorial Child Development Grants. Under this grant a child study institute was established in 1924 at the University of Columbia followed by Minnessota and California at Berkeley in addition to the Gessel Clinic of Child Development at Yale and Iowa Child Welfare Station.

With Rockefeller Grants the focus of child study moved from the home to the University Centre where pre-school children were observed. Infants and Pre-schoolers became the focus of search studies in the 1920's. His idea was to ''Bring the best from all the human sciences-biology, sociology, anthropology, phychiatry, medicine and physiology and effect joint effort to understand the normal development of an individual''. This step contributed to interdisciplinary research in the next decades.

From other field of psychology and allied sciences, came greater influences for the development of child psychology. Psychologists for example, had the greater influence in the area of motivation, understanding the dynamics of behaviour, etc. But no less important sources of influences were the areas of child guidance, clinical psychology, pediatrics, education, and educational psychology without exception to cultural anthropology. These fields virtually contributed to the development of child psychology during modern times.

MODERN PERIOD IN CHILD PSYCHOLOGY

In the modern period, the child is seen as an individual in a total situation. The child functions as a result of innate disposition and environmental forces. This has resulted in multidisciplinary child development research. The physiologists, nutrition specialists, child guidance experts, psychiatrists, all contribute to our understanding of the child, his behaviour and growth. Long term research projects have become the order of the day.

In recent years there has been emphasis on the process of development rather than merely observing the pattern of development as a function of age, sex, socio-economic status, etc. The developmental emphasis also stresses the personality development of the child, in which the child psychologists have an important role to play.

Basically advancement child psychology in the modern period can be understood in terms of :

(*a*) Methodology of studying children behaviour

(*b*) Contents of child study.

Looking from the points of view of objective standards in methodology, it seems that child psychology of today has become stubbornly empirical. The greatest virtues are objective observation, description, measurement and use of experimental designs in child study.

Since 1900 remarkable progress have occurred in various fields of child development. Norms for social, intellectual, physical, and emotional developments have also been available. It is possible now to predict intelligence. Analysis of the major developments can also be statistically analysed and then interpreted.

There is also in increasing recognition on the part of psychologists to unify the various developments occurring in the field of child psychology and develop a comprehensive theory of personality, social learning, motivation, and the like.

Various theoretical stances have also contributed quite amazingly to the above unification of ideas. Piaget's description of cognitive development, Sear's social learning theory, Freud's psychoanalytic orientations have enriched the field beyond expectations. However, during the last twenty five years certain trends in child development have become quite obvious. They are :

(*a*) Establishment of norms of thinking, reasoning, creative behaviour of children.
(*b*) Mechanisms underlying various changes occurring in the life of children.
(*c*) Antecedents and consequents of behaviour change.
(*d*) Studies of socialization and personality development and the factors associated with them.
(*e*) Parent child relationship.
(*f*) Cognitive development of children.
(*g*) Use of experimental approach to child forsaking the traditional correlational designs.
(*h*) Intervention programmes for enriching personality, linguistic and cognitive development from early childhood.

The twentieth century has, therefore, become known as the 'Century of the Child'.

THEORETICAL PERSPECTIVES ON CHILD STUDY

The growing interest in child study, as has been said in the preceding pages, contributed to various perspectives embodied in the form of theories. Theories infact describe, explain and predict what will happen in a given situation.

Freud was a medical doctor, who contributed to the development of psychoanalytic theory at the end of the nineteenth century. Freud's thesis was that an individual possesses two minds : conscious and unconscious. By using different techniques Freud investigated the unconscious and understood its nature. His main contribution was psychosexual theory of personality development. The individual is matured by going through a series of stages that are fixed in order *i.e.* oral, anal phallic, latency, genital.

The primary source of pleasure comes from stimulation of oral regions of the body primarily the mouth, in the oral stage or the infancy stage. Pleasure shifts to the anus and activities focus on toilet training in the anal stage. At about age three, the child's interest shifts to the genital region of the body and the child enters the phallic stage of development. During the elementary school years, the child is in a latency period that is essentially guilt. Adolescence brings the genital stage with a focus on sexual development and introduction. According to Freud the basic personality is shaped very early in life. Somewhat around five years of age. Feelings about the self, development of thoughts and attitudes are influenced by early childhood family relationships. Children perceive the world very differently from adults. They lack the cognitive and mental ability to understand all that they see and hear. The purpose of the psychoanalysis is to appropriately gear adult functioning. Psychoanalysis is a theory and therapy. It understands child's development and treats childhood problems.

Sigmond Freud

One of the students of Freud, named Erik Erikson extended Freud's psychosexual stages to include psychosocial learning, and included some ideas from cultural anthropology. His theory is popularly known as the 'eight stages of man'. Although Erik believes in the Freudian ideas but he places emphasis on the cultural and social factors that influence the development at each stage.

Erikson considered infancy as a period during which infants either learn to trust or mistrust depending upon how well their needs are met. Toddlerhood presents the conflict of autonomy *vs.* shame and doubt which is influenced by how others respond to the infants own attempts to gain some self-control. The pre-school years are concerned with initiative *vs.* guilt as children learn to undertake, plan and do things for themselves. Children who are rewarded

feel initiative, children who are punished feel guilt. During elementary school years there is the development of industry *vs.* inferiority depending upon mastery over things. Adolescence is a period of identity *vs.* identity diffusion during which the individual tries to become a person.

There is a great deal of crisis in adolescence. This is best described in the book Indentity, Youth and Crisis (1968). Interpersonal relationship is emphasized in early adulthood, a period of psycho-social crisis of intimacy versus isolation. During this period the individual either develops a meaningful relationship with another person or does not. In the middle adulthood, the individual develops a commitment to improve the life conditions of their own children. Erikson calls this stage productivity *vs.* self-absorption. The final stage of adulthood is integrity *vs.* despair. In this stage the individual accepts the facts of his or her life and face death without fear.


Erickson

Both Erickson and Freud considered stage specific nature of development. Freud has emphasized biological factors. Erickson has emphasized the cultural factors. In any case they converge on one point that childhood forms the basis of later personality and functioning. As such, area of child psychology should concentrate on early influences in family, culture and external environment. Personality is not inherited. It is learned.

Learning Theory

The behaviourists, stimulus-response and social-learning theorists all believe that behaviour is learned, no matter whether it is by conditioning, practice or socio-cultural conditioning. Watson's famous study with Albert in 1920 is a case in point. How Albert developed fear response can be seen in the chapter on emotion. The principle is stimulus generalisation. Watson said :

"Give me a dozen of healthy infants, well formed and my own specific world to bring them up in and I will guarantee to take any one at random and train him to become any type of specialist. I might select-doctor, lawyer, artist, merchant, chief, and yes, even beggar man and thief regardless of his talents, tendencies, abilities, vocations, and race of his ancestors (1930, P 82). Thorndike demonstrated how reward helped learning and Skinner, the giant among the present day psychologist demonstrated the modification

of behaviour by gradual change or successive approximations and reinforcements''.

The recent approach to behaviour development is imitation and modelling. The child sees, he believes, identifies, imitates and learns behaviour of the models. Albert Bandura (1924) is the leader of this movement. The child does not repeat the behaviour unless the model is rewarded. Both Skinner and Bandura emphasized the modification of behaviour principles to educational and clinical settings. They have successfully demonstrated that aggressive behaviours, thumb sucking, nail biting, isolate behaviours, crying, etc. can be decreased and more appropriate behaviours can be learned by differential reinforcement.

B.F. Skinner

Albert Bandura

Cognitive-Developmental Theory

Jean Piaget, the father of cognitive psychology was the advocate of cognitive-development theory whose interest in science and psychology was from a very early age. He believe in the process of biological adaptation. Piaget's belief that the child's capacity for formal logical operation is developmentally linked and is only developed systematically when the child reaches the age of fifteen years.

Whatever may be the perspective, it sheds light on the

problem at hand. The more we know about the area of child development, the better equipped we are to understand the nature of the child. Perhaps it is a bit like the story of the blind men who wanted to understand the elephant. The one man who touched first said, ''the elephant is like the snake, that can curve and curl around itself''. ''No, the elephant is not like the snake, it is more like a smooth limb of tree.'' The third man went upto the elephant and said, ''Oh no, the elephant is neither like the snake nor like the limb of a tree, it is rough, wide and fall-like a wall. An elephant is like wall''. ''The fourth touched the ear, and said, gentleman you are all mistaken, the elephant is like a large leaf from the shady trees''. So each man has his own way of looking at things, a piece of truth, a perception that was helpful but incomplete. Only by sharing the insights and accepting the realities the picture could be complete. This is truth with the theory of child development.

THE HINDU THEORY OF HUMAN DEVELOPMENT

Hindus have a rich cultural heritage although they have different sects within other it. They believe in Karma (deeds) and transmigration of soul which are universally accepted. Thomas has outlined a Hindu theory of Human development based on 'the laws of Manu-manusmruti. The Griha Sutra, the rules of Vedic domestic ceremonies the Dharma Sutra, Upanishad, Vedas, Ramayan and Mahabharat.

Hindu doctrine holds that all things have derived from a Cosmic Soul or Divine self existent. Mind or power (atman) is the essence of reality and that the physical world of everyday life is a passing thing, a kind of illusion. The concern therefore is development of Soul rather than human body. The three elements which guide thinking are caste, reincarnation and Karma.

First, a person is immutably bound to his Caste by birth. Second, the rules of living which influences development varies from one caste to another. Failure to observe rules after the subsequent life.

A Key concept in development is the concept of justice. A person gets what he earns and desires. Justice operates through the principle of Karma.

Under the principle of Karma a person accumulates the effects of his acts in the four of an investment account, which is the algebraic sum of good and bad deeds at any point of time. Associated with this in the reincarnation of the soul *i.e.* a person is reborn in the form of human or an animal based on one's Karma.

The period of development for the body extends from the moment of biological conception to the moment of final heart beat, that signals death. In contrast the period of development of the soul extends from the tince individual soul emerges from the cosmic soul and countries till reunification with the cosmic soul in future.

The goal of development is release for life after attaining masters of knowledge from the sacred writings, being disciplined, dutiful, devoted, loving, and obedient, humble, unselfish, self effacing, and self sacrificing, free from desire and aversion, exempt from ties and affection, pure speech and thought and a confidence in elements.

The cause of development is based on free will, heredity and environment and its interaction. Heredity in the genetic sense does not exist in Hindu theory. A person creates his own inheritance of on earth by means of his past deeds in his previous existence. His characteristics, which he inherits, are all his past Karma. He is his own progenitor and his own heir.

A small portion of traits however, are inherited from the parents. These are all predetermined and is known as fate.

Environment in a Hindu perspective consists of a person's surroundings that provide opportunities which individuals use to create their own fate. This governed by free will. People are free to choose to think and act in terms of their knowledge and intention. The evidences are controlled through threat of punishment.

In Hindu theory, there are two types of learning, outer directed and inner directed. The outer directed learning is derived form formal study of sacred writings and informal interaction with the world known as experience. The inner directed learning is inner spirit or atman and its method is introspection through meditation. To motivate learning, Hindu theory emphasizes punishment or threat of punishment. 'Knowledge must be grown in fears equivalent to earlier western saying ''Spare the rod and spoil the child''. Punishment is given in earth by the king over the populace, the parent over the child, the teacher over the pupil. The second punishment is given by Brahma after the present life on earth. The inner disected learning is through meditation and Yoga.

There are three states of awareness through which the individual gains awareness *(a)* the waking state *(b)* the dreaming *(c)* the dreamless sleep. On the basis of these, individual creates his own experiences and volition.

There are different stages of development especially for men. The first stage is studentship — mastry of scriptures, vows, duties from a Guru after the individual attains maturity or shortly after. The second stage householder which begins with marriage. The third stage is hermit in the forest. When the individual is old he may resort to the forest saint life of an ascetic. He forsakes his earthly ties and cencern for his physical self and looks for merger of his atman with the cosmic soul.

Individuals differ in terms of caste, sex, age, physical attributes and intention. They themselves determine how they will act from day to-day.

These ideas and beliefs lead to certain practices in child rearing, teaching and counselling. In the early childhood the parents take care if the child, his nutrition, as well as voicing incantations through the ears of children. As soon as he reaches adolescence, they go to a guru for studentship which consists of drilling the scriptures and punishment is the real motivation. Counselling techniques logically would include sacred rites and austerities and motivating individuals to behave as recommended by scriptures and follow the path of righteousness.

Of course, this theory is of interest in terms of basic elements, many seem to be oblitereted by the recent thoughts.

PRACTICAL IMPORTANCE OF CHILD STUDY

Why do we study child psychology ? Like all other fields of science, child psychology has come of the age since World War II. Instead of only concentrating on description of child behaviour in terms of derived norms, child psychologists have accepted the four fold objectives of observation, prediction, guidance and control of child behaviour and development. These of course, presuppose a thorough understanding of the developmental trends and norms.

It helps one to observe child behaviour
It helps one to predict child behaviour
It helps one to guide child behaviour
It helps one to control child behaviour.

For example, it enables one to know how attachment develops between mother and child, how the child reacts to various anxiety and frustration producing situations, how the rate and quality of language acquisition can be accelerated, what is the role of sensory stimulation in early childhood on the development of behaviour, how far certain types of parental child rearing practices are helpful to the children's development of personality, how best early enrichment programmes can be arranged to promote growth. These problems are of crucial importance of parents, teachers and any one who is interested in child devlopment.

More specifically, the practical importance or child psychology can be illustrated from the point of view of parents, teachers, and guidance experts.

For the parents, it enables them how to keep a record of the growth of the child if they are interested. They can know what to expect at what age of development. Whether the developments are taking place appropriately or not. Further, a knowledge of the conditions which are responsible for the healthy growth of the fetus during pregnancy is so valuable that nothing can compensate for it. The expectant mother knows what to eat, what precautions to take, which are the dangers (X'ray, drugs, alcohol) to avoid, and in what

way tension during pregnancy can be avoided before the baby may be born with damaged cerebral functioning, physical malfunctioning and deformities. Prenatal care is as important as postnatal care. The parents after reading child psychology become able to know what it the critical period in development, what constitutes an enriched environment, how such facilities can be created, how the baby will be reared democratically or under autocratic discipline, how to deal with his curiosity etc. Even the study of child psychology enables the parents to use healthy child rearing practices free of over protection, over rejection, indifference, double discipline etc. as a result of which the child develops into a balanced personality without much of a behaviour problem. In fact, children imitate parents. It is for the parents to know that how best they can serve as good models for their children.

A knowledge of child psychology enable the parents to know the technical know how for dealing with childhood emotions (fear, anger, jealousy) and when resultant frustrations in a more healthier way than by sparing or using the rod only. They apply the motivational and learning principles to bring changes in their children.

They can guide their children according to childhood interest. They can help them to develop socialisation and cognitive functioning through play. They can provide opportunities for the development of cognitive growth and creativity from early childhood by controlling and directing their own behaviour in relation to children. A parent ignorant of child psychology is definitely at a disadvantage. Of course knowing these does not guarantee use of these but it is a step ahead of ignorance.

Another area where a knowledge of child psychology is useful to parents is the area of language and socialisation. The parents' use of an elaborate language system is immensely helpful to the child's growth of languages. Many parents do not know this. They use threats, single repetitive directions, they stop children when they ask questions. They do not know that they talk elaborately during mealtime, bedtime, playtime, the child can learn more vocabulary, usage, and applications including comprehension of language. This enables him to have better socialisation, contact and communication. Many parents do not know that they are responsible for stammering, stuttering and certain other speech defects in the absence of any physiological deficit. This way they know how they can contribute effectively to reduce speech defects by their own behaviour *i.e.* by not criticising childhood speech, by not embarrasing them etc. There are many such specific uses which have been explained in detail at different places in this book.

Child psychology is practically useful to the teachers especially in the early childhood period. A naive teacher does not know what are the basic needs (security, safety, attachment) of children when they enter school. They

deal with them as guine pigs or silent spectators of the instructional setting. By reading child psychology a teacher knows the basic needs of children that are to be complied in school without which the child may quit school. Unless a teacher takes care of the basic needs he can not except the child to come to him with a smiling face. Hence, he will not learn spontaneously in school.

It enables the teacher to be acquainted with the milestones of development. He can cut his coat according to the cloth. Otherwise, what he is teaching may be beyond the developmental level of the child. At least, he knows after an exposure to the field of child psychology, new concepts develop, when do they develop, how best they can develop *i.e.* exploration or direct teaching, praise or reprimand.

It enables the classroom teacher to know and identify the behaviour problems in school. This he can do only when he knows what is normal behaviour and at what stage. The teacher is really master tailor and the knowledge of child psychology helps him to his job perfectly. He becomes acquainted with technique of socialising, rearing, learning and cognitive development, regulating his play and leisure time activities, building his personality, giving him remedial measures, matching his communication level with that of the level of child etc.

More important is the use of observational techniques by the teacher. The teacher for understanding the development of the child uses case history, experimental method, rating scales, checklists etc. These knowledge and competencies he develops from his reading of child psychology.

Many teachers spoil the child and their curiosity not because they want it but because they do not know how to develop curiosity, creativity, intelligence, positive mental health in children. A knowledge of child psychology this way becomes practically meaningful to him and he acts accordingly.

Most of the practical utilities mentioned for parents are also meaningful in the context of teachers because the teachers in the early stage of development become parent substitutes and mould the behaviour of children. In fact the teacher spends more of active time with children than the parents of children. Hence, it is all relevant for the teachers.

However, in our country child guidance service has not been developed except in very big cities and that too very rarely they are psychologically oriented. These are mostly medically designed with a catchy term of 'child guidance clinic'. This is in fact a great necessity for a developing country like ours. Bulding a bridge, expending agriculture are as important as shaping the child for becoming a healthy citizen of the country but seldom we care for this. The belief is, children grow, but we must know that they can grow

in any direction and in any speed. Child guidance is necessary. For this purpose thorough and comprehensive understanding of child development is essential.

The uses of child psychology are so many and varied. The child guidance expert contributes for helping the child who suffers from chronic behaviour problems, speech defects, learning dysfunctions as well as in giving advice to parents regarding the child's capabilities and deficiencies by proper testing. Child psychology becomes extremely useful in the context of guidance of children.

Further, an understanding of the child psychology is necessary because it contributes to later development of personality and behaviour. 'The child is the father of MAN' and 'as the twig is bent so grows the tree' are the popular proverbs which explain and emphasize the practical importance of studying child psychology.

REVIEW EXERCISES

Answer the following questions in about 500 words each :

1. Define child psychology. What are the objective of child study ?
2. State the Nature and Importance of Child Psychology.
3. Describe briefly the development of child psychology from the prehistoric time to the modern period.
4. What are the various theoretical perspectives of child study ? Explain each veiw point.
5. ''Child is a miniature adult''. Comment.
6. What are the practical importance of child study ? Explain.
7. What is the subject matter of child psychology ?
8. State the Hindu view of child development.
9. 'The child is the father of Man'. What does it mean ? What care one should take of the children ?

Answer the following personalities important in the field of child study (within 50 words each).

1. Stanley Hall
2. Sigmund freud
3. Robert Sears
4. Erickson
5. Skinner
6. Preyer
7. Albert Bandura
8. Charles Darwin
9. Alfred Binet
10. Jean Piaget
11. Rousseau
12. Watson.

Write answers to the following questions within 50 words each :

1. Spare the rod spoil the child.
2. Learning must occur with tears.
3. The child is the father of man.
4. Twentieth century is the century of child.
5. The child is a miniature adult.
6. Uses of Child Psychology.
7. Difference between Child Psychology and child development.
8. Idea of people about children in the prescientific period.

Answer the following in one word or sentence :

1. Who is called the father of Child Psychology ?
2. Who did write the book "Centuries of Childhood" ?
3. Who did introduce "Baby Biographies" ?
4. Whose theory of development is known as "Eight stages of man" ?
5. Who introduced Social Learning Theory of child development ?

Write whether the following statements are True or False :

1. Freud is the father of Child Psychology.
2. Child Psychology studies the child from conception to death.
3. Darwin's origin of species theory influenced the growth of Child Psychology.
4. Cognitive developmental theory of development was introduced by an associate of Piaget known as Inhelder.
5. 17th century is known as century of child.

Fill in the blanks :

1. Until.....century there was no special emphasis on understanding childhood.
2. 'The contents of children's mind' was written by.....
3. Freud had a.....orientation towards study of children.
4. Hindu theory of development was written by.....
5. Developmental Psychology studies the entire.....span of individuals.

2

Methods for Studying Child Behaviour and Development

Child psychologists use several methods for understanding, recording and interpreting behaviour of children. These methods range from incidental and subjective nature to well designed and objective procedures. In the beginning when the field of child psychology was not developed more attention was placed on ancedotes and collection of baby biographics.

As the field of child development matured many methods were developed to observe child behaviour and collect information, describe, measure, and make inferences about child behaviour. The naturalistic approach focused on at home observations for a specific period of time. The experimental approach emphasized observing the child in the laboratory. Norms are established by large scale survey. Indepth observations are made by case studies. Thus there are different techniques suitable for each situation.

The psychologists sutdy the child behaviour in order to understand, control, and predict future development. To assist him in his observation he uses certain tools, commonly used as methods of child study. Some of the important methods are the following :

1. Biographical method
2. Controlled observation method
3. Case history method
4. Behaviour rating
5. Check list and Questionnaire
6. Experimental method
7. Clinical method
8. Differential method.

1. BIOGRAPHICAL METHOD

Biographical method or collection of Baby biographies is one of the oldest method used in the field of child psychology. The biographer is often the

Data for the case study of a child are obtained through interview with the child, his parents, neighbours, relatives, teachers, physician, or any person who knows the child. It contains information about the child's development and types of environment in which he has been living. Psychological test are used to ascertain his present intellectual and personality status.

Case histories have great value in handling maladjusted children.

There are a number of merits for using a case study approach :

(*a*) It helps in analyzing the problems of child having physical, intellectual or emotional difficulties and solving these problems.
(*b*) It helps in getting information on any child for occasional reports, interviews involving parents.
(*c*) It helps in assessing growth, development or change in an individual.
(*d*) It enables us to know an individual's learning style and coping style well enough that we can play appropriate guidance.
(*e*) It provides records that can be useful to other educators or specialists as background data in future years.

For conducting a case study one needs to collect information concerning :

1. Physical description of the child.
2. Family background, socio-economic status.
3. School environment and achievement.
4. Activity in which the child is involved.
5. Language, motor development and cognitive skills of children.
6. Interaction pattern with peers, parents and teachers.
7. General behaviour in school.
8. Leisure time activities.
9. Coping style and reactions to frustration.
10. Early childhood experiences.
11. In case of special needs of children, opinions from various sources are essential.

However, as a scientific method, case histories can be accepted only with certain reservations, or demerits

(*i*) Casual relations deduced from case history are adhoc and not subject to experimental verification.
(*ii*) Since data are collected primarily/usually from selected groups of maladjusted children and parents the obtained data canot be considered as representative.
(*iii*) It does not provide cause effect relationships.
(*iv*) One cannot relax on pragmatic grounds and assume that these generalizations are sound.

The criticisms of course do not apply completely to case history of children because collecting case histories of children is an interdisciplinary approach. The talents of psychologists, pediatricians, biochemists, physical anthropometrics, sociologists, and other specialists are used in compiling the case histories of children as time advanced.

4. BEHAVIOUR RATINGS

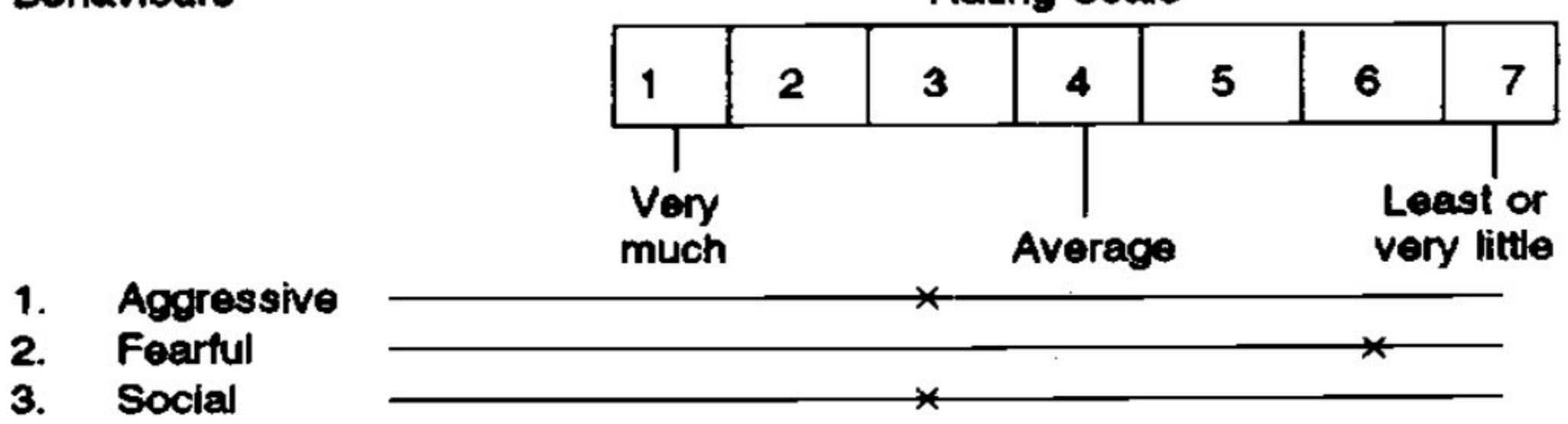
Many of the complex aspects of child development are as yet inaccessible to measurement by psychological test. With the help of rating technique some of the components of child behaviour can be quantified in a rough rule of thumb manner. Crude measurement is usually considered superior to a complete lack of knowledge.

Rating scales became popular as soon as they were developed. Rating scales continue to be ed in many studies of child development. All ratin . Guilford (1954) indentified five different types of

A. Graphic
B. Numerical
C. Standard
D. Cumulative points
E. Forced choice

They differ in physical arrangements, the kinds and number of steps on the scale, and the level of discrimination required.

Ranking procedure is most simple. The child psychologist observes the behaviour of children for a few days and then assigns ranks or positions *i.e.* 1st, 2nd, 3rd, 4th as regards creativity, aggression, sociability etc. Since no standardised tests are available to measure many behaviour, ranking method can be used to quantify observations. The rating procedure involves an observer indicating where he believes a child stands on a continum with respect to some characteristics, triat or type of behaviour. The rating is frequently made on a linear, graphic scale as the following example illustrates.



A sequence of defined numbers is assigned to descriptive categories. The observer or rater selects most appropriate number for the behaviour he observes in a numerical scale.

For example, the behaviours for measuring attentiveness may be :

1. Overt disruptive activity
2. No overt disruption
3. Follows teacher visually
4. Facial expression shows interest
5. Makes appropriate verbal or motor activities

An average is calculated on the basis of several observations regarding a particular behaviour of the child.

Standard rating procedure is the third variation. The rater is presented with a set of standards against which judgement of others are done. This rating procedure is usually done by the University departments.

The format is like the following :

Traits	Top 1%	Top 2%	Top 5%	Top 10%	Top 50%
Intelligence		x		x	
Responsibility			x		

Cumulated points type of rating scale arranges items to be rated so that each one acts as a separate indicator of an overall trait. There are positive and negative characteristics. The score is positive minus negative score, which gives a total picture of a given trait. For example, an estimate of the character is made on the summated score of a series of characteristics of a given trait *i.e.* character development, morality etc.

Forced choice ratings are slightly different. The rater or observer is given a series of descriptive phrases and he is forced to choose one of the alternatives. The child can be best described as :

— friendly
— cooperative
— a good leader
— hard working

Rating scale is very easy to prepare and use. It takes very little time, usually 10 or 15 minutes. The scale is very easy to score and quantify. It is used to study a wide range of behaviours. It requires very little training for any one to use it, whether he is a teacher, or parent or any researcher. It can also provide a match between a person's perception and reality.

There are however, drawbacks to the use of rating scales that make them less reliable than other observational measures.

One of the most serious limitations of this method is the effect of observer's prejudices, and biases on the ratings. Further, the observer may

be more familiar on some traits about the child. So his observational ratings are more appropriate for these traits than other traits or those of other observers. However, ratings are quite useful even though the findings are to be interpreted with caution.

Therefore, Guilford (1954) identified six potential rating errors and biases of which the rater must be aware of.

There are : error of leniency, error of average *i.e.* tendency to rate everyone as average, the halo effect *i.e.* other factors might influence rating : error of logic *i.e.* rating in the opposite direction; and proximity error *i.e.* ratings are similar to preceding items either in space or in time.

Further, itmes are sometimes so ambiguous that error of judgement is likely to occur. Social desirability comes into play in judgement unless one is conscintious at the time of rating. One has to weigh all these considerations before rating any child, since most rating scales ask the observer to reflect on past impressions to generate ratings.

5. QUESTIONNAIRE AND CHECKLIST

The questionnaire method was introduced by Stanley Hall (1891). This instrument is very often mishandled because it appears on the surface very simple. The questionnaire which contains a series of verbal questions has been widely used an instrument to solicit the opinions and attitudes of children. This is the most useful device in an exploratory study. Children's anxiety level, feelings of security, etc. are measured by this technique.

A questionnaire because of its simplicity very often leads to obtaining weird and confusing findings but with careful administration and collection of information the technique yields more information in a short time. Questionnaire is not a mere print out of random questions but it should be prepared more accurately before it is used. It can take any form.

For example,

1. Do you think going to movies is harmful ?

   Here it elicits opinions attitudes of the child.

2. How many hours does your child
   (*a*) plays ?
   (*b*) sleeps ?
   (*c*) read ?

   Here the question elicits information about the child.

Validity of data depends upon the care in which data are collected and questions are phrased as well as the sincerety of the children who respond to the questionnaire.

Checklist is an ofshoot of the questionnaire method. In this form a large number of behaviour patterns are mentioned. The individual child if he can read and write, or an individual who is acquainted very thoroughly with the child gives a tickmark against any or all points given in the behaviour checklist. The procedure of giving ready made list of behaviour patterns is useful in the sense that children and parents or observers don't know and or timely remember the appropriate terminology to indicate the presence of such behaviour. But again it deserves to be considered in its own merit.

A check list is prepared before doing the observation. The target behaviours are also mentioned in the list ahead of time to note the presence or absence of the characteristic. Thirdly, the checklist is logically organised. It is based on the objectives set for observation.

Checklists are useful for classroom teachers and other service personnels. They are easy to use. The teacher can identify behavioural objectives, translate them into specifies, and check up their behaviours against the list. It allows recording of behaviour very quickly and very efficiently with minimum of strain. It is a very simple method and the behaviours entered can be reviewed. The format of the checklist is as follows :

	Activities		
Child/Activity	Social	Aggressive	Thoughtful

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A checklist makes it easy to incorporate recording in a flexible manner. More specifically, a checklist serves four functions :

(*a*) It is record of daily activities
(*b*) It provides diagnostic information relating to participation in the various indoor activities.
(*c*) It is useful for curriculum planning
(*d*) It is very quick and efficient observational tool.

Checklists call for qualitative judgements about the presence or absence of behaviours. Rating scales call for quantitative judgement about the degree to which behaviour is present.

6. EXPERIMENTAL METHOD

An experimental method is a method of observation under controlled conditions. In child psychology, it is primarily used to determine changes in child's behaviour as a result of certain environmental variables. Such investigations are usually carried out with control groups; matched groups, matched pairs of children and indentical twins.

Before the use of experimental methodology in child psychology, man

had been observing the 'whole child' for centuries. History bears witness to the paucity of information that accrued from this approach. In experimental method the behaviour of the child is recorded in the most reliable manner and under high degree of control of extraneous factors. For example, if the child psychologist wishes to study the relationship between frustration and aggression, the E sets up conditions accordingly and exposes the child to that situations and observes the behaviours of the child.

The technique is most commonly applied when the investigator wishes to study a suspected causative relationship holding between a phenomenon of some interest (dependent variable) and one or more other factor (independent variable). A situation is constructed in such a way that the dependent variable is readily observable, the independent variable is introduced and varied in a systematic manner and all other variables are controlled to prevent them from influencing the dependent variable. Changes in the dependent variables are then stated as a function of the preceding in the independent variable.

A laboratory is simply a place in which causal factors may be brought under the investigator's control more easily than elsewhere. Hence, the accuracy of the data about child behaviour would depend upon the extent to which the E has controlled :

(*a*) the child's present environment
(*b*) the child's history of interactions with his past environment
(*c*) the child's genetic endowment.

The first one is the best to control. For example, the child's discrimination learning can be studied in a laboratory for some continuous days or trials and the trend can be easily observed. Similarly development of attachment behaviour toward mother can also be experimentally studied in children.

Matched group is technique is used to observe changes in development of behaviour due to certain conditions. In this set up, groups of children are matched earlier on sex, mental ability, age, or any variable or more than one variables for better control and then the treatment is applied and after the termination of the treatment, behaviour of the two groups are compared.

Matched pairs of children are used when it is not possible to obtain large number of children and form matched groups. Developmental differences are obtained by comparing the two children. Identical twins often the most accurate identical matching because of common heredity. Hence, if the child psychologist wants to study the effect of heredity and environment of the child he can very well use the identical twins. After exposing the twins into differential treatment the behaviour development can be compared and the cause effect relationship can be established.

Hence by experimental method, child's behaviour can be reliably

observed as compared to other techniques. But certain ethics are to be observed because children as research subjects present problems for the investigator different from those of adult subjects and consent of the parent for the child is a pre-requisite to obtaining consent from the child. And the young ones are more vulnerable to distress and as such one cannot put them in complete isolation or in harmful positions for the sake of observation.

A common argument against the experimental method in child psychology results in the E's losing sight of the unique distinctiveness of the child because of greater involvement with methodology, theory, statistics, and apparatus.

Secondly it is often supposed, quite wrongly of course, that experimental method applied to child behaviour precludes the investigation of truly relevant, real life, socially and personally significant behaviour. For example, the child's affection for the mother cannot be studied in an experimental laboratory. Recently it has been possible to show effects of mother absence on child behaviour and personality.

7. CLINICAL METHOD

Clinical method is helpful to the child when the child displays any problem behaviour of sign or mental tension reflected in his behaviour. The method offers insight for undertaking remedial measures.

During the course of analysing and understanding the child's problems, the clinical psychologist uses data obtained by experimental and differential methods in addition to using his own insight and clinical experience. The clinician looks at the child as a person or his own right.

The clinical approach traces back into the past life to find out what has really made the child to have some problems. As such the clinician wants information as is necessary for diagnosing the problem and suggesting remedial measures. All sources are used. He relies on case history reports, experimental findings, data obtained by differential method and then traces the cause. Observation is most crucial for the clinician. Symptoms in children may arise due to a single cause of different causes or their interactions. It is different from an experimental method. Religious control cannot be used in this method. Instead, insight is more useful.

This happens becuase psychology of the child is not a finished body of knowledge. It is rapidly changing. Therefore all methods of observation have to offer meaningful, accurate data for child guidance. Clinical data might lack exactitude and precision but it is necessary to understand why a child becomes a problem, emotionally disturbed, socially maladjusted, juvenile delinquent and so on. The information concerning these, probably, cannot be obtained by other available techniques.

8. DIFFERENTIAL METHOD

In the experimental method the investigator generally manipulates one variable and arrives at concluding corresponding changes in the dependent child behaviour. But sometimes such control may not be possible. So the psychologist has to wait for some occasions where he can compare the behaviours of one group of children with another group. Further, sometimes it may involve violation of moral and ethical rights to observe children, for example, deliberately placing children in deprived environmental and comparing them with those of enrichment may contribute to our understanding of the role of environment on child behaviour, which is not humane. In such cases, the psychologists can locate such cases or groups and can compare the development of behaviour. The differential method is therefore more useful.

This method enables one to observe life as it exists and offers greater promise than does and experiment. Here the child psychologist finds a situation. He does not arrange for it. The children are behaving in a situation that is natural for them. In differential method we use independent variables but we do not purposively manipulate these. We identify these and establish antecendent consequent relationship. We choose children according to certain and compare their behaviours. Hence, use of control groups is still possible in this method. Correlational studies mostly use this differential technique.

However, in many situations the child psychologists use a combination of methods and techniques in observing children behaviour to make it more meaningful, objective and comprehensive as well as reliable.

Cross Sectional Versus Longitudinal Approaches

The purpose of both the approaches is to arrive at establishing norms and trends in development. In cross sectional method data are gathered by studying many groups over a short period of time. The groups are selected on a random basis. Hence, norms derived from the sampled groups become more reliable and valid. In a short span of time it becomes possible to get an idea about the trends in development. For example, if we want to know the development of interest patterns in children from age 4 to 16, we can select samples at each age level and administer the interest battery and derive the interest scores. It is a less time taking process in the sence that we do not have to wait for 16 years to get the data. But the merit of this method is also cited as the srongest demerit. Because in child development it becomes essential that norms are derived taking into consideration developmental changes in relation to cultural and environment factors. Unless one observes that changes in one person continuously for more years, growth changes are to be questioned as regards their validity.

Primarily for the above reason child psychologists use longitudinal approach. Under the framework of this approach the same child has to be observed continuously over the years at certain intervals of time. Data thus obtained would provide trends against increase in age. This procedure is time taking, expensive, and cumbersome. Because on many occasions morbidity, mortality and lack of parental support create problem in following up the same group of children over the years. In spite of the tediousness, this approach has certain distinct advantages.

(*a*) It helps us to understand the growth trends of the same child and at the same time it provides idea of growth increments of the group.

(*b*) Relationship between maturational and learning processes can also be obtained from the observations of growth trends when the data are obtained from the same children.

Comparison between longitudinal and cross sectional approach to child study

Characteristics	*Longitudinal*	*Corss sectional*
1. Method of study	Same group is tested over the years repeatedly.	Different groups are tested belonging to different developmental or age levels at a particular time.
2. Cost and time involved	It is expensive, and takes years to arrive at a generalisation.	Less time taking and comparatively less expensive.
3. Interpretation of results	It has to wait for years or till the entire data are collected.	Interpretation is done as soon as the data are collected, since data are gathered quickly.
4. Quality of data	Shows individual growth and change over a period of life. There is possibility of sample mortality.	Large data are collected and norms can be established. No possibility of sample loss since data are collected at a stroke.
5. Professionals involved	Many observers and expert researcher are needed.	Relatively few persons under a researcher can collect the information.

Studies based on longitudinal apporach are very seldom undertaken. But it is true beyond doubt that the findings obtained from longitudinal studies will prove to be valid both internally and externally.

Longitudinal studies are certainly among the most complex though sensitive methods of investigation since they combine the developmental-psychological and differential view points and therefore come to closest to the actuality of the psychological process.

REVIEW EXERCISES

Answer the following questions in about 500 words each :

1. What are the disadvantages of behaviour ratings, as methods of observing children's behaviour ? Give examples.
2. Describe the merits and demerits of experimental method as a method of observing children's behaviour.
3. What is a case study ? How can you prepare a case study report ? What are its uses ?
4. What is a check list ? What preparations are necessary for recording children behaviour using a check list ?
5. What is a Baby Biography ? What are its limitations ?
6. Write a note on the clinical method with reference to understanding behaviour problems of children.
7. Distinguish between longitudinal and cross-sectional approach to child study.

Write short notes on each of the following within 50 words each :

1. Questionnaire
2. Biographical method
3. Differential method
4. Rating scales
5. Objective observation.

Answer the following questions within 50 words each :

1. Merits of experimental method used for observing behaviour in children.
2. Uses of case study.
3. Uses of Baby biography.
4. Advantages of checklist.
5. Merits and demerits of Questionnaire.

Write the answers to the following in one word or a sentence :

1. Who introduced objective observation method ?
2. Who advocated experimental study of children for the first time ?
3. When is clinical method used in case of children ?
4. Why is longitudinal method not preferred to Cross Sectional method ?

Fill in the blanks :

1. Stanley Hall introduced.....method for understanding children.
2. Cross sectional method gives very.....results.
3. In..... method same group is tested repeatedly over the years to yield results about behaviour development in children.
4. In.....method different groups are tested at one time belonging to different age groups.
5. ..... introduced conditioning method for developing fear in children.

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Principles of Development

Child psychologists are interested understanding and predicting behaviour. This presupposes knowledge of principles of development and normal developmental patterns.

In the area of child psychology very often doubts arise concerning the meaning of the two terms most commonly used : Growth and Development. The two terms are, however, very clearly different in their meaning. Generally growth refers to quantitative changes in physical development while development refers to qualitative changes occurring in behavioural characteristics of the child leading towards maturity. In course of the process of growth and development certain basic characteristics appear and are quite prominent. Growth and development are incremental processes.

TYPES OF CHANGE

Each year the child undergoes a series of changes in size, height, weight, etc. Similarly as would be from the works of Piaget and cognitive developmental theorists, the child's development also undergoes qualitative changes *i.e.* sensori-motor, preconceptual, concrete and formal operations.

Proportion is another dimension where growth changes are noticed. With increase in age not only the body proportions changes but also the level of thinking. Thinking instead of based on pleasure principle gradually becomes reality oriented. Interest patterns undergo dramatic changes.

Certain physical features do disappear such as the baby hair, baby gland, thymus gland function, first teeth, baby reflexes, mental symptoms like egocentrism, baby speech and so on. Instead, new features appear in children which were not present earlier. For example, physical features undergo changes in middle childhood, and early adolescence. Besides these, mentally the child becomes a different one at each successive of growth. He becomes

more curious, especially about sex and moral standards, religious habits, language usages etc.

Further, when we speak of development be it physical or mental, it appears that it is not a uniform process. It is very rapid in babyhood especially upto 3 years. From a microscopic cell the baby grows into a perceptible human being. The rate growth between six and adolescence slower down a bit but again it makes it up during puberty. Mental development is also quite rapid at first. It is observed that about 1/3 of intelligence and mental ability is developed by age 3 years, 1/3 between age 6 to 10, and the remaining 1/3 by age 16 years.

Studies in genetics have shown that behavioural development follows a pattern even though there is individual difference among children. The various principles of development are mentioned below :

(*a*) **Development is similar for all children.** There is a sequence in physical as well as in mental development. The rate of development may differ in case of average, bright, and dull children, but the baby must stand before he walks, he must babble before speech appears.

(*b*) **Development of behaviour proceeds from general to specific.** For example, before birth the fetus moves the whole body but is incapable of making specific responses. In emotion, there is general excitement at the beginning and specific emotions develop late in the process of growing-up.

(*c*) **Development is continuous.** There is no discontinuity in development. Speech for example, is not developed overnight. Instead, it gradually develops from cooling, babbling, monosyllablic sounds.

(*d*) **Development proceeds at different rates for different behaviours.** Development of mental and physical traits are continuous but is never uniform for the entire organism. The feet, hands reach their maximum level early in adolescence; the face and shoulders are slow in development.

(*e*) **There is correlation rather than compensation in development.** Gesell observed that there is a relationship between the development of physical and mental traits. Development of language is related to development of speech organs; sexual behaviour depends on the maturing of gonads; school readiness depends upon maturational development of the various parts of the body. Evidence contrary to this assumption does not exist. One cannot find someone who is above average in one trait but below the normal in another trait. As a matter of fact, genetic studies of the genius have shown that desired traits go together. Negative relationships are not observed.

(*f*) **Development follows two sequences.** Cephalo-caudal and proximodistol sequences : The cephalo-caudal sequence means that development spreads over the body form head to foot. That is structural and functional

developments occur first in head then in trunk and lastly in legs. The baby can turn his head, lift it up before he lifts his chest or legs. At the fifth month, the baby can control eye movement, head movement, shoulder but he cannot sit in the chair.

Proximodistol laws explain the development from central part of the body towards peripheries or extremities. In the prenatal period, the head and trunk are fairly well developed and at that time the rudimentary limbs appear. Gradually arms enlarge and then developed into hands and fingres. Proximo-distol development is better known as side-wise development. These two sequences suggest that the development is predictable in some ways :

Onto-genetic sequences of behaviour	5 years	— Sociability
	4 years	— Concepts of from/number
	3 years	Speech, Sentences
	2 years	— Bowel control
	18 months	— Larynx, words, phrases
	12 months	— Legs, feet, stands
	40 weeks	— Trunk, fingers, sits, creeps
	28 weeks	— Hands, grasps, manipulates
	16 weeks	— Head, balance
	4 weeks	— Eyes occular control
	0 birth	— Vegetative functions, vision
	24 weeks	— Autonomic Nervous System
	20 weeks	— Tonic neck-reflex
	18 weeks	— Hand closure and grip
	16 weeks	— Perspiratory movement
	10 weeks	— Swallow, Babinsky reflex
	8 weeks	— Trunk extension
	1 weeks	— Embryonic stage
	0 weeks	— Conception

(g) All children do not reach the point of development at the same age. Depending upon the interacting influence of heredity and environment children attain various behavioural characteristics at different age and in differing degree. In other words, there is individual difference in the development pattern. Individual differences arise due to various conditions prevailing in the homes : emotional climate, cultural milieu, emotional deprivation, socio-economic status of the family etc.

(h) Early development is more important than later development. Early childhood is characterised by plasticity and the child is most malleable during this period. As such, early childhood experiences such as emotional cultural, and nutritional have a greater say in the developmental progression

In many cases, early childhood sufferings are not reversible and are not made up by experimental manipulations. Recent research with Guatemala children by Kagan proves that deprivation in early childhood is reversible if children are brought up under better environment.

(*i*) **Development proceeds stage by stage.** The development of the child occurs in different stages. Each stage has certain unique characteristics, and in each stage certain behaviours or traits stand out more conspicuously than others. Since there is individual difference in the rate of growth, age limits for different stages can be regarded as merely approximates and suggestive. However, the entire period of development is divided into the following stages :

Major Developmental Periods

From conception to birth	— Prenatal period
From birth to 2 weeks	— Neonate
From 2 weeks to 2 years	— Infant
From 2 years to 6 years	— Early childhood
From 6 years to 13 years	— Late chilhood
From 13 years to 16 years	— Adolescence.

All children normally pass through these stages of development around the age levels suggested. Hence, it is necessary that training and learning materials are planned to fit to the age levels or characteristics of the child in a given culture. Special provisions are called for when development does not follow normal limits and sequences or otherwise.

(*j*) **Certain behaviours considered normal at one stage may not be accepted as nomal in a different state of development.** Supposing a child who refused to sleep or who wants water when he is put on a bed is considered to have shown problem behaviour'. But we must understand that the child is acting upto his age. Lieing is a common behaviour just before the child enters into school. Similarly day dreaming is quite normal in early states of school. Hence, child's behaviour is to be predicted and understood against the expected behaviour at his stage. No problem behaviour is to be overlooked or unduly emphasized.

EARLY EXPERIENCE AND CRITICAL PERIOD IN DEVELOPMENT

The concept of early experience implies two things : providing enriched stimulation, and accelerating development through compensatroy programmes. Historically, the roots of the concept of early experience can be traced to the writings of Rousseau, the work of Dr. Itard and Dr. Seguin with wild Boy of Aveyron, in the tradition of infant and nursery schools in Germany and in the writings of Montessorie.

In the traditional set up, behaviour development was considered fixed and predetermined but this doctrine began to lose its force in the first quarter of the present century. After the 1940's there remained two byproducts. The first one is whether nursery school attendance had effect on the child's development. Secondly, the works of Skeels and his colleagues on the use of enriched rearing conditions with infants raised in orphanages. Although Skeel's work has been criticised yet it has stood the test of the time.

It is said that the "childhood shows the man, as morning shows the day". It means that the early years are critical in the child's development more specifically the preschool years *i.e.*2 to 5years. On the other hand, White (1976) remarked the first two years are more critical. If rich experiences are provided during this period, then personality has its smooth growth and differentiation.

Critical period and early experience have traditionally been given important roles in intellective, personality, social and emotional development. These early developmental periods are critical because experiences occurring during this period have greater impact upon later behaviour and deprivation effects are irreversible. Whether one is extreme hereditarian, an environmentalist, a constitutionalist, or an orthodox psychoanalyst, he is not likely to anticipate major changes in personality after the first year of life.

Hunt (1961) clearly stated the relevance of early experience on development. Inadequate experience according to Hunt, retards intellectual development. Enriched experiences can remedy the deficits in adaptive behaviour and intellectual functioning. Early experience is emphasized so much because it is during early childhood that evanges take place rapidly. Hence, providing enriched experience would lead to better behavioural change. Several infant and preschool early enrichment programmes have been reported in the literature. These experiences vary in terms of language lessons, exposure to new materials, training parents for early stimulation but all these programmes have led to significant gains in intellectual functioning Median IQ gains are between 11-15 points and average gain in IQ vary from 41-2 to 3 IQ points. Of course, the gains might appear due to motivational factors. Yet some precise conclusions can be drawn from such studies. Gains are observed when a trained educator is utilised to train mother to interact with their children. Providing the children wide range of experience are more meaningful and effective than specific experience. Not all children benefit from these projects. Those who benefit, not all of them benefit equally.

Moreover, the effects of early experience do not last over time unless the programmes are long term or continuous or the natural environment itself is enriching. Hence, gains can be maintained if compensatory educational

programmes are introduced to supplement the natural imput or environment. For preschool children between age 2 and 5 the results are mixed. Gray and klaus (1970) reported that the enrichment does not act as an inoculation against the long term effects of inadequate environments. Adequate early experience seems to be a necessary but not sufficient condition for later adequate intellectual functioning.

What is an enriched environment ?

Operationally and enriched environment means :

- providing children with a chance to the child to explore his environment;
- providing a physically and socially responsive environment to the child;
- providing variety and change in stimulation offered to the child;
- providing an environment that is rich inverbal stimulation;
- providing a high level of adult child involvement but one that does not interfere with the child's intention and actions;
- providing adult modeling of desired cognitive skills or attitudes;
- the use of positive reinforcers;
- matching the interaction with child's level of development.

A good number of studies have raised the role of maternal deprivation as a contributing factor to early experience and its effect on development. Inadequacies in mothering leads to behaviour deficiencies. Bowlby (1951) after reviewing the literature stated that mothering is essential for providing enriched environment for the infant. Very rarely it can be substituted. Bowlby concluded, 'that the prolonged deprivation of the young child of maternal care may have grave and far reaching effects on his character and so on the whole of his future life'. The meaning of deprivation or separation may be many, temporary absence, illness or hospitalisation, desertion etc. But the implication of the separation for the child are also many. The child during the first six to eight months of life learns to discriminate the mother from others, and develops a primary attachment for the mother, which can not be substituted. This contributes to feeling of security which then contributes to cognitive development and behavioural adjustments.

Are there research evidence in Support of Early experience ?

Recent studies however, reject this notion of continuity in development. The effects of early experience are neither enduring nor irreversible. The evidences are :

1. Early feeding, toilet training and other experiences are not correlated with later behaviour (Kagan and Moss, 1962).

2. Most children recover from mild perinatal insult, recovery from severe insult is much less likely.
3. A number of severely deprived children have shown much of intellectual and social development after much of intervention (Clarke and Clarke, 1976; Skuse, 1984).
4. Critical period does not exist according to various researches.
5. Brief intervention does not inocculate children against adverse effects.
6. Maternal deprivation in and of itself does not provide lasting deleterious effects upon children (Rutter, 1981).

Although early experience is still viewed as playing an important role in human development, its role is not as pervasive as once thought. Evidence for critical periods in some areas of development is strong (Colombo, 1982). Further, evidence that change in normal development occurs throughout life and that effects of extreme deprivation can be partially countered with intensive therapy should not be misread as implying that plasticity is equivalent across life. Humans are more responsive to many types of experience at a relatively early age. Indeed, MacDonald (1985) suggests that plasticity declines with age and that more intense therapy may be necessary with older individuals. Similarly Brown (1986) proposes a continuum of therapeutic environments, suggesting that the greater the degree of early impairment, the greater and more unusual may be the needed intervention. Recovery from some early experiences will occur only in response to therapies that are not part of the normal environment. Recovery from others that involve manifest brain damage may not be possible under any condition. A question of considerable current interest is whether recovery from early brain damage is more complete than recovery after later damage. Further, we need to distinguish between different types of early experiences and critical periods (Brown, 1981). Areas where adverse early experiences have disrupted a developing organic system will be more resistant to therapy than areas where the experiences have resulted in the learning of particular behaviours. Early interference with organization of an organic system is likely to be permanent, whereas interference with the organization of behaviour through learning can be overcome through relearning.

Parents should not be blamed for their children's autistic or schizophrenic behaviour, nor should complete recovery of most such children, particularly autistic ones, be expected. Much recovery from early psychological deprivation *or adverse conditions can* be effected with sensitive and intensive therapy. Psychodynamic explanations of childhood and adult behaviour in terms of infant experiences have little scientific support. Early intervention programs

can be effective in increasing the intellective, emotional and social development of highrisk infants and children, but they need to be intensive and long term (Bricker, Bailey and Bruder, 1984). Finally, therapy or rehabilitation of children with manifest brain damage should be undertaken as soon as realistically possible in order to effect maximum recovery.

COMPENSATORY EDUCATION

Few aspects of education that currently command the attention is the education of the weaker section of the community, especially at the early childhood stage. Wastage and stagnation not only lower down the literacy rates in the country but the children coming from lower class homes are pushed backward in greater numbers to the pool of illiteracy because of failure to meet the requirements of a standard curriculum, slightly alien to their own. This is not peculiar to our society alone but this has in the recent past created problems in the most advanced countries of the world. Advanced countries through various enrichment programmes have been able to succeed in combating this disease but for us, it has become an epidemic in education and therefore demands more attention than it would normally receive. We now think loudly for providing compensatory education, remedial education or enrichment programmes. What is the rationale behind such a thinking ? What in reality do the previous research on compensatory education tell us ? What infact, can be undertaken within the limits of a developing economy ? Plans and thinking have been quite ideal with us but regrettably the implementations lag behind.

The rationale that influenced a few of the compensatory education programme approach is the developmental assumption *i.e.* children coming from weaker section of the community are slow in the rate of development. Therefore, for these children education can start a year earlier *i.e.* should be given some preschool experience. Such programmes were organised by Parents' associations in most part, in U.S.A.

The second approach was the 'critical period hypotheses' akin to the developmental process. This approach emphasized that certain structured learning experiences are to be provided to children of the weaker section of the community in early childhood since they suffer from environmental deprivation including the vagaries of poverty. Infact, as much 50 per cent of the intellectual potential of an individual is determined during the preschool period and it constitutes a kind of general critical period of intellectual development (Bloom, 1964).

The third approach has been reinforced by the belief that is possible to ameliorate intellectual deficits. Although Jensen (1969) in his famous article denied the effect of environment on intellectual ability (IQ) and asserted that

'compensatory education has been tried and it apparently has failed, a number of well designed compensatory programmes demonstrate remarkable achievement gains : If genetic or cultural deficits impair the learning capacity of low SES children, such children would never be able to learn successfully. This conclusion is not tenable, in view of the findings from research on compensatory education.

The compensatory education programmmes vary widely in size and scope but have in common the dual goals of remediation and prevention. They are remedial in the sense that they attempt to fill gaps : social, cultural or academic in the child's total education. They are preventive in that they try to forestall either initial continuing failure in school and in later life.

The principal focus in the compensatory programmes has been on reading and language development, arithmatic, improvement of psychomotor ability, personal and social adustments. These programmes have operated either at preschool years or during the elementary school years and sometimes have been built into the regular school periods or have been introduced in the summer breaks, so that weaker children make up the deficiencies before entering into the next grade. The well known compensatory education programmes are these of; Bereiter and Engleman (1966) in the area of Reading. Arithmatic and spelling; using drill approach; Martin Deutsch's (1965) enrichment programmes in the areas of language, mathematics, science, reading skills, concept formation, and personal adjustment; Susan Gray and Klaus (1965) in the areas of perception, concept development, and language development, during the summer break, and Spicker, Hodges and McCandles (1967) in the areas of Psychomotor, language, intelligence, and social adjustment. In all these studies significant gains have been achieved but the acquired gains did not persist for long in case of short term interventions. However, these programmmes do suggest that children coming from weaker section can be helped through enrichment programmes and the degree of their efficiency depends upon how well the programme has been formulated.

In our country, we have a large segment of children population in the school who come from tribal areas, scheduled caste and families who are very poor. These children come to school very rarely under compulsion and very soon drop out from it. Although poverty and economic reasons do account for school dropout, yet a great many of their children do not succeed in school because of low ability consequent upon deprivation of one sort or another.

Sinha (1976) after examining a whole series of work on the deprived stated that an early enrichment programme at the preschool and kindergarten levels may be helpful in removing the arresting or reversing the cumulative deficit. For the Indian disadvantaged tribal children Rath (1974) recommended

interventions in forms of compensatory and high intensity education as remedial measures. The writer (Panda, 1976) has also suggested the special requirements of an instructional design that will be suitable for the disadvantaged children. The suggestion included modification in teacher training curriculum, changing the life style characteristics of the deprived, use of accelerated learning programmes and changing the motivational and affective climate of the classroom (Panda and Lynch, 1972).

Perhaps the answer may be sought in training the deprived children for realistic goal setting, developing self attribution, developing a more analytic way of information processing while in school and giving training for intellectual activities and/or skills where they are deficient. But it is essential that parental education is more crucial in so far as providing an enriched interaction environment in early childhood is essential.

The Coleman data has proved that integration resulted in improvements in the achievement test scores of Black students, in integrated schools do better than those in equally middleclass all Black schools. Coleman suggests that the overall gain in verbal ability for Blacks in an integrated schools is approximately of one SD. Crain and Weisman (1272) observed the problem of achievement in relation to the integration. They defined integration (a) the Negro students in the school with White at least for 5 years (b) no White student did move out the school (c) the school was at least half White.

Compared to segregated school it was found nearly 1/2 of the segregated respondents did not finish high school. 48% completed compared to 36% students of the integrated schools. That dropout rate is reduced by 1/4 in integrated schools. Further, integrated education seems to cut the dropout rate for southern migrants nearly a half. Pupils of integrated schools are more likely to finish elementary and high school and they attend and finish college. Respondents who attended integrated high schools and segregated elementary schools fare as well in terms of finishing high school as those whose schooling was entirely integrated. The effects of integration are stronger for both men and women students. Students who attended integrated schools scored higher on the verbal Achievement test than those who attended segregated schools. Occupying a deprived status or a minority status in an integrated school failed to poise social and psychological strain among the pupils. Optimism concerning the effectiveness of preschool compensatory programme such as project Head start has waived considerably in the last few years. Findings have been consistent that at the end of a year of Head start type of experience children are superior to children without preschool experience in both intellectual and social emotional functioning (Klaus and Gray, 1968; Weikart, 1971). However, the superiority of Head Start children vanishes and is greatly diminished by the end one year of formal school

(Bronfenbrenner. 1974). In the face of this evidence some have concluded that compensatory education or Head start in particular, is a failure (Eysenck, 1971; Jensen, 1969). It is unrealistic to expect long term effect of a short term intervention. But it can't be denied that the programmes have in fact succeeded in removing educational disadvantages which economically disadvantaged children might encounter in later life (Bereiter and Engleman, 1966). For this reason the Follow Through Project has been introduced which is 4 year compensatory edcuation programme in USA school system. Longitudinal data analysis revealed that the follow through programme assessed was not capable of ameliorating all of the negative effects of living in an economically disadvantaged the programme was highly beneficial to the children who participated in it. The longitudinal and cross sectional evidence together lead to the conclusion that the gains acruing from compensatory education programmes are comensurate with the duration and amount of effort which are expended on these programmes. Abelson and Zigler (1974) are thus very clear in their statement confirming the efficacy of enrichment programmes. Developmental psychologists agree on two basic assumptions : Environmental factors help determine how fast or showly children develop intellectual ability and second, experiences during the first years of life strongly shape children's relative intellectual functioning. Harvard University psychologist Prof. Kagan asks a fundamental question, "Are the ill effects of early deprivation irreversible ? or does delayed growth persist children ? Only if the environment that causes the delay remains the same," replies Kagan to his colleagues.

Kagan (1977) from his studies in Guatemala a non western culture came to a conclusion—'' Children listless, silent, apathetic infants, passive, quiet, timid three years olds but active gay, intellectually competent 11 years old''. He said that children are more resilent, and more malleable that is more capable of making a comeback after a poor start than most psychologists have believed. Kagan readily admists that his data are not yet adequate to prove the thesis he is putting forward, but they provide sufficient evidence "for a grand jury to say, there should be trial''

In the isolated Indian village of San Morcos in Guatemala babies are raised in small, dark huts that lack even windows. These infant are not allowed outside where it is thought that seen or dust might harm them. In Psychological terms, they lack experiencial variety, the very thing essential for intellectual development and later achievements and they must contend with malnutrition and disease which combine to retard their development as well. By comparing the developments of some Marcos infants with American babies of two years old, Kagan and his co-research workers found that San Morcos children are 3 or 4 months behind.

Kagan had sampling problems but his one year observation of children ''with pale cheeks and vacant stares had the quality of tiny ghosts''—would suggest that infant's development was infact retarded.

By age 3 or so the children still seemed inordinately inhibited and shy but says Kagan, ''they began to look like children''. Cross sectional studies using American children did well on a few culturally fairer memory and intellectual ability tests than 8-9 years old Guatemale, at age 10 and 11 no such difference was observed between the two groups. Kagan attributes the make up' to change of environments of the San Morcos children to an urban setting. Whatever may be but you can get there'' because there is inherent resiliency in human development. Kagan in no way implies that the early environment is not important—or that in an age-graded schooling system parents should not be concerned with nurturing children's early growth. But he emphasizes the reversibility of early deprivation through the provision of a better environment. This hopeful message needs additional research to confirm or refute.

It seems that the evidences are quite convincing that cultural deprivation and consequent discrimination do create psychological disability which in turn arrests school achievement. It is true that deprived children remain in an impoverished environment which hampers their school achievement. But the school is a part of that environment and school integration is a simple and effective method of cultural enrichment. School integration of course represents a partial solution to the problems of underachievement of the deprived.

Conditions which promote early childhood development in terms of enriched experience are :

(*a*) Favourable interpersonal relationship
(*b*) Emotional acceptance by parents
(*c*) Democratic but not permissive family atmosphere
(*d*) Early role play with increasing confidence
(*e*) Small family structure
(*f*) Stimulating environment.

The child tends to use his abilities spontaneously. The famous child psychologist Jersild has said, that the child's capacities for doing, thinking and feeling emerge in the process of growth. He has an impulse to put them to use. This is what he calls indigenous motivation. The child has a tendency to speak, to search, to explore, to seek out new stimuli. In earlier years of schooling this behaviour is prominent and often wanes as the child reaches upper grades due to pressure for conformity. This is not hereditary. Therefore, a great responsibility lies on the teachers to foster this sense of curiosity, drive and interest of the child for spontaneous expression. Then only

understanding the nature and principles of growth will be meaningful.

FACTORS AFFECTING DEVELOPMENT

The development of physical and mental characteristics are influenced by a host of factors. These factors can be grouped under certain broad areas :

(a) Maturation and Learning
(b) Heredity and Environment.

Maturation and Learning

Maturation refers to the unfolding of traits potentially present in the individual resulting from his hereditary endowment. Some of these are insensitive to environmental influence while others are dependent upon environmental influence while other are dependent upon environmental conditions. For example, crawling, sitting , standing, walking etc., appear with physiological maturation of the system, whereas swimming, cycling etc. require training or practice. Further mental abilities simply do not depend upon maturation but on environmental conditions in which children are brought up.

On the other hand, learning refers to the acquisition of a few behaviour or modification of the previous behaviour consequent upon some kind of practice, exercise or effort on the part of the individual. The child shows certain changes in his physical structure and other behaviours. A child may have a mechanical aptitude but if in the environment he does not get a chance to play and manipulate different mechanical activities, then his mechanical aptitude will not develop. Hereditary potential may remain in extinct state. Learning may take place under imitation, identification or training under different conditions of motivation. But the fact remains that behavioural manifestations are the product of learning. Maturation and learning interpretations offer two conflicting view points for description and development of behaviour.

The methods of isolation and cotwin control have invariably resulted in bringing inadequate and inconclusive evidences regarding the relative contribution of maturation and learning on behaviour. The issue can be dealt more effectively if we analyse the relative importance of maturation and learning in relation to prenatal/postnatal periods and physical/mental development.

It is true that the prenatal development is mostly rather solely influenced by maturation. Fetus which are most well developed and active appear to acquire skills most readily in postnatal life than those who were less active. But the child learns many things from society, culture and the neighbourhood where he lives. If he is physically and mentally well developed, he assimilates

and accommodates from experience than the child who does not have a well developed structure. It can be stated that maturation in and by itself does not produce much of the changes in and organism but it provides the ground for further behavioural development to occur due to learning.

Piaget has said, the child tries to adapt himself to the environment and in this process of adaptation he acquires new behaviours in a coordinated sequence. This concept of coordinated sequence automatically confirms the notion that physiological maturation of the organism does have a role to play. Learning helps in acquisition of new behaviour but the sequence in which different developments occur are age specific in (approximately) character. In other words, maturation sets a limit beyond which development cannot go even when learning is encouraged.

This concept of limit is quite meaningful from genetic and pedagogy points of view. The genetic specialist like Gesell would insist that growth can be guided but not created.

No behaviour will appear unless there is genetic transmission or genetic basis for it. Learning is limited to the genetic potential. It has therefore, pedagogic significance because if learning is pushed beyond the maturational level or the genetic endowment. Psychological damage may occur to individual child.

Here again an optimistic note comes from Watson, the behaviourist. Watson emphasized excessively on the role of environment and development of behaviour through conditioning. The over emphasis on the role of learning or environment has been abandoned. Evidence for such a statement comes form the studies on education of mentally handicapped children, and failure in increasing IQ and aptitudes to a considerable degree.

Learning techniques are nevertheless helpful. Wherever there is a block to progress, on individual's inability to improve further, change in the method of learning has brought improvements in the activities of the individual. In other words, innate capacities must be stimulated by environmental factors. If children are brought up under deprived and under-nourished environment, there is no doubt that their intellectual and physical growth will be retarded. For example. Bloom has very recently stated that if the fetus during the last two weeks before birth and upto six weeks of postnatal life fails to get nutritious food, mental and physical growth will be retarded *i.e.* he cannot function in accordance with his genetic potential. Similarly, children coming from poor socioeconomic status groups, broken homes, crowded and slum areas fail to get rich stimulation, suffer developmentally. In rare cases such deprivation effects are reversible but usually not so. Hence, even with large genetic potential for mental ability,

children under—achieve in a classroom and are developmentally below their age in adaptive behaviours.

Parental expectancy, aspiration, child rearing habits have a lot to do in engineering development of the new born upto the age of maturity. Under a high achievement atmosphere, the child sets up goal, tries to achieve it, makes attempts to reach it and become self-directed or self motivated. Invariably such as motivational set helps the average child to achieve superior status in life.

The relationship between maturation and learning can be examined from point of view of readiness. The developmental cognitive theorists like Piaget and Kohlberg believe that a child cannot learn unless he is ready to learn. Whether one talks of motor activities, sensory conditioning, or higher forms of learning, maturational readiness of the physical and mental apparatus is a must. You cannot teach a child the concept of reversibility at 4 years of age; the concept of volume at age seven; the grasping behaviour at 2 months no matter how much practive you give. The system has to take it and it must be ready for it structurally. Studies have shown that teaching reading at 13 months brought little improvement in vocalization until they reached 17 months of age. Training is ineffective until the baby is matured.

The concept of readiness is vital for educating the children. It is ascertained by means of (*a*) the child's interest in learning (*b*) the duration of sustained attention or persistence in a task, and (*c*) the improvement that comes as a result of his practising the task. An assessment and undertaking is necessary for teachers in making instruction effective. It thus seems logical to state that both maturation and learning age necessary for development of the child. Maturation besides bringing some automatic changes, provides the ground for learning to occur. Further, acquisitions of skills reflect a better maturational status of the children. Hence, both are interrelated and interactive. In any case, maturation is a necessary condition for learning.

Heredity and Environment

The word environment is so broad that is includes a large variety of factors *e.g.* family, peers, school, culture, socio-economic status, nutrition, child rearing practices and so on. The term heredity is also quite inclusive and generic to cover effects of sex hormones, sex, twin birth, chromosomal anomalies. Each of these factors have been discussed at appropriate levels in respective sections on development of physical, social, intellectual and emotional, abilities. As such, there is no need to present a general picture here excepting discussing the main interacting factors *i.e.* heredity and environment in detail. Gregor Johan Mendel (1822-1884), an Austrian

Monk, the father of modern genetics, published certain laws of hereditary transmission on the basis of his observation on peas. He observed that hereditary characteristics are trasmitted from parents to children through genes. Like begets like was his general promise of operation. He crossed pure strain of white and purple flowers. In the first generation all the offsprings had purple flowers. Here one was the parent characteristics because dominant (purple) and the other was recessive (while). In the second generation grand parental traits appeared in a ratio of 3 : 1. This was Mendel's first law *i.e.* law of segregation. It means that genes occur in pairs and one member of the pair is contributed by each parent. When sperm and ovum unite a new and unique gene pair is transmitted to the offspring. His second laws is that of independent assortment. This means that every character is inherited independently of any other character. The paternal and maternal genes present in the offspring of the hybrid will undergo independent assortment for the production of all the combination of genes in the gametes. The result is that in each generation random combination of characters are present.

After some years of Mendelian theory the law of mutation was introduced. According to this law characters which are not present in parental generations do appear in children due to chance and cannot be explained by hereditary principles.

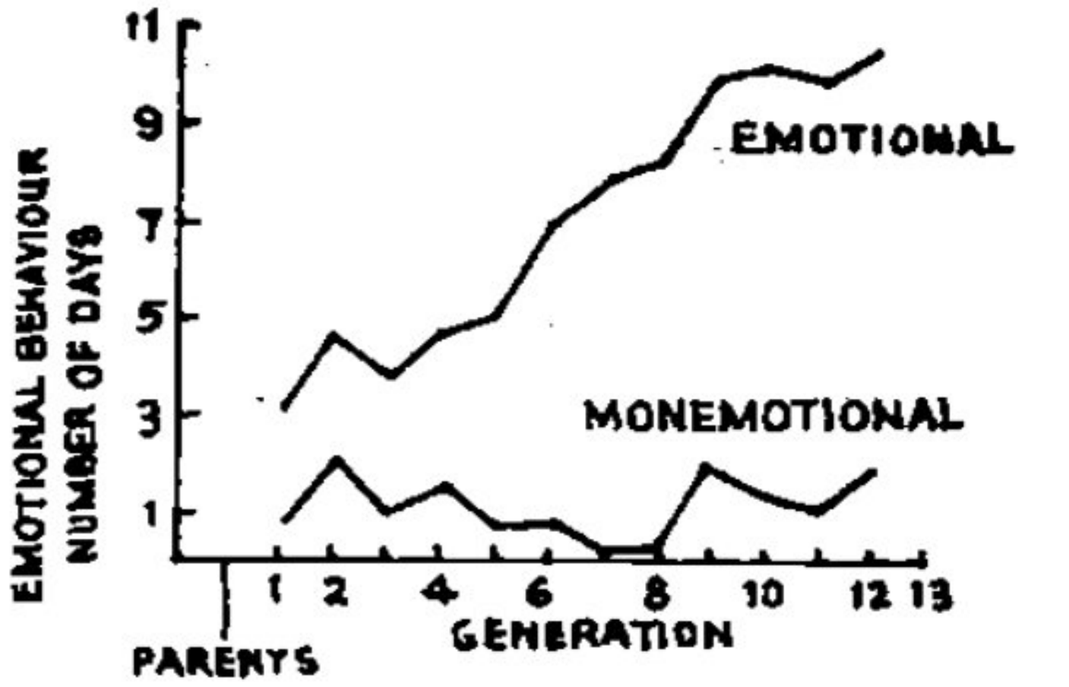
Many times we feel whether we inherit any thing from our parents except the property rights. Do we carry the culture ? More precisely. Is human behaviour inherited or is it a result of environment ? This way of putting a question is equivocal. Because such question cannot be answered in either manner. All behaviours infact are the result of the interplay or interaction of both heredity and environment. Their relative contribution however, differ from traits to traits.

ROLE OF HEREDITY

In most case, genetic studies of behaviour have been conducted on animals than on human beings. This has been a practive because animal behaviour is less complex, animal environment can be controlled at ease and breeding rate of animals is faster. Although animal studies can not be generalised to human beings yet they certainly prove the genetic influence.

Mendel's laws of hereditary transmission have now been established for many traits such as : eye colour, baldness, hereditary diseases and a condition known as albinism. The albino individual is born with white hair, pigmentless skin, pink eyes. These persons are sensitive to light, and their vision is always poor. Taste is also found to be inherited, particularly with reference

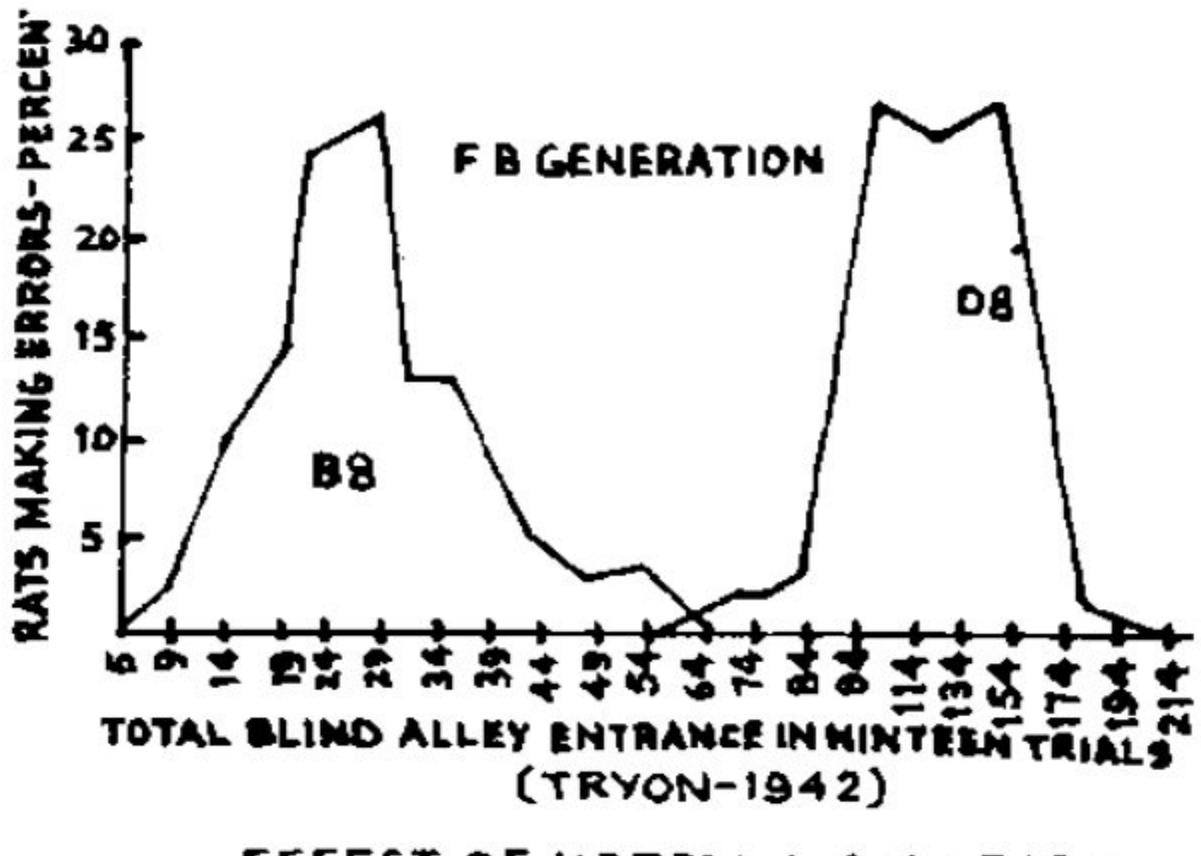
to phenyl theocarbamide. Nearly 30 per cent of the population cannot taste it.



EMOTIONALITY IN 12 GENERATIONS (HALL, 1951)

In case of emotional behaviour also the role of heredity has been demonstrated by Hall (1951). Hall inbred the most and the least emotional rats and observed the emotionality in 12 generation of rats. The figure shows the emotional behaviour of rats for 12 generations. It is quite clear that emotionality in rats has a genetic base.

Tryon (1942) demonstrated the role of heredity in maze learning ability of rats. He selected 142 rats and gave them 19 trials in a complex maze. Some animals learned the maze very late and others learned it very quickly. The bright rates were met each other and the dull rats were met with each other. Both sets of the offsprings were followed and the process was repeated for eight generations. By the eighth generation there was practically no overlap in maze learning ability between ''bright'' and ''dulls''. This is seen from the graph where learning ability shown in trials.



(TRYON-1942)

EFFECT OF HEREDITY ON LEARNING

From this experiment it is clear that maze learning ability and heredity are related. Selective breeding could demonstrate this genetic basis very clearly.

The question may arise here. Is intelligence also inherited ? Twin studies after some meaningful answer to this question. The correlations and heritability ratios and shown here to indicate the role of heredity (Vandenberg, 1972).

Country	*Year*	*Identical Twins*	*Fraternal Twins*	*Heritability ratio (H = V genetic V Environment)*
England	1933	.84	.65	.54
	1954	.76	.44	.57
	1958	.97	.55	.93
	1966			
U.S.A.	1932	.92	.61	.80
	1937	.90	.62	.74
	1965	.87	.63	.65
	1968	.80	.48	.62
France	1960	.90	.60	.75
Sweden	1952	.89	.72	.61
	1953	.90	.70	.67

Studies of identical twins reared apart have been powerful in substantiating the role of heredity on development of intelligence. Vandenberg 1971 (b) have obtained correlations between IQ scores when children are reared apart and when they are raised together. The data are :

Country	*Year*	*Identical Twins*	*Raised together*
U.S.A.	1937	.77	.98
England	1962	.77	.76
England	1958	.86	.92

Cyril Burt's (1955) study is very well known in this field although there is some concern about his data after his death. Skoddak and Skeels (1949) examined the intelligence scores of 100 adopted children who were tested for a period of 16 years. It was found that with increasing age the IQ the adopted children became highly correlated with the educational level of biological parents than with that of their adoptive parents. This was reflected in the absolute scores of IQ.

I.Q. Correlation From Child Adoption Studies

Study	*Adopted child vs. Adoptive parents (averaged I.Q.)*	*Own child vs. Adoptive parents (averaged I.Q.)*	*Control child vs. True parents (averaged I.Q.)*
Freeman et al. (1928)	0.39 (N = 169)	0.35 (N = 28)	
Burks (1928)	0.20 (N = 174)		0.52 (N = 100)
Leahy (1935)	0.18 (N = 117)	0.6 (N = 20)	0.36 (N = 137)
Pooling all studies (Kamin 1974)	0.26 (N = 520)	0.35 (N = 48)	0.57 (N = 237)

There is also strong evidence that verbal ability, word fluency, and spatial ability have larger genetic component (Thurstone, 1941). Jensen (1969) in his most widely circulated paper proved that IQ is inherited and the heritability scores are reported in large number of studies prepared by Burt (1966).

Correlations between Relatives

Correlations between	*No. of studies*	*No. of pairs*	*Medium Correlation*	*Theoretical Value*
With parents	13	374	0.54	0.49
With parents (as children)	1	106	0.56	0.49
With grandparents	2	132	0.24	0.31
Between identical twins reared together	13	95	0.87	1.00
Between identical twins reared apart	3	54	0.75	1.00
Between identical twins same sex	8	71	0.56	0.54
Between fraternal twins different sex	6	56	0.49	0.50
Between sibling reared together	36	264	0.55	0.52
Between siblings reared apart	33	151	0.47	0.52
Between uncle (or aunt) and nephew (or neice)	1	161	0.34	0.31
Between first cousins	2	215	0.26	0.18
Between second cousins	1	127	0.16	0.14
Foster parent and child	3	88	0.20	0.00
Children reared together	4	136	0.23	0.00
Children reared apart	2	200	0.01	0.00

These results clearly show that intelligence is inherited and 20 per cent variation occurs due to environment.

A deaf child on the other hand suffers from intellectual ratardation but in such cases hereditary handicap may be offset by training procedures. In case of blood groups the relation to specific genes is so close that no other concomitant heredity or environment can alter the outcome. Certain characteristics on the other hand are hereditary. Sex, and skin colour, including general body build depend upon heredity. By citing correlations from the studies of identical twins, fraternal twins, twins reared apart and together in one environment and siblings with regard to presence of intelligence, Burt proved that intelligence is hereditary. So also Jensen, who reviewed a large number of studies to establish that there is evidence for genotypic intelligence or what Cattell calls the fluid intelligenece. This is hereditary to the extent that 80% of common variance is attributable to

hereditary factors. Only 20% remains to be accounted for by environment and measurement factors. However, estimates regarding the contribution of heredity is only indirect and is based on logical inferences. The actual position is rather more complex, and there is infact, a range of variations. There are many others who believe that enriched environment will increase the depressed intelligence and other behavioural characteristics. The preschool projects and compensatory education projects are not cent per cent ineffective in enhancing the rate of development of mental abilities in children. Short term intervention might have resulted in equivocal findings..

ROLE OF ENVIRONMENT

Many studies have examined the role environment in the development of behaviour in animals and human beings. What precisely we mean by environment ?

Environment refers to all the external events to which the individual is subjected including prenatal and neonatal conditions, nutrition, medical care, parents child rearing practice, cultural millieu, educational experiences, types and place of occupation, and even the climate of residence and epoch in which the person lives.

The importance of environment is determining physical traits can be seen in study of Himalayan rabbits. When rabbits are raised under natural conditions, these rabbits have a white body with black extremities. When the same rabbits are raised in warm case, they do not develop the black pigmentation. This indicates that rabbits with same genetic make up have different phenotypic appearance as a result of environmental factors.

In case of human beings similar things do appear. A man's physique is strongly determined by genetic factors, but environmental influence like nutrition, has strong influence on the size and weight at any point in time. In case of mental ability also, a highly intelligent man may not recall anything under stress. Hence, each genotype or hereditary trait may show itself in many phenotypic characteristics depending upon environmental influences, but within limits.

An experimental evidence by Freedman (1958) can be cited here. Freedman (1958) reared four types of pups under either indulgent or disciplined regiments. At eight weeks each pup was tested for inhibition of eating by being punished by the person who reared the animal and left the place. It was observed that the Baseujis (a type of pup) ate as soon as the trainer left regardless of whether their rearing has been indulgent or disciplined. Shetland sheep dogs did not eat the food no matter how they have been reared. The indulged beagles and terriers were more inhibited by punishment than those of the same type reared under strict discipline. Environment had precisely effect on their behaviour.

The role of environment on behavioural development can be analysed with reference to stimuli (*a*) producing organic changes which influence behaviour and (*b*) those directly produce psychological reactions or behaviours.

Mental deficiency or retardation sometimes result from cerebral birth injury and prenatal nutritional deficiencies. In the absence of any neurological impairment resulting from injury in the brain, there are evidences of cerebral palsy or motor disorders, which in turn affects lowering the mental ability of the child. In other words, because of environmental factors there is organic damage and that damage in turn leads to behavioural deficiency.

Social class membership may serve an illustration of broad, pervasive and enduring environmental factors. It has wider influence on the behaviour development. Bernstein has proved that the language spoken at home has far reaching effect on the language development of the child. In slums, parents use restricted language and as such the linguistic competence, of slum child or lower socio-economic child is further restricted. One's aspiration and expectations are also shaped by parental, especially mother's expectations about the child. Highly restricted environment in early childhood determine to a large extent the development of intellectual competencies in children. Emotional and social traits may likewise be influenced by the nature of interpersonal relations characterising the homes at different SES levels.

Personality traits are very much influenced by environmental factors compared to intellectual ability. Studies of Margaret Mead, Malinowski and Ruth Benedict, the well known cultural anthropologists of the world have demonstrated the role of the culture is shaping personality characteristics. The emphasis on early childhood emotional experience in the family by Freudians also has great significance on personality development of the child. Details of parent's child rearing habits and child's personality development are described in the social learning section of this volume.

Early learning and experience contributed to the maze learning ability of the dogs. This was demonstrated further by Fuller (1967). There were two breeds of dog and same pups of each breed was bred normally and others in isolation. The effect of isolation was observed in each breed and environment had differential effect on each breed. Fuller observed that dogs reared in isolation demonstrated a poorer learning ability because of emotional factors. When this was controlled their maze learning performance increased, Fuller's work demonstrated a lot of truth as the how deprivation starts quite early in life in case of human children.

Cooper and Zubek (1958) studied the role of environment on maze learning ability of bright and dull rats reared under there different environments : enriched, restricted, and natural. At sixtyfive days of age each groups was tested for maze learning. The enriched environment helped

the ''dull'' but did not affect the ''bright''. The restricted environment had no dulls but depressed the ''brights''. It seems that instead of environment having a direct effect on genotypes, it has an interacting effect.

Some theorists belicve that social experience are of utmost importance to intellectual development and that social deprivation can cause IQ changes. Skeels (1966) studied 25 children who were in orphanages devoid of early stimulation and personal attention. At the age of 11-12 year thirteen of these children were transferred to an institution of retarded women. These children had IQ of 64 at that time. Each child was nourished by a retarded woman and recieved much affection. They were given toys to play and were taken on field trips. It was found these children had their IQ by 28 points. In the mean time children who remained in orphanage had 20 points of droppage in IQ. These studies raise many issues. Whether early deprivation is reversible ? Is there any direct relation between social deprivation and IQ or intellectual development ?

Kagan's (1977) study in Guatemala is convincing. In these villages children are confined to dark huts. Adults seldom pay with infants. At the age of 2 they are listless, apathetic, and retarded in development. But when these children do learn to walk, they leave the huts and begin to participate in community life. By the age of eleven they are active children and intellectually competent.

Dennis (1973) found that in case of children living in orphanage home in Lebanon, under extreme social deprivation, they become mentally retarded and the IQ is around 55 if they continue to live in such atmosphere upto adolescence. But children who were adopted before age 2, they had varying degree of decline in intellectual development. Social deprivation therefore affects adversely the intellectual functions depending upon how long the deprivation continued and how early it started.

It is obvious from the previous discussions that range and nature of influence of heredity and environment on the behavioural development of children are quite varied. It is clear that all the evidences regarding the presence or absence of one of the other variable, is based on biographical follow-up data or correlational studies. In recent years the trend has changed. There is more emphases on verifying explanatory hypotheses and observing changes in behaviour as a result of intervention of changes in situations.

HEREDITY ENVIRONMENT INTERACTION

An organism basically inherits a range of characteristics and there is a limit of their modifiability. Each genotype can specify a range of phenotypes. Environment can have very little influence on it. On the other hand, there are traits which are greatly modifiable by environment. Experimental

evidences can be cited to make this interactional view points more precise and clear.

In one of the studies Haldane (1946) demonstrated that individuals with genotype 'A' always scored higher than genotype 'B' but then they were exposed to two different environments 'X' and 'Y'. It was found that both the genotypes improved under environment 'Y' than under 'X'. This was an ordinal interaction. Better nutrition increases the heights of both men and women although in general men are taller than woman.

In certain situations the interaction is disordinal. For example, there are two genotypes 'A' & 'B'. There are two environment 'X' and 'Y'. Genotype 'A' Develops better under environment 'X' but genotype 'B' performs better under 'Y' environment. Europeans outlive Blacks in Europe because of their resistance to Tuberculosis where in Africa Blacks outlive Europeans because of their resistance to yellow fever (Haldane, 1946).

In some cases environment has no effect on one genotype but dramatic effect on the other. An illustration can be drawn from classroom instruction on two methods of teaching reading to 18 pairs of identical twins. Out of 18 pairs some of the twins pairs are average intelligence and some were superior in intelligence. One of the twin in each pair was assigned to a classroom and the other to another classroom instruction. Reading was taught by the phonic method in one room and sight method in another room. Within each room there were the average and superior children. It was observed that the average children learned better by the phonic method where as the gifted ones learned better by both the sight and phonic methods. In other words, two environments had same effect on the gifted but different effect on the average children.

The above findings show that environment acts on the genotype but genotype does not act on the environment. But this assumption is not true completely. Growth does not proceed in a simple reflex manner in relation to certain environmental manipulation. Rather there are evidences where heredity sets a limit in which environmental influences can act. The individual can act on the environment and control, manipulate and change the environment to his experiential level. In other words there is reciprocal relation between the individual and his environment. For example :

"There are parents who abuse their children tend to be impulsive, self-centred, imatured, self critical and less intelligent. Not all children activate these abuses. Only certain children do *i.e.* the chronically sick, the unmanageable ones, the malnourished. Hence, neither heredity nor environment alone determine behaviour, the emphasis is upon one or the other but both the factors interplay in determining the course of development.

But the fact remains, that we can easily manipulate the environment, create environment and produce behaviour change. Manipulation of heredity is a stupendous task, often baffling the genetists'' (Panda, 1983).

Seven types of investigations have been undertaken by different psychologists to explain the process through which such influences operate.

Selective Breeding. This pratice was used to identify specific hereditary conditions underlying the observed behavioural differences. Rather than simply telling that 'maze learning ability' is inherited, attempts were made to find out what chemical properties of the genes ultimately lead to behavioural characteristics. A follow up study on Maze bright and Maze dull rats developed by Tryon on various breeds and cross breeds of dogs it was crystal clear that 'difference in performance are produced by differences in emotional, motivation, and peripheral processes and the genetically caused differences in central processes may be light or non-existent'. Breeding differences in physiological characteristics were established.

BEHAVIOUR AND PHYSIOLOGICAL VARIABLES

Research on electroencephalograph recordings, autonomic balance, metabolic process and chemical factors substantiate that defective genes of dominant/ recessive genes through metabolic process cuase cerebral malfunctioning such as PKU, feeblemindedness, schizophrenic reactions.

PRENATAL ENVIRONMENT

Prenatal and paranatal deficiencies are significantly related to mental defect and psychiatric disorders in children. These deficiencies mostly occur in low socio-economic homes. Direct evidence on maternal nutrition and child's IQ has also been obtained in a study made by Haldane and his associates. Two groups of pregnant women were selected from the lower SES. One group was given a supplementary diet during the period of pregnancy and lactation. The other group was left to their normal diet. The children of these mothers were tested at age 3 and 4. Higher IQ was observed for the children of experimental mothers than those of the control.

SENSORY DEPRIVATION STUDIES

Animal studies in many cases offered most crucial evidence. Studies on prenatal radiation and neonatal asphyzia upon cerebral anomalies and subsequent behaviour development have established quite clearly the role of environmental factors. Sensory deprivation studies also demonstrate deficiencies in development of perceptual responses motor activity, learning, emotionality, and social reactions, and when animals are again put in nourished environment they invariably regain their depressed.

COMPARATIVE STUDIES ON CHILD REARING PRACTICES

Whiting and Child (1953) analysed the dat on child rearing practices of different primitive societies and clearly stated that personality development of children are influenced directly by child rearing practices. Whether we analyse from psychoanalytic orientation, or cultural orientation the fact clearly emerges that parent-child interaction contributes to the personality development of the child no matter what his genetic endowments may be.

SOMATO-PSYCHOLOGICAL FACTORS

Although Sheldon, Kretshmer and a few others have explained personality characteristics of the child according to the body physique yet direct evidences are wanting. More of research in necessary to find out the direct relationship between the two variables. But in any case it will merely provide an indirect estimate about hereditary influence.

TWIN STUDIES

Whatever information has been obtained regarding the role of heredity or environment it is primarily by comparing identical twins, fraternal twins under different child rearing conditions by using the cot-win control method over a short term period. It longitudinal studies are undertaken from very early age though school age the effect of heredity and environment will be more readily identified with regard to intellectual and personality changes in the twins.

These principles and factors of development are necessary for parents and teachers to know in order to regulate the development of their children and also to observe if there is any deviation. Successful development infact requires guidance for which a knowledge of normal developmental pattern is required. Lack of opportunity and lack of encouragement may delay developmental sequence.

REVIEW EXERCISES

Answer the following questions in 500 words each :

1. What are the principles of development ? Explain the principles by giving examples.
2. Point out the relationship between maturation and learning.
3. Discuss the relative importance of heredity and environment on the development of the child.
4. Write a note on the sensory deprivation studies in relation to development of behaviour.
5. What is the role of early experience on development ?
6. What are the views of Piaget and Watson on role of environment in the development of children ?

Write notes on in 50 words each of the following :

1. Stages of development
2. Concept of growth and development
3. Selective breeding
4. Sensory deprivation
5. Twin studies
6. Role of enriched environment
7. Heritability of Intelligence.

Write the answers to the following questions within 50 words each :

1. Stages of development.
2. Types of growth.
3. Rate of development.
4. Difference between growth and development.
5. Cephalo-caudal sequence in development.
6. Proximo-distal sequence in development.
7. Enriched environment.
8. Heredity.
9. Environment.
10. Size of the head.

Write whether the statements are True or False :

1. Mental development and physical development are not uniform processes.
2. Development is very rapid upto 3 years.
3. Development proceeds at different rate for difficult behaviour.
4. There compensation rather than correlation in development.
5. All children donot reach the development at the same age.
6. A child cannot come back after a poor start.
7. Child develops in a continuous manner.
8. There is a difference in rate of physical development.
9. It is not possible to accelerate development.
10. There is discontinuity in development.

Fill in the blanks :

1. .....is the beginning of development.
2. Development proceeds from.....to specific.
3. Early childhood is more important than.....childhood.
4. There is.....in the development of children.
5. Child hood shows the man as morning shows the.....
6. The period from 2 weeks to 2 years is known as.....
7. The period from 2 years to 6 years is known as.....
8. The period from 6 years to 13 years is knwon as.....
9. The period from 13 years to 16 years is known as.....
10. The effects of early experiences are neither enduring nor.....

4

Prenatal Development

Life of an individual begins when a sperm from the male enters into the wall of an ovum from the female. This movement or union is called conception. The characteristics of the parents are transmitted to their children at conception. The mechanism through which such hereditary characteristics are transmitted is knwon as 'mechanism of hereditary transmission.'

Each fertilised egg. otherwise called 'Zygote' contains 23 pairs of chromosomes equally released from both parents. The chromosomes contain genes. Genes are the carrier of heredity. Each gene is composed of a chemical called DNA. This DNA is actually the molecule of heredity. There are about 1,000,000 genes in a human cell, approximately 20,000 in each chromosome.

Inspite of this common carrier of heredity children born to same parents are not identical. Because each child inherits only half of each parent's genes. This combination occurs during the process of cell division. Only in case of identical twins heredity remains same, as in this case same fertilised egg splits into two individuals and the 46 chromosomes in the germ cell are divided always in the same way. It is possible only in rare case.

SIGNS OF PREGNANCY

The first symptom of pregnancy is a missed menstrual period although this may occur due to fear of pregnancy. Nausea or morning sickness occurs after about two weeks of conception and lasts until end of 3rd month. Tingling sensations appear in the breasts after about a month of conception with nipples becoming large and areas around these becomes dark. Frequent urination especially at night is another indication of pregnancy. Medical examination reveals that around sixth week the lower portion of the womb becomes soft. There is swelling of the abdomen by twelfth week. Various tests are conducted to ensure pregnancy by physicians such as frog test, rabbit tests etc. The average lasts about 280 days from the date of conception to the date of child birth.

COMPLICATIONS OF PREGNANCY

There are a few conditions which are more succeptible than others during pregnancy.

Cystitis is an infection of the bladder. The symptoms are frequent desire to urinate, pain and burning sensation during urination. It responds to sulfa drugs and antibiotics and fluid intake.

Ectopic pregnancy results when the fertilised egg implants itself in the Fallopian tube instead of the wall of the womb. Since the tube is small it tends to burst when the embryo increases in size. Surgery in necessary to save the mother.

Toxemia *i.e.* puffness in face and hands, persistent vomiting, severe strain in vision, rapid gain in weight indicates medical attention and control of salt intake and sufficient rest. Otherwise this leads to another complication *i.e.* Eclampsia whose symptoms are difficulty in breathing, convulsions and in extreme cases coma. These occurs primarily in the case of first pregnancy and lasts 3 months during pregnancy.

There may also be premature misplacement and separation of placenta demanding immediate medical care for saving the mother and baby as well.

MENDEL'S LAW OF HEREDITY

The basic principles of heredity were formulated in 1865 by Gregor Johann Mendel (1822-1884), an Austrian monk. He has pollinated red and white flowers of true breeding species of a garden pea which is self pollinating and which he called parental generation (P). Then their seeds were collected to grow the first fillial generation of F1; these were self pollinated to produce offsprings of the second fillial generation or F2. After many years of experiment Mendel concluded that :

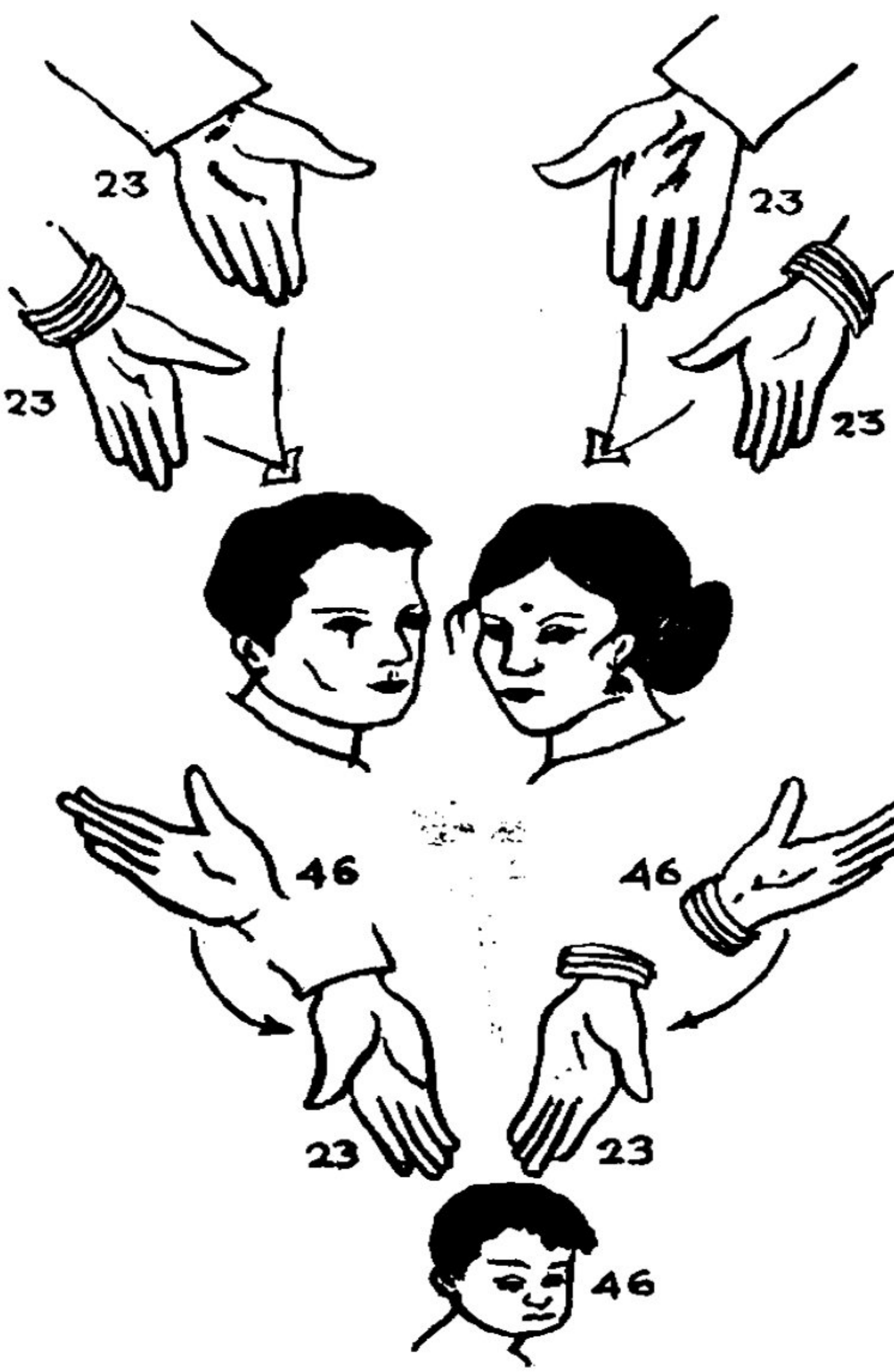
(a) the flowers of the first fillial generation had both characteristics of redness and whiteness. Mendel called such individual or offspring having dual characters as hybrid.

(b) that something takes place by which the two characters (redness and whiteness) are segregated or separated in the next fillial generation.

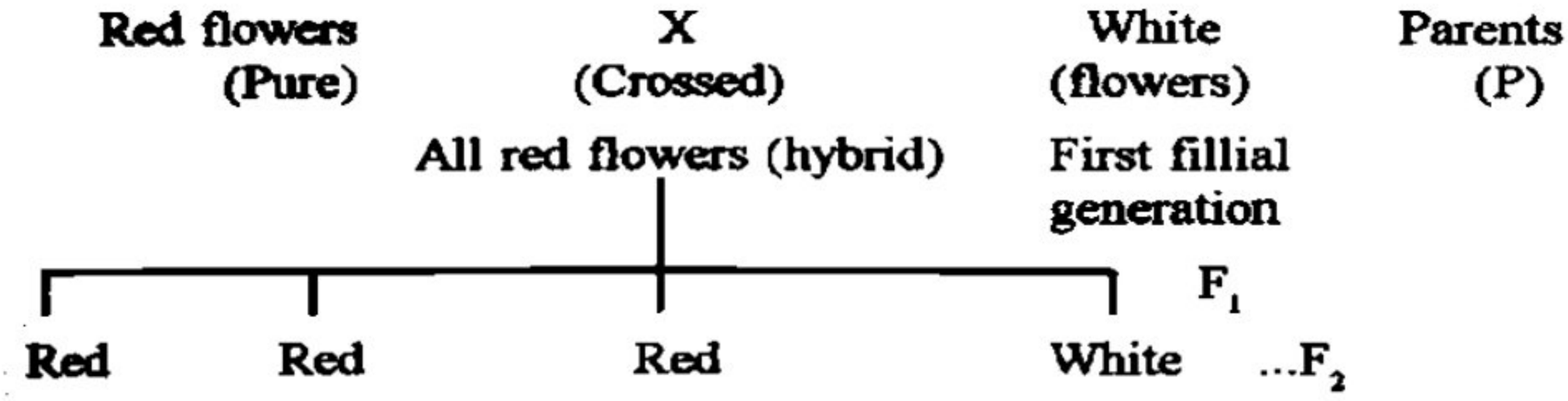
These experiments can be graphically represented.

Gregor J. Mendel

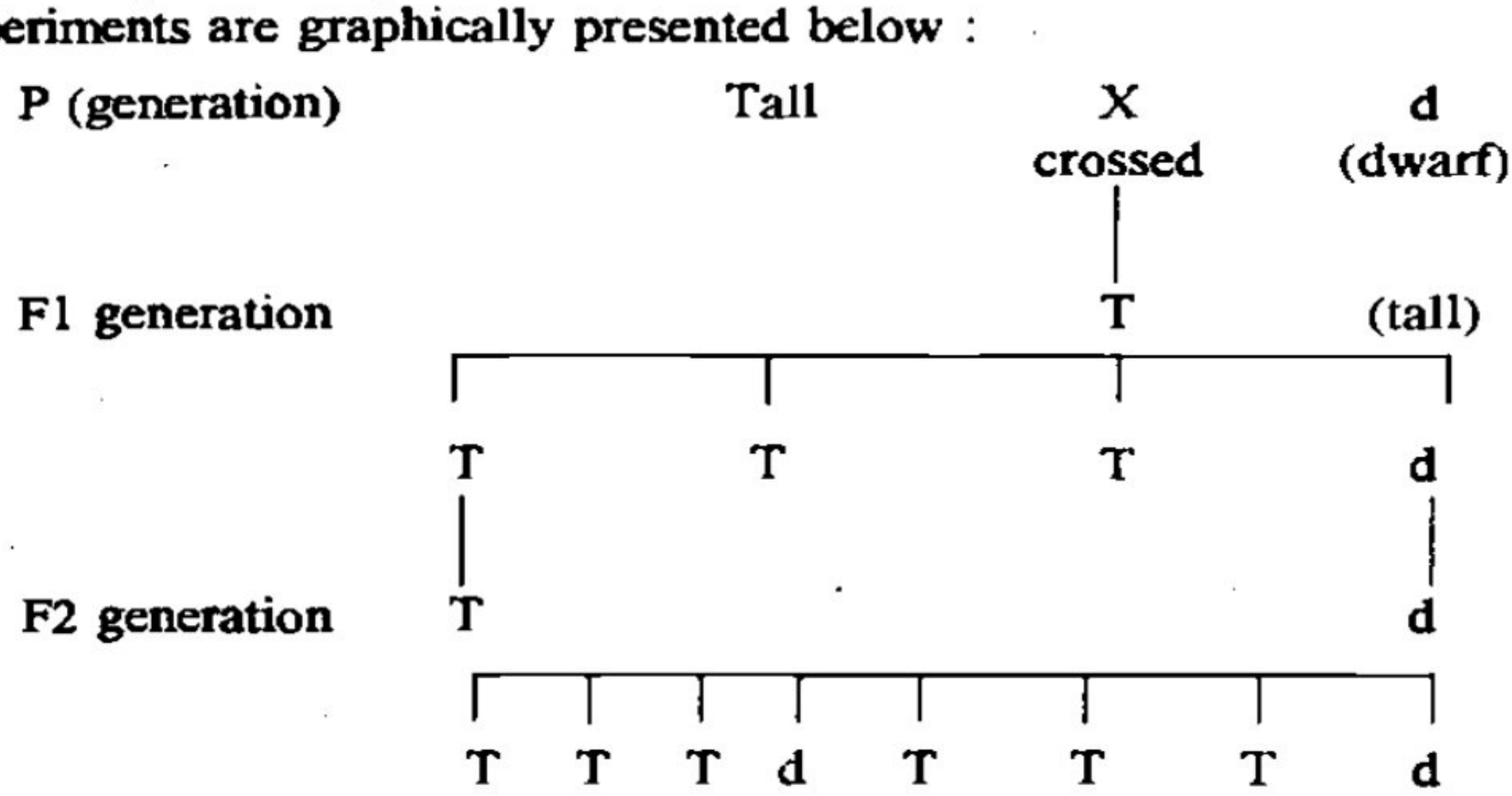
Every man and every woman
at conception receives 23 chromosomes
from each parents.



The heredity of the child is
determined by 46 chromosomes
i.e. 23 chromosomes from each parent.



Another example can be given to illustrate Mendel's contribution to heredity. He crossed a Tall (T) variety of pea with a dwarf (D) variety. The resulting seeds when planted always produced Tall plants (F1—the first fillial generation). The character for dwarfness did not appear at all in the F1 generation hybrids. Then Mendel permitted F1 hybrids to self pollinate. He found that the F2 generation has mixed progeny of all and dwarf plants. The original parental types (tall and dwarf) appeared to the F2 generation in the approximate ratio of 3 : 1. This shows that dwarfness disappeared only in the F1 generation but was not completely lost. When the F2 dwarfs were self pollinated they produced only dwarf offsprings in the F3 generation. The F2 Tall plants were of two kinds. One third (25% of the total F2 progeny) on self pollination produce only tall plants in the F3 generation and were therefore pure talls. The remaining two third (50% of the total F2 plants) when self pollinated produced both Tall and dwarf in the ratio of 3 : 1. These experiments are graphically presented below :



On the basis of the above experiments, Mendel, propounded certain laws. The important laws are :

(a) Mendel's law of dominance

This states that in crossings between organisms, for a pair or contrasting characters, only one character of the pair appears in the F1 generation. The

character that expresses itself in the hybrid is called dominant and the alternative or that fails to show itself is called recessive.

(*b*) The law of segregation

According to this law, the F1 hybrid tall peas of Mendel's experiment will produce two kinds of gametes, some carrying the factor of Tallness and an equal number carrying the factor for dwarfness. This law can also be defined as non-mixing of genes in the hybrid. A gamete is pure for a character.

(*c*) The law of independent assortment

Every character is inherited independently of every other character. The different maternal and paternal characters (or other genes) present in the offspring of the hybrid will undergo independent assortment for the production of all the combinations of genes in the gametes. The result is that in each generation random combination of characters or their genes takes place.

After some years law of mutation was introduced. According to this law some characteristics which are not present in parental generation do appear due to chance factors and that cannot be explained by Mendel's laws of heredity.

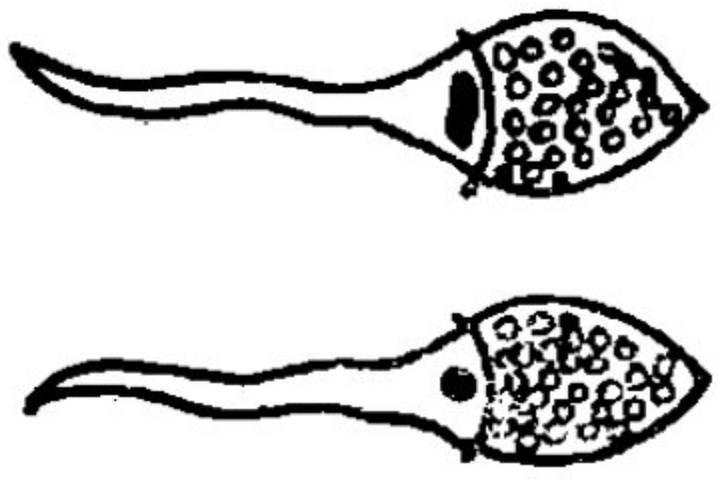
SEX DETERMINATION

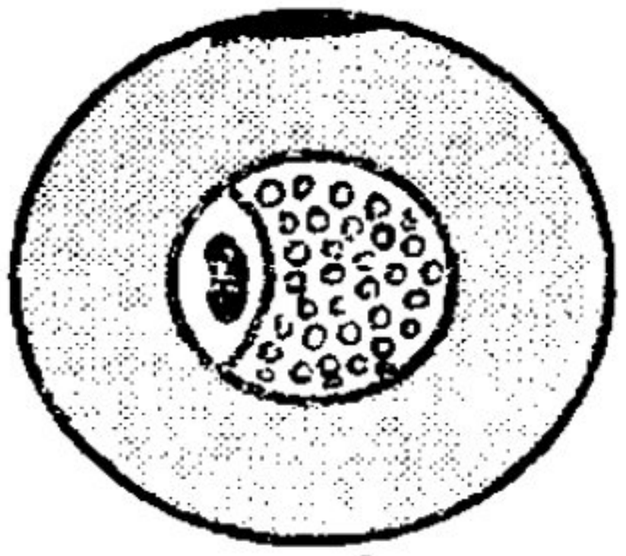
A curious question often arises, as to how the sex of the offspring is determined ? Recent advances in the field of biology have made it possible to explain. Out of the 23 pairs of chormosomes, one pair is responsible for determining the sex of the child. In the female this pair contains XX chromosomes which are large in size. In the male, there is one large chromosome (X) and another small chromosome known as (Y) chromosome. When mating between a male and female occurs and the ovum containing X unites with a sperm containing Y choromosome, the result is a boy (XY). On the other hand, when sperm and ovum are united each carrying X chromosomes, there is the development of a female baby (XX).

PRENATAL GROWTH

It has been already stated that life beings at conception and not from the time of birth. Birth is only a point in the continuity of development. Conception occurs during mating of a male with a female. And there are particular periods when mating results in conception. In other words, around the middle of menstrual cycle, an ovum ripens in one of the two ovaries. It then enters into the Fallopian tube and marches towards the uterus. This ripening of the ovum occurs only once in every 28 days. Further, during the

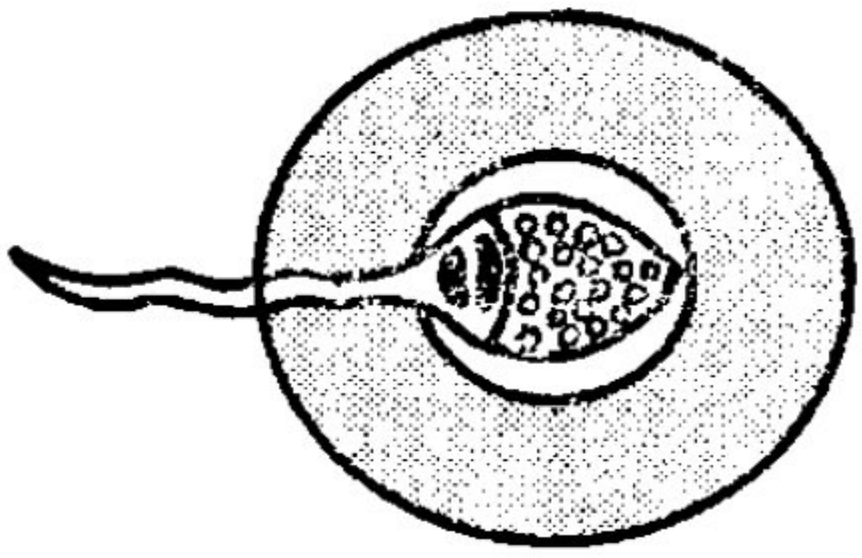
Father produces sperms of two kinds, in equal numbers :
(a) with large X sexchromosome. (b) with small Y chromosome





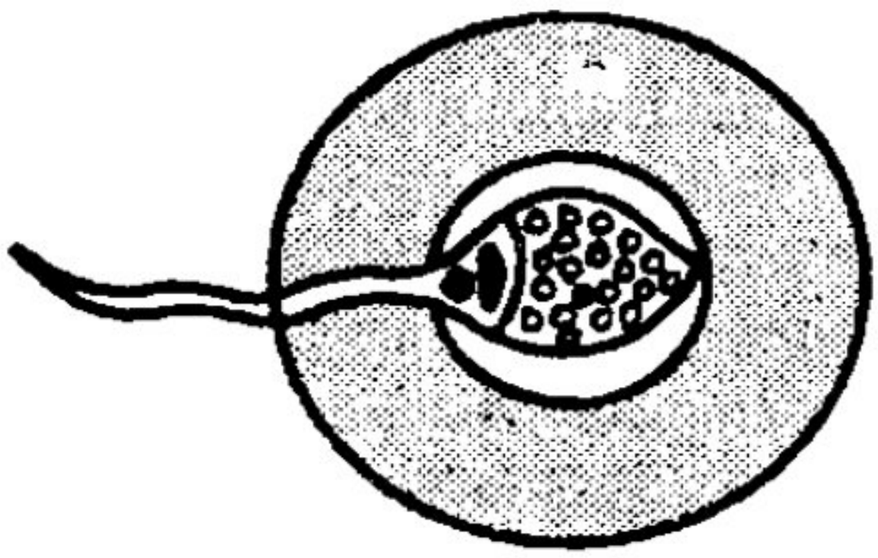
Mother produces eggs all of one kind,
each with a large X sexchromosome.

1. If sperm with X enters egg :



X X

A Girl



X Y

A Boy

2. If sperm with Y enters egg :

course of its journey to the uterus, if it unites with a sperm, as a result of mating at this time of menstrual cycle, then conception occurs.

At the beginning of this union of sperm and ovum, the chromosomes line up and split, and the process of development begins. The fertilised ovum or Zygote is very small at conception, about 1/175 of an inch in diameter. The period from conception upto the time of birth is best known as Prenatal period, which is again subdivided into three phases : period of ovum, embryo, and fetus. The 10 lunar months (280 days) are marked off into these divisions.

PERIOD OF OVUM

The period of ovum extends from the time of fertilization upto the end of second week of life. During this period the size of the ovum is about the size of a pinhead and the size hardly changes because it does not receive any external nourishment. Around 10 to 14 days after fertilization the ovum will attach itself to the uterine wall. Before the 10th day it was unattached and free moving. When it becomes attached to the uterine wall, it derives nourishment from the mother. The period of ovum then comes to an end.

PERIOD OF EMBRYO

The period of embryo extends from third week to the end of second lunar month. Growth of the embryo becomes rapid. By the end of this period the embryo has all the important external and internal features of the human being. The embryo begins to function by the end of 3rd week. By the end of second month the embryo is approximately 11-2 to 2 inches long and weight 2 grams to 2/3 ounce.

In fact, the inner cell of the fertilised egg which develops into an embryo begins to differentiate into 3 layers from which different organs develop.

(*a*) **Ectoderm**. The outer from which skin, hair, nails etc. develop.

(*b*) **Mesoderm**. The middle layer out of which muscles, skeleton, circulatory and excretary organs develop.

(*c*) **Endoderm**. The inner layer from which the gastrointestinal tract, Eustachian tube, lungs, lines, pancreas, salivary glands etc. develop.

Various nutritional substances from the mother passes to the embryo through the placenta. The placenta regulates the embryonic development.

PERIOD OF FETUS

This period extends from the end of second lunar month to birth. Upto this time the fetus was passive and was floating quitely in the amniotic fluid. It becomes capable of reacting to tactile stimulation. By the end of 3rd month,

it becomes about 3 inches long and weights 3/4 of an ounce. Muscles are well developed. Eyelids and nails are developed. The sex of the fetus can also be distinguished.

In the fourth month there is rapid increase in growth. The fetus now becomes 7 inches in length and weighs approximately 4 ounces. The head is disproportionately large. The digestive system is fairly well established. The fetus is active. The food intake, oxygen and water is increased. The eyebrows and genetal organs are fairly noticeable.

Around 5th month, the mother begins to feel the movements of the fetus. By this time the fetus has become 4 ½ inches long. By the end of 5th month it becomes 10 inches long and in weight, it is about 8 or 9 ounces. The fetus resembles a human baby. The fingers grip; eyes blink; mouth opens and closes. The skin is developed which protects the fetus. The eyelids are still fused and shut. Except lungs all other internal organs are matured. The fetus has now both sleeping and waking moments.

The sixth month fetus is over a foot in length and is about 1 ½ pound in weight. It looks as a miniature baby. The eyelids are separated. Finger nails appear. The fetus can now make eyelids are separated. Finger nails appear. The fetus can now make a fist. Bones have become gradually hard. Sometimes babies are born at this stage but they very rarely survive.

During the third trimester i.e. seventh to ninth month there is rapid growth and increase of weight. The weight is about 6 pounds and height 1 ½ to 2 ft. Crying, breathing and thumb sucking appears in the seventh month The uterus becomes cramped. The brain stem is developed but neural functioning is not perfect. That is why there are respiration problems if babies are born at the seventh month. By seventh month almost all sensory functions appear in the fetus excepting sensitivity to pain. Many children are born at this stage and they reveal the following characteristics :

Movement and muscle tones are poor; avoidance to bright stimulation; breathing is irregular; head turns to sides; crying is absent; and no definite period of waking and sleeping. These functions are all modified and well developed when the fetus reaches the end of 10th lunar month. The nervous system is now adequately developed and it functions independently.

ENVIRONMENTAL FACTORS INFLUENCING PRENATAL DEVELOPMENT

Human development is complex. Neither heredity nor environment shapes the course of development. It is as a result of the interaction of the two that various growth and behavioural characteristics are manifested in human beings. It is true that genes carry hereditary influences but genes develop

under different environments. Recent researches have established some crucial factors which influence the development of the child during prenatal period.

Age of the Mother

Age of the mother during pregnancy is responsible for the mental development of the child. If mothers become pregnant before they reach 20 years or after they attain 35 years, there is a greater possibility that less intelligent children will be born to such mothers. Especially the danger of having retarded children is more when mothers become pregnant in their late 40's. Studies have shown the best age for women to have children is between 21 to 28.

Nutrition

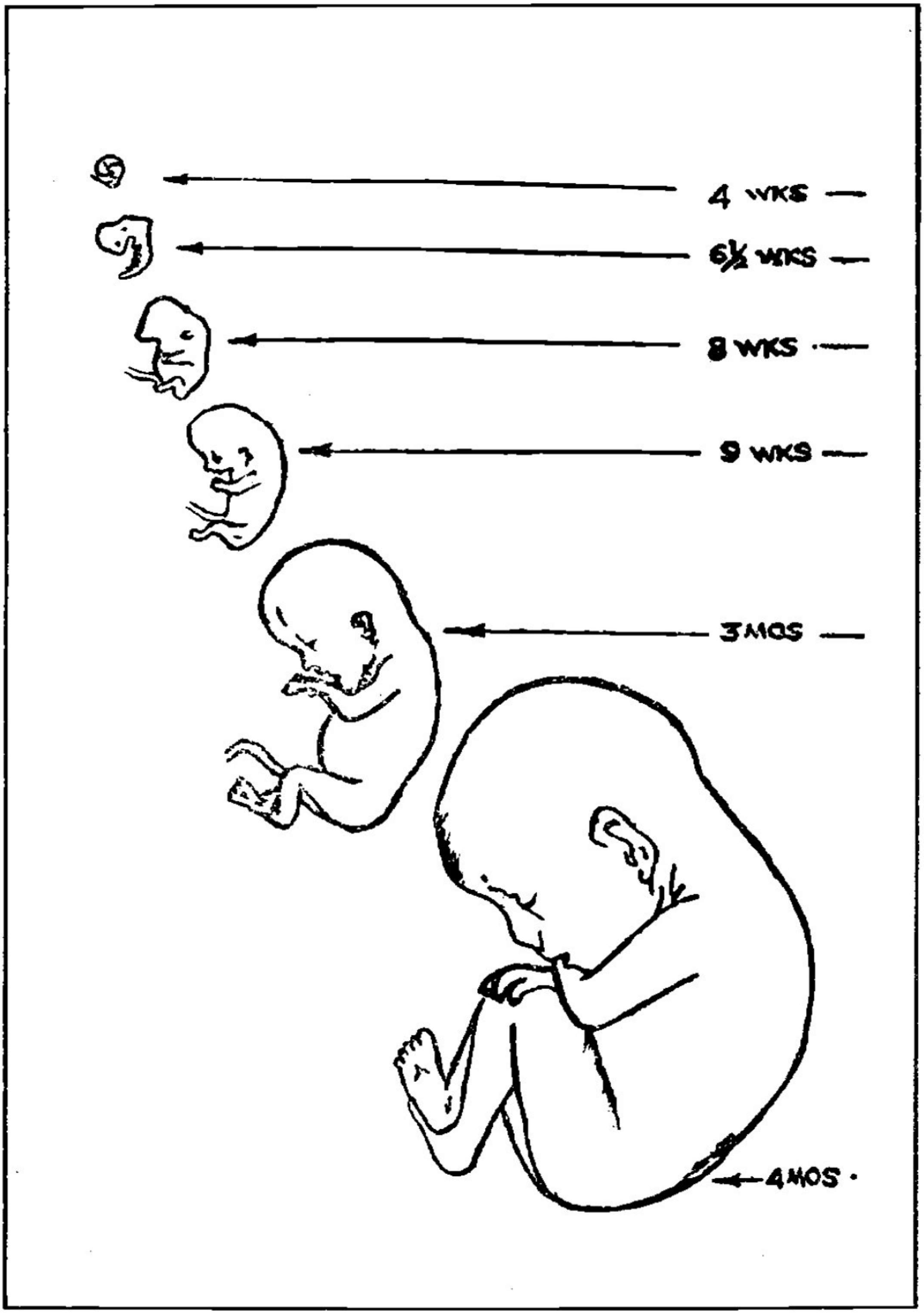
During pregnancy the mother not only needs better food for herself but also for the growing fetus. The fetus derives the food from the blood stream of the mother through placenta and umbilical cord. Hence, if the mother suffers from malnutrition, complications such as aneamia, toxemia, premature and still birth, miscarriages do arise more frequently. If the mother is poorly fed during first four to five months of pregnancy the baby born to such mothers suffer from pneumonia, ricket, cold bronchitis, immediately after birth. Burke has observed that lack of sufficient protein in mother's diet is responsible for premature birth and neural defects in the infant. Mental retardation of the baby has also been associated with maternal malnutrition in the prenatal stage.

Drugs

Intaking of drugs by the mother has a deleterious effect on the development of fetus. For example, if the mother takes thalidomide of fetus. For example, if the mother takes thalidomide during pregnancy, the child is born with anatomical defects. Respiratory troubles in children are seen if the mother has taken barbiturate drugs during labour period. Use of seconal sodium during labour also results in low cortical activitas as revealed from EEG records. Besides, permanent brain damage to infants occur if the mother remains under excessive drugs during pregnancy.

Smoking

Smoking by pregnant mother affects adversely the development of fetus. Heart rate of the fetus is often accelerated following mother's smoking. It may lead to impairment in the heart and circulatory system. Alcohol, tobacco, etc. have similar adverse effects.



Prenatal development of the human baby

X-Ray Treatment

It has become a fancy even with the rich and educated elite to check the pregnant mother and development of the fetus by frequent exposure to X'ray. Medical science has shown that frequent X'ray treatment precipitate abortions and other damages. In addition usually physical and mental abnormalities appear. In a research investigation, 75 full term babies were observed whose mothers underment frequent X'ray treatment. Of the 75 babies, 25 had mental and physical abnormalities; 16 became microcephalic; and 8 were blind and physically deformed; 20 had severe disturbances in their central nervous system. The disaster is still more if X'ray treatment is applied at the early stage of pregnancy.

INFECTIONS AND CHRONIC DISEASES OF MOTHER

Mothers who suffer from syphilis face miscarriage. Their children become extremely weak and mentally deficient.

If the mother gets infection by German measles during early pregnancy, the child is more likely to be mentally retarded. Nearly 47 per cent of the children born suffer from mental retardation if the mother gets an infection of Rubella or German measles in first month of pregnancy; 22 per cent of these become victim to deficiency in case of the infection if occurs in 2nd month of pregnancy and nearly 7 per cent suffer in case of infection during the 3rd month of pregnancy. Besides mental deficiency such infections do produce deafmutism, cardiac lessions, contracts etc. Mothers who suffer from diabetis during pregnancy give birth to children with respiratory and circulatory troubles. Toxemia *i.e.* swelling of the limbs during pregnancy leads to kidney troubles in the mother and intellectual deficiency in children.

Rh-incompatibility

Differences in blood composition of the fetus and the mother leads to bio-chemical incompatibility. The Rh-positive fetus produces antigens which enter into mother's blood stream. Antibodies are formed in the mother's circulatory system and these antibodies are passed into the fetus through placenta. The red blood cells of the fetus are destroyed and it also prevents supply of oxygen to the fetus. Consequently it creates erythroblastosis leading to death of the child in most cases. In case of chance survival, the child suffers from paralysis. The first born children are not affected by this blood incompatibility. Recent advances in medical sciences have been able to take care of this incompatibility by blood transfusion when detected early in pregnancy.

Maternal emotional states

Mother's emotion influence the fetus through glandular changes caused by her emotions. Whatever may be the cause, if the mother remains in tension, anxiety, and depression during the pregnancy period it leads to increased fetal activity which makes the baby leaner than the normal baby. Again, if tensions occur early in pregnancy then damage dome to the fetus is more. A woman resents to be pregnant but becomes pregnant is emotionally more upset for having a child. This emotional attitude is more damaging not only for the fetus but for future psychological adjustment of the baby.

Birth hazards

Certain factors at the time of birth also cause damage to the unborn child : (a) hemorrhaging and (b) failure to breathe early. In case of birth injury or injury to the head during delivery the blood vessels in the brain are destroyed. Hence, supply of oxygen to the brain becomes limited. The brain cells die for want of oxygen. As a result, the child may die or become deficient. When the cells of the brain stem are damaged motor defects are likely to occur. The child may also have difficulty to speak.

It is clear partly from the foregoing discussions that hereditary factors might affect an individual in important ways but the prenatal influences certainly contribute greatly how the Zygote has to develope itself into a full grown baby. The prenatal period is a critical period for the to-be-born child in as much as the first three years is for the new born baby. All effects of deprivation can be offset but enrichment studies are not very convincing.

Teratogenic Agents affecting the Embryo

It is any substance that causes a change in the genetic code. This in turn produces abnormalities in growth and behaviour of the baby. Teratogenic agents environmental or genetic affect genes and protein poduction. The genes may be damaged or become incapable. Ezymes may be blocked or totally destroyed. As a result of these, there may be developmental halts, incomplete development or overgrowth. Thallidomide is a dangerous drug which affects development of arms and legs as would be seen from the following summary table which contains other agents which inhibit growth.

Category	*Cause*	*Effect*
Physical	X'ray of the mother during pregnancy	Malformation of any organ, depending upon stage or development of the embryo
Infections	Rubella	Brain damage, Mental Retardation, sensory loss in hearing and visual field
Chemical	Quinine	Possible deafness and malformation.
	Thalidomide	Taken after 21 days of pregnancy creates absence of external cars, cranial nerve paralysis. After 25-27 days creates agnesis of arms, after 28-29 days creates agnesis of legs.
	Vitamin A	Large dosage taken during pregnancy creates cleft palate, eye damage, congenital abnormalities
	Vitamin D	Large dosage taken during pregnancy cause mental retardation
	Alcohol	Mental subnormality.

Vitamins

Deficiencies of vitamin C, B-6, B-12, D, and K in mother are especially responsible for inhibiting prenatal development of the fetus.

These factors are therefore, very essential for maternal care of the pregnant mother and unborn baby.

REVIEW EXERCISES

Answer the following questions in 500 words each :

1. What is Mendel's law of heredity ? Explain the mechanism of hereditary transmission.
2. Describe the prenatal environmental influence on the development of the fetus.
3. What physical and psychological changes take place after birth ?
4. What care the mother might take to give birth to a healthier child ? Describe briefly.
5. What are some signs of pregnancy and complication of pregnancy ?
6. Explain the effect of the following :
   (*a*) Rh-incompatibility on growth of fetus.
   (*b*) X'ray on infant behaviour.
   (*c*) German measles on mental characteristics of children.

(*d*) Maternal intoxication on growth of new born baby.

Write notes on in 50 words each :

1. Period of Ovum
2. Determination of Sex
3. Law of dominance
4. Period of embryo
5. Period of fetus
6. Conception
7. Maternal emotional states
8. Birth hazards.
9. Contribution of Mendel to Child Psychology
10. Hereditary transmission process
11. Law of dominance
12. Law of independent assortment
13. Zygote
14. Rh-factor.

Write whether the statements are True or False :

1. Identical twins reared apart develop in similar way.
2. Childs sex is determined by combination of XY chromosome.
3. There are 47 chromosomes in a mentally subnormal child.
4. Heredity sets the limit of development.
5. Fraternal twins have common heredity.
6. DNA is the molecule of heredity.
7. Each gene is composed of a chemical called DNA.

Fill in the blanks :

1. .....is the carrier of heredity.
2. X chromosome when combined with.....chromosome of the mother produces a male child.
3. X chromosome when combined with.....chromosome of the mother produces a female child.
4. Personality of the identical twin is.....when they are reared apart.
5. Ovum period extends from conception to.....
6. There are.....pairs of chromosomes in a fertilised egg.
7. .....is responsible for sex determination.
8. When sperm and ovum one united.....is formed
9. Sex of fraternal twins are.....
10. Mother in case of Drugs have a.....effect on child.

5

The Neonate : Effects of Birth on Development

Life does not begin at birth, it begins at conception. Birth is merely an interruption. "Birth represents a transition from a parasitic type of sheltered existence in a relatively invariable environment to a physiologically autonomous existence in a less protected and highly variable environment"—Ausubel and Sullivan (1971). Because of birth, the organic system and sense modalities are brought into use for the first time. These organic system need time for adaptation and adjustment.

PHYSIOLOGICAL AND PSYCHOLOGICAL CHANGES

Immediately after birth the neonate starts the respiration for his own survival. A few infants have difficulty in establishing respiration after birth. Birth cry becomes the first sign of life after birth. But breathing is imperfect and irregular. At birth, respirations are mostly of the abdominal type and during sleep average about thirtytwo per minute as compared to 20 in the adult. There is change from fetal to nasal respiration because the former is not adequate for the full term fetus. In fact, during the last few weeks of prenatal life the amount of oxygen available from the placental circulation becomes insufficient leading to severe anoxia if pregnancy is prolonged beyond term. There is high mortality rate in post-masture infants due to oxygen deficit.

The two major cardiovascular changes at birth are (*a*) termination of the placental circulation that links maternal and fetal blood systems. (*b*) Obliteration of the shunts and channel fetal blood away from the lungs at birth. The fetus oxygenate his own blood and the lungs are inflated with air. Neonatal pulse rate is approximately twice as that of the adult, and blood pressure is only half as high as that of the adult, and blood pressure is only half as high as that of the adult.

For the first time ingestion and digestion of food occur after birth. The neonate looses weight during the first few days of life but tends to regain has

birth weight after a week. First born children loose less weight than do later borns. Infants born in summer and autumn regain their weight sooner than those born in winter and spring. The kidneys also become functional at this time since wastes can not be disposed of through the placental channel.

Birth has certain psychological effects. Birth is considered as a catastrophe in the life of the child. The feeling of oneness with the mother and the serenity of the womb always remind the child when the child feels helpless and insecured. This feeling becomes the primal basis for later anxiety. Clinical studies support such kind of mental reactions.

PREMATURITY

There is variability in period of gestation and in the rate of prenatal development. Because of these reasons children vary in degree of maturity at birth. The Mean length of the gestation period is 280 days with an upper limit of 334 and lower limit of 180 days (Carmichael, 1954). Approximately one third of all post-mature infants fail to survive if the mother is primiparous and over 26 years of age (Clifford, 1954). Prematurity is most likely to occur among first born children.

Nearly 5 to 10 per cent of all live births are prematurely born. Very rarely children born before 26 weeks of age survive. Survival infact, varies according to the period of gestation and weight of the baby.

Prematurity is associated with unmarried motherhood and advanced age of the mother, with maternal infection of Rubella, congenial Syphilis and Rh-incompatibility and inadequate maternal nutrition.

Prematurity accounts for physiological and anatomical anomalies. Prematurity is ? casual factor in more than half of all neonatal deaths. General activity level is lower and required responses are rudimentary. His respirations are shallow. His body is very weak. He is unable to regluate body temperature effectively. Prematurity is ascertained primarily on the basis of birth weight which is less than 5 lbs. The head circumference is less than 33 cm. Scalp hairs are shorter that 2 cm. Crown-Tump length is less than 32 cm.

The prematured born infant requires a special environment for improvement, most nutritional adequacy. The prematurely born child experiences retardation in postural, locomotive and manipulative activities.

The prematurely born child does differ from the normal baby. The fetus is likely to be restless, distractible and displays motor and cognitive deficits during the first year of development. In case, the child weighs less than 4 lbs, he hardly survives and in case he survives, he becomes a severely brain damaged child. After the 9th month no damage occurs to the baby due to premature birth. Nearly 10 per cent of the children are born prematurely and

most of them are due to maternal malnutrition, anoxia, toxemia and emotional stress.

Prematurely born infants are show in physical growth. They have more physical illness. They are slow in motor development and are mentally deficient and are retarded in language development. They are highly sensitive to sounds and noises and are easily distracted. Nervous symptoms *i.e.* thumb sucking, irritability, tempertantrums are seen among these children. In early childhood they are shy, dependent but later on problem behaviours are more often seen.

TYPES OF BIRTH

The effects of Birth injury on development depends largely upon the types of birth. Hurlock (1972) describes four different types of birth : Spontaneous or normal birth, Breech birth, Transverse-presentation birth, and Caesarean-section birth. In spontaneous birth no external aid is required. The head appears first, followed by one shoulder and the other and so on. This is normal and no complication occurs usually. The breech birth uses instrument to get the baby out since the buttocks appear first in the birth canal followed by the legs, arms and finally the head. In the Transverse-presentation birth, the fetus lies cross-wise in the uterus. The child is born only after instruments are used. When fetus is large enough to pass through the birth canal with a difficult and prolonged labour. Surgical methods are applied to deliver the child through maternal abdominal wall. Although in case of the birth through prolonged labour, the later developments of the infant are affected adversely, it may also happen in normal deliveries if the mother is emotionally tense and fearful of child birth.

BIRTH INJURY

When the neonate is born after prolonged difficult labour Asphyxia becomes a common complication. Sometimes fracture in the skill, intra-cranial hemorrhage and cerebral laceration may result. Development becomes retarded in the first two years of life, perceptual and motor defects do appear. Inter-cranial injury may lead to convulsive disorders, cerebral palsy and mental retardation.

Anoxia refers to interruption of oxygen supply to the brain. This is more common and damaging than Asphyxia *i.e.* pressure on the brain. A total lack of oxygen to the brain will kill the brain cells in 18 seconds. Anoxia is caused by prematurity or abnormality in circulation.

Epilepsy is most common in breech birth because of damage to the brain call due to oxygen deprivation. The transverse type of birth which uses instruments, if applied to fetal head, causes brain injury. The infant born

through caesarean method is less likely to have brain injury but has difficulty of respiration and the brain cells might suffer from oxygen deprivation. Less serious disorders are : Loss in auditory acuity, slow breathing, less initial activity following birth, hyper irritability and general Psychomotor problems, lower attention level, reading disability etc. Prematurity also affects birth process and development adversely.

THE NEW BORN BABY

The neonate makes certain major adjustments. These are :· adjustment to temperature, breathing, nourishment, elimination process because of the vast differences in internal and external environment.

Several reflexes appear at this stage. Moro or startling reflex appears in the new born due to loud noise, bumping crib, sudden loss of support. The neonate draws legs up, arms are brought forward in hugging. It must appear in normal babies. Its absence indicates brain damage. Hands grasp objects with firm grip than let go. Toes curl downward. Absence of this grasping reflex indicates neural depression. Absence of sucking while touching lips indicates immaturity, brain injury, retardation. Hot milk bottle, pinpricks induce withdrawal behaviour. The neonate cries in pain. Absence of this behaviour indicates immaturity and damage of brain.

Babinski reflex appears when there is stimulation in the foot. The neonate spreads the toes. If it persists it indicates malfunction. These are some of the reflexes which appear in the neonate.

The first two weeks or a month of postnatal life refers to the period of neonate. The neonate's general appearance indicates disproportionate head, eyes, trunk, and limbs in relation to childhood standards. Mean weight at birth is between seven and one half pounds and mean length is 20 inches. First born infants tend to be smaller at birth than later borns. Infants from lower socio-economic levels tend to be smaller and lighter at birth.

The behaviour of the new born is general and of gross nature. There is little cortical inhibition of control which is necessary for specific and directed movements, as well as for integration and coordination of movements. The whole body is almost involved even in simple act like sucking. The neonate shows eyelid closure in relation to illumination or a blast of air, pupilliary contraction and dilation in response to change in illumination, nystagmus sneezing urination, defection, balancing, movements of the head in response to change in bodily position, tonic neck reflexes, knee and ankle jerks, Gradually specific behaviour develops. The grasping reflex is replaced by voltitional reflex which again is replaced by voltitional grasping involving the thumb. Reflex behaviour undergoes relatively little developmental change after the neonatal period.

CRYING

Crying and whinning are the only sounds the new born is able to utter and are invariably accompanied by mass activity. Crying is not under cortical control and serves no communicative purpose and is different from speech sounds. At the earlier stage it is involuntary but later on its casual relationship to need reduction is established.

Hunger accounts for 1/3rd of all crying. Its incidence is just prior to feeding. Infants cry less when there is some type of auditory stimulation present and if they are kept in a prone position.

FEEDING

Neonates suck when they are awake or aroused irrespective of degree of hunger. Ordinarily the neonate sucks milk from any thing that is soft. The older neonate sucks more vigorously and is less responsive to irrelevant stimuli. Gradually the neonates are placed on a feeding schedule. Breast-fed babies are more agitated and show more sucking than bottlefed babies.

SLEEP

The younger the child, the longer he sleeps. The neonate sleeps from 16 to 20 hours a day. But individual periods of sleeps are relatively short, approximately three hours in duration. At birth, almost equal amounts of sleep occur during day and night but by the 16th week twice as much sleep occurs at night as during the day. With increase in age total time for sleep decreases. Most of this decrease occurs during the first three months of life. Further, individual periods of sleep and wakefulness become longer in the older infant.

PAIN

The infant is sensitive to pain and this sensitivity painful stimuli increases during the first four days of life. A little pin prick, produces pain in the infant. The infant's reaction to pain is not enhanced by anticipatory anxiety or emotional reactions to threatening stimuli but by painful physical stimulus. All skin sensitivities are highly developed in female than in male infants.

SENSORY — RESPONSE DEVELOPMENT

The sensory response capacity of the neonate is little different from that of a full term fetus. The neonate is exposed to a greater degree of exposure to adequate stimuli in postnatal life.

VISION

At birth the eyes appear to function quite independently. Monocular vision

occurs during the first six weeks and binocular vision thereafter. The neonate responds to light very repidly. Intense stimuli of short duration elicit pupiliary contraction, eyelid closure, the Moro and startle reflexes etc. Brightness discrimination undergoes rapid improvement during the first two month of life. Visual acuity increases with age. The infant prefers familiar faces to desings of pictures. The infant is able to discriminate patterns, forms, shapes at a crude level but color discrimination is late to develop.

Robert Fantz (1965) conducted experiments on visual acuity of young infants. The young infant typically looks for longer time at the stimulus that is tall. If he is shown two stimuli with differing amount of contours or height he will look longer at one of them. This indicates that he differentiates between the two.

Fantz concluded that as two weeks of age the infants can detect the difference between a grey patch and a square of stripes that are only 1/8 of an inch wide, at a distance of 9 inches from his face. At 3 months of age, the infants will look longer at stripes of 1/64 inches wide than at a grey patch, at a distance of 15 inches.

By the time the infant becomes half year old, his visual acuity is comparable to that of any child or adult.

Fantz (1965) did another study to study differences in fixation time for six different patterns for infants of varying ages. All five stimuli with Black and White contours hold the infants' attention longer than the plain grey patch, as early as 2 days of age. This is not due to learning but due to the result of biological characteristics of the central nervous system. This enables the child to focus on the mother's eyes because of black and white contrast.

HEARING

Because of presence of amniotic fluid or mucous in the middle ear and Eustachian tubes the neonate's auditory acuity is still poor. The Neonate is less sensitive to sounds. Even when a sound occurs over 10 seconds the neonate is not very clear. Most infants can discriminate the location of sound within the first 3 to 4 days after birth.

In fact, much less is known about hearing of the child between 2 weeks and 1 year of age. The new born is capable of hearing at birth, and is sensitive to location of sound as well as to frequency. Experiments have shown that new borns can discriminate between tones of 200 and 1000 cycles per second *i.e.* between a fog horn and a clarinet whether he responds to tones or not can be known from his motor movements, babbling, heart rate changes etc.

The new born reacts differently to sounds differing in frequency or pitch. Low frequency sound causes more of motor behaviour (200 to 600 cycles). High frequency sound (4000 cycles leads to freezing behaviour and a dramatic alerting behaviour as if the child is asking, what is it ?

Sounds of short duration have a minimal effect (less than a second). Sounds of 5 to 15 seconds have maximal effect on the activity level of the new born. If sounds last too long, and the infant becomes less responsive.

Third quality of sound is rhythm. New born responds quickly to rhythmic sound than two dysrhythmic sounds. This is a learned rection. Low frequency rhythmic sounds tend to stop baby's crying. This is why learning over a baby and rhythmical repeating hello... hello....in a low voice is often very effective in quieting an upset infant.

TASTE AND SMELL

Taste and smell sensitivity of the neonate is minimal. The neonate reacts positively to sweet stimuli and negatively to bitter ones during sucking. Taste discrimination tends to improve during the neonatal period. Taste and smell sensitivity is knwon from facial grimaces, respiration and circulation, crying etc. Olfactory sensitivity is not well studied and well developed in the neonate.

These early neonatal indeces are useful for diagnostic and prognostic purposes when early infant complications are seen.

GENERAL BEHAVIOUR

The neonate exhibits generalised or undifferentiated excitement in emotional situations. These occur mainly due to loud noises and other abrupt or intense stimuli. Smiling occurs to familiar faces. Although some conditioning of behaviour and discrimination appear at the neonatal level yet much of these activities are at the subcortical level, and are reflexive. This gradually gives way to more cortically controlled activities. Early environmental stimulation has significant effects on the growth of the neonatal system and his characteristic ways of functioning .

An understanding of the effects of birth on development of the new born reveals various significant features and characteristics which are the result of interaction between genetic endowments and environmental pressures and forces. In general, the characteristics and trends have far reaching use for parents and teachers of early childhood in understanding the children in their right perspective. Knowledge of such development would enable parents to have preventive steps.

REVIEW EXERCISES

Answer the following questions in 500 words each :

1. What are the effects of prematurity and birth injury on mental development of children ?
2. Describe the characteristics of the new born.
3. Write a note on the sensory development of the new born.
4. 'Birth is the greatest of human frustration'— Discuss.
5. 'Life does not begin at birth, it begins at conception'- Discuss.
6. What are the various types of birth ? Explain their characteristics.
7. What is Moro Reflex ? At what stage of development it is found ?

Answer the following within 50 words each :

1. Prematurity
2. Neonate
3. Birth injury
4. Fantz's experiments or perception.

Write whether the Statements are True or False :

1. Birth represents a transition from parasitic type existence to a variable environment.
2. Nearly 5 to 10 percent children are immaturely born.
3. Anoxia refers to lack of oxygen supply to Brain.
4. Epilepsy is most common in breach birth.
5. Amniotic fluid cause poor auditory acuity.
6. The neonate exhibits undifferentiated emotion.

Fill in the blanks :

1. Prematurity born infants are.....in physical growth.
2. .....Reflex appears when there is stimulation in foot.
3. .....vision occurs during the first six weeks after birth.
4. The first.....weeks after birth refers to Neonatal period.
5. A total lack of oxygen supply to Brain will kill brain cells in.....seconds.

6

Baby Care and Childhood Problems

There are certain specific activities which need special attention of mothers in order to regulate and control development of children in a wholesome way. Many mothers are not conscious of these and they let children go on their own. Others become extra conscious and expect things to happen before the child is ready. From the point of child development, it is imperative that some care activities are known to mothers and the ways they should perceive and handle these so that concern is not created in them and their children. Quite often unnecessary concerns have led to development of behaviour problems in children. The present section discusses some of these aspects.

FEEDING THE BABY

Infants are given liquid foods after birth. After three weeks, solid foods are added to their diet. Variety of soft foods are given to infants and babies : rice, barley cereal and mashed banaras. The baby learns the swallowing process. First solid foods are added with enough milk. Once the baby is accustomed to swallowing process the milk mixed in the food can be reduced. Mashed beans, peas, can be given in small quantity. But solid foods should not be given more at a time. Do not speed up the process of feeding. Do not be *critical how he eats when he does it independently.*

Breast Feeding

There are two issues : Whether baby be breast fed or use formula milk ? This is a controversial issue which is difficult to resolve. Upto 1950 when formula milk was not upto the mark mother's milk was the only way to go. Breast feeding promotes close psychological and physiologial blending between mothers and infants. It also prevents allergy conditions (Caplan, 1973). Mothers if in good health do feel relaxed, peaceful, and calm.

Breast milk is the natural food for the infant. The fetus remains dependent on the mother for its nutritional requirements and after birth the

newborn depends solely on breast milk for its healthy development upto 4-6 months.

In our country infants belonging to poor families are breast fed for several mothers. Children upto age six months donot suffer from malnutrition if breast fed but only after that protein calorie malnutrition, starts.

The National Institute of Nutrition has emphasised the nutritive value of brest milk. Soon after delivery the mother secretes a thick milk like fluid called colostrum. Its quantity may not be much but it makes a good food for the new born. It contains high amount of vitamin 'A'. Unfortunately our mothers do not feed this milk to the newborn due to false belief. Since vitamin 'A' is deficiency is very common in children in our country this colostrum should not be wasted.

A study covering 400 nursing mothers showed that 90% of them breast fed their infants upto six months. About half of children are breast fed upto one year.

It is also a common practice among the poor mothers to continue lactation even till the ouset of next pregnancy. The Indian mother maintains nutritional standard of her milk even at the expense of her own body rescue. Only after six months breast milk would not be enough and hence needs to be supplemented by other food.

Bottle Feeding

When mother's milk is not available due to sickness or otherwise, cow's milk is desirable for infant feeding. Milk should be boiled well and stored in a cool place. Milk bottles should be kept clean. The cows milk should be properly diluted in 2 : 1 ratio (milk : water), in the first month. By 4 months whole milk can be given. Amount of sugar per day in milk should be increased from 69ms (1 teaspoon in the first week to 4 teaspoonfuls) at 6 months about 24 gms.

There cannot be any better substitute to mother's milk. It is therefore advisable to continue breast feeding as long as feasible, particularly in poor communities.

Bottle feeding has certain advantages. It is mobile and the mother can use anywhere she likes. While some mothers welcome bottle feeding, others feel terribly embarrashed socially to use it (Newton, 1972). No scientific evidence is available on either.

Babies are now a days fed with bottle than from the breast. The formula for bottle fed babies is basically made of cow's milk, water, and sugar and the proportions depend upon each baby. The formula can be made at home or commercially purchased. Mothers and baby can get off good start in bottle

feeding if the feeding experience is being held in the mother's arms. It is advisable to hold the baby even when bottle fed. The baby gets plenty of cuddling and is held for most of his feelings.

For bottle feeding the equipment must be sterilised in hot water or refrigerated. In either case, it is good. But if the mother wants to give warm milk, the bottle can be heated in a pan with water. The milk should be luke warm not hot. The milk bottle should be tipped high enough to keep the nipple full of milk so that the baby does not swallow too much of air. The hole of the nipple should be of right size so that it is safe for the baby.

Bottle feeding can be given on demand feeding basis or four hour schedule. Babies differ in widely in their appetites and the way their systems function. Demand feeding is therefore, desirable. At early period, the gap may be less and it increases as the baby grows.

Mother's attitude is quite important on whether the baby will be brestfed or be kept on formula. Breast milk is most digestible and it contains all nutrients needed by the baby; it is safe and clean. It also contains antibodies which works against infections. The act of nursing also satisfies many needs. Breast feeding is an economy measure and it does not prevent further conception. However, breast feeding need rest and good diet so that she does not feel tired and milk supply is regular.

Babies, of course, need vitamines. To prevent rickets a baby should have vitamin D from the time he is two weeks old. Vitamin C is another vitamin the babies should get. Small babies are given vitamin A,C,D in small drops dissolved in water in dropper. As they grow the amount is increased.

Milk alone does not contain some nutrients essential for keeping the children's teeth healthy and strong. That is why from six months on words children can be given seasonal fruits, orange, tomato grapes. Fruit juice in small doses can be given even from third month with little dilution, twice or thrice a day.

Instead of milk, porridge made from milk, Ragi flour, wheat flour, suji, rice or sage may be used for preparing the porridge leafy vegetables may be boiled in water and water filtered. This water may be fed after adding a pinch of salt to it. Mashed potatos with salt, pulses with salt can be given, yellow part of the boiled egg can be given after six months. Shark liver oil can be given after sixth month onwards to help children to grow and it is good for eyes. From 2 to 3 drops the amount can be increased to one spoonful for a day. This may continue till they are five years old.

For a preschool child soon after he gets up from bed a glass of milk sweetened with sugar.

10 Am–rice, 'dal, or cereal-pulse mixture, boiled egg, half a glass milk or half glass of fruit juice is ideal.

1 Pm–rice, cooked vegetables, dal, or fish.

3 Pm–milk 1/2 glass, with shark liver oil.

7 Pm–two spoons porridge from cereal with milk.

Before bed-Half glass milk.

Between 3rd and sixth year milk quantity can be decreased and quantity of food increased. Sweets particularly those remain for long should be avoided to prevent dental disorders.

MALNUTRITION

Nutrition food is very essential to provide resistance against diseases. It consists of good amount of pulses, leafy vegetables, and fruits, and food with proportionate nutrients. Proteins *e.g.*, milk, eggs, flesh food vitamin 'A' in leafy vegetables, carrot and fruits are essentials. If children at one to 3 years of age are not given good nutrients particularly proteins and calories they became prey to nutritional deficiencies and diseases.

Kwasiworker is a nutritional deficiency disease which arises due to protein deficiency among children between 1st to 6 years. The word Kwasi worker is an African word which means "the disease of the displaced child", a disease normally affects the first child when the second in born. This is common in our country. Why does this occur ? How can we prevent it ? Will this disease have effect on the future health ? Where its symptoms ?

The first main symptom is lack of growth in children. Swelling of the body on hands, feet, face, reduced muscles, dullness and inactivity, hair turns pale are some other symptoms. Liver disorders are also seen. Stunted growth of the child, frequent diarrhoea, occurrence of respiratory diseases may be considered as signs of impending Kwasiworker. The disease can be prevented by nutritious food described earlier in addition to mother's milk. But when disease sets in, easily digestible proteins should be given, more food to increase calorie and protein intake. Bannana is a good supplement. As appetite increases, more food can be given. Kwasiworker condition or protein calorie malnutrition leads to mental retardation and in extreme cases may be responsible for premature death of the child. Hence, parents ought to take care to the maximum if such symptoms are noticed in their children.

BURPING AND CARRYING THE BABY

Babies have small stomach. If they swallow a large amount of air when nursing or taking the bottle, they are likely to feel uncomfortable on full. Burping is therefore necessary. If the baby sleeps on his stomach, he himself

produces burp rather than on his back. It helps the baby to take enough food. Rubbing the back of the baby helps to a great extent, and pat his stomach. Some babies do not even require burping because they are breast fed than bottle fed.

Parents are often uncertain to carry their babies. They think the baby too fragile, as a result they carry the baby in such a way that the child is not feeling secured. While carrying the baby the child should get enough physical support and a sense of confidence. The craddle technique is the more common. This technique brings the baby against the mother's shoulder and in the foot ball technique, he rests against her lips which is not comfortable. A firm grip in carrying the baby gives him feeling of confidence and security .

BATHING THE BABY

Bath serves as a means of maintaining cleanliness, relaxation and a sense of well being. In infancy, the baby should take bath at the same time and the timings may change as the baby grows older. Upto 2 weeks the baby should have sponz baths in warm water and only after that, they can have their first bath. The vessel in which the baby should take his bath should be convenient and comfortable. The following things are necessary. Soft wash cloth, towel, clean set of colthing, mild soap, oil. Wash the baby's face and ears quickly with soft cloth from most of the water has been squeezed out so that little of it drips into his eyes or ear canals. No need to wash his mouth and eyes. Wash the scalp with water but only very little. After the bath, the baby can be dressed. As the child becomes grown up or 4/5 years old, they regulate their bath habits and it can take place daily.

BED FOR THE BABY

The baby can sleep on a firm mattress with no bumps. The child can be placed in a crib which is fairly long enough so that he can use it for 3 to 4 years. The crib can be kept clean. Do not use heavy, stiff covers such as quilts and pillow. A baby's bones grow but his posture develops properly when head lies perfectly flat. A pillow also may present the danger of suffocation. Put water proof under the mattress pad. If the child suffers for any ailment it is better to clean the mattress.

Getting a child to bed sometimes creates problems and concerns for parents. If properly handled, it can be relaxed and rewarding time both for parent and child. Children often get a sense of security from being allowed to sleep with a favourite toy. Many bed time problems arise because the parents think that the child should sleep more than he does.

Most infants will sleep as much as they need to but it does not match

with that of parents. There is a stress on self demand feeding and attending to child's cry whenever the situation occurs.

Real sleep problems start when the child is about 2 years old. The parents should be affectionate and relaxed but firm at the time of taking children to bed. Give the water to the child before going to bed and take him to bathroom and thereafter try to be consistently firm to control him on bed otherwise the child will ask for these things and keep himself awake. Children cry at the time of going to bed, they scream, and hold onto the furniture. Do not sneak away before the child sleep. This will increase his terror. Most of the sleep problems at this age is called separation anxiety. He realises that after he sleeps the parents will run away from him by putting him to sleep. Bed time stories should not be terrifying to children. Rather it should be pleasant and entertaining inducing children to sleep.

Another problem of bed time is jealousy and fear of the dark which is seen among children of 5 to 6 years of age. But the child should learn to think of bed time as a regular rule. Bed time stories make the habit regular and choosing a story is no problem with children of two or so. One can narrate what they have done during the day. For others, story should not be terrifying and it must be interesting.

CLOTHING FOR THE BABY

Infant clothing are very quickly outgrown and one must have only a few of them. Only essential items are required in proper quantity than to acquire a variety of useless clothes. Cotton knit is the best material. Shirt should have easily extended necks. Night clothes that are easy to lie are easy to cope with. Sweaters should have large bottoms. Too much triming is not necessary. The child may prefer a particular colour by age three to four then he should be given the same.

SLEEP OF THE BABY

Sleeping is absolutely essential for the physical and emotional well being of children as it is for adults. It is as important as food. There is no hard and fast rule but the baby must be put in a schedule so that he gets proper amount of sleep. At the very young stage the baby has regular patterns of hunger, wakefulness, and readiness for sleep. Sometimes they are so tired that they literally cry for sleep. Mornings should be kept as quiet as possible so that they sleep well.

The child at 3 to 4 sleeps almost 12 hours at night and about 1 to 2 hours during day. From five to six there are great variations in sleep needs. Sleep indicates the emotional and physical well being of the child. In periods of rapid growth there is also a definite need for additional sleep. His sleep is

reduced as the adjusts to school. By age 12 the child should have sleep about 10 hours a night. The child should not be given heavy meal before he goes to bed. The bed should be comfortable and the room should be free of noise and other disturbing activities. Serious problems in sleep can occur in families where discipline is too strict and unyielding. The alternative is also true when the child is left on his own. Hence, a regularity in sleep is essential for development.

TEETHING IN THE BABY

By the time the child is born his baby teeth as well as his permanent six years molars are developed inside his jaw. There are babies who are even with one or two teeth. There is no fixed age at which such development would occur but tooth development is influenced chiefly by heredity, parental conditions, nutritions, serious illness etc. It takes about full 21-2 years before the full set of twenty teeth to appear.

Sometimes teething brings loose motion or fever. The baby refuses to take a bottle at that time. A teething bay often finds relief in chewing. There is constant crying because of teething pain. The rubbing the baby's gums frequently makes him feel better. But no medicine should be applied. In the beginning there is nothing, no pain but around age 1-2 when molars appear, the babies feel discomfort and cry. A few comforting words and something to drink may keep the baby asleep. When teething appears it should be shown to doctors regularly.

WEANING IN THE BABY

The age at which weaning process starts varies a great deal with children. In some children, it continues upto one year. In others weaning starts at six mothers and the babies are interested in outside food. Weaning is a slow process. The mother should be careful to know its signs when the baby wants to cooperate. Most mothers postpone weaning and go on breast feeding beyond the time required. Some mothers even look at every drop of milk in the milk bottle and can not rist it to be left out.

In general, between sixth to tenth month babies start weaning. It is related to teething at this time. It is therefore desirable to introduce a cup or glass (small) for taking milk after six months which may be of bright coloured plastic. Obviously at initial stages milk will be spiled, dabbled and wasted. Parents therefore should not get angry, worried, and they will see that the babies will have full control using cups by the 19th month. There is nothing to be upset. The baby is sure to wean by the end of one year. Extra cuddling, holding, or singing and talking to the baby may help him toward weaning. If during weaning the milk intake is reduced, weight is reduced, this should not cause concern to the mothers so much because this is natural.

The child can be given some solids to munch or chew on. The child will be left to complete his own weaning.

BED WETTING

Most children wet their beds. It is called enuresis. If it is occasional, it is not a problem but if it continues after certain age it is a problem. They do not wet the bed by the age of three to six. It is sometimes suggested that a child will be less likely to wet his bed if he is awakened and taken to toilet during night. Sometimes the child is not given enough of fluid before going to bed. As the child grows older it can be reduced or eliminated.

Emotional factors are sometimes the reason. This is true with children to revert to bed wetting after a period of control. Too early efforts bladder control also results in bed wetting because of a feeling of insecurity. He wets in bed for getting unconsciously the attention of parents.

Scolding and sparking for bed wetting does not help and they should not make this as an important issue. Neither should they be overpraised nor overprotected for toilet training. A relaxed home atmosphere reduces bed wetting in a general way.

TOILET TRAINING

Toilet training is a milestone in the life of children. It varies widely with individual child. There is no uniform way to deal with such training. Until the end of 1st year of development, the bladder and bowel function remain a completely involuntary process beyond the baby's conscious control. That is why the early toilet training is a waste of time. The mother keeps a track of child's pattern of elimination. Attempts to early toilet training may create a very angry feeling in the child.

Normally children respond to toilet training when the baby is 2 years old. He is able to respond to body needs and he uses language. He understands and imitates adults. He expresses interest to be neat and clean and dry. Children become interested in this routine behaviour and cooperate with parents. Neither extreme praise nor scolding is essential for this training.

Studies show that bowel control precedes bladder control. Boys achieve bowel control somewhat earlier than girls whereas girls gain bladder control earlier than boys. Usually a potty seat is provided to the baby inside the toilet and the mother accompanies the baby to the otty seat and helps him to sit on it. He can see the bowel as he is curious to watch it. Neither parents should show disgust nor tenseness in cleaning the child. Some children may go through constipation because of this discomfort.

Sometimes during 2.5 to 3 years they do it independently and want privacy. They tell the mother to leave. They control their movement now.

Bladder control especially at night is a slower process and a complex too. Before the end of first year the baby can hold urine for 3 hours but he is not yet ready for conscious control. By two he follows a routine of going for urination. By 2.5 its span becomes about five hours. Some children make up at age 3 and go for urination from this on there is wide variation of bladder control. Some children achieve control earlier because of muscular agility, talking, social awareness but others go on upto age six and have bed wetting due to emotional factors. Toilet training therefore is a delicate area of concern which parents should be aware of.

THE BABY TALK

Most babies talk to themselves before they are six months old but they learn a single word like 'baba', 'mama' by one year. The mental process in which this talk develops is a remarkable mile stone in the process of development. Babies normally avoid complicated sounds and substitute with baby talk, which is easier sounds. The babies learn language by imitation. Parents should not imitate baby talk because the babies will not learn the right pronunciation. In case of faulty pronunciation they should ignore it. They should not tense him, or caution him or make him self-conscious about his talk and faulty pronunciation if any. It sometimes leads to greater speech problems. The technique should be : leave him alone and he will learn.

Sometimes a child who has no problem of talking has taken recourse to baby talk especially when the child is jealous about the other siblings. In such cases, the parents should give more attention to the child so that he is not unhappy. Often lisping, stammering and stuttering defects are seen due to this emotional difficulties.

LEAD POISONING IN BABY

Now a days infants and toddlers are victims of lead poisoning who are likely to put edible objects into their mouths. The most common source of lead poisoning is crumbling plaster from walls painted with lead paint. A child may eat paint flaking off window sills, furniture, crib rails, toys, battery cases. Unfortunately these are discovered only after the child has it enough and it has produced certain symptoms. Effects of lead poisoning are seen in weightloss, anemial stomach, cramps, and constipation, mental depression, irritability, convulsions etc. Since lead is retained in the body the effect of poisons grow more serious as the amount of lead teken into the body increases. It might result in brain damage and mental retardation. Prevention is more important than cure which is very difficult.

THUMB SUCKING

Thumb sucking is a normal infant activity. The instinct is present from birth. The infant desires both pleasure and nourishment from nursing. Thumb sucking is thus a continuation and it appears in almost all children. It does not result in any facial deformity. When it continues for some years it becomes a warning sign of nervousness. Parents put bad taste thing on thumb which has bad effects. Instead, he needs ecouragement in doing other activity during the day. Sometimes he gives up the habit when he enters the school. When he clings to do it for long years it indicated nervous tension. In such cases parents should try to find out the cause of tension and reduce the causes which are bothering him.

NAIL BITING

Nail biting may begin when thumb sucking stops even among those who were quite relaxed during childhood. When the pressures are more especially in school home, classroom competitions nailbiting starts. Usually it is a symbol of nervousness and a means of reducing tension. It has an unpleasant social effect. In order to remove this habit, try to build up confidence and reassurance. The nail biting can be mentioned in passing but without pointing toward it. Diverting the attention of the child when he/she bites the nail to some other substitute is anoter way. Punishment and ragging do not help in removing the habit. Once tensions are over nail biting is eliminated automatically.

REVIEW EXERCISES

Answer the following questions within 500 words each :

1. Explain the importance and need for taking care of the baby ?
2. What are some of the most essential babycare activities ?
3. What problems are seen in childhood ?
4. How can you prevent lead poisoning, bed wetting, Thumb sucking and Nail biting ?
5. What should a mother do to help the growth and development of the baby ?

Answer the following questions within 50 words each :

1. Bottle feeding vs Breast feeding
2. Burping the baby
3. Bathing the baby
4. Bed wetting
5. Clothing
6. Sleep
7. Weaning
8. Toilet Training

9. Lead Poisoning
10. Baby talk

Write whether the statements are True or False :

1. Solid foods are added to the food of diet of the baby only after 3 weeks.
2. Breast feeding promotes close psychological and physical blending between mothers and infants.
3. To prevent rickets in a baby vitamin A in given from the time the baby is two weeks old.
4. The child should not be given heavy food before he/she goes to Bed.
5. Emotional factors are the reasons for bed wetting.

7

Common Ailments of Childhood

According to UNICEF figures nearly 750 children in India are affected by poliomyeletis. A few die but the future of nearly all of them is shattered. For those who survive, live in quiet desperation, leading sadly diminished lives. Their genetic potential is destroyed for want of a simple in-expensive intervention. Every two minutes in India there is a child death directly related to measles *i.e.* two out of every 100. Among malnourished groups the fatal proportion is 10 to 100. About 250,000 infants die each year of neonatal tetanus. Hundreds of thousands of children in India are affected by tuberculosis. Those who do not die they are prone to suffer permanent brain damage. Whoofing cough ravages the respiratory systems of hunderds of thousands infants and children. The situation is a burden on social conscience and a drag on national development. Therefore, from the points of view of child care and development there is a need to know the common childhood ailments, their prevention and care by parents and the schedule of immunisation in order to save children from decay and despair and deal in a certain cases.

Hence, the organisation of this chapter includes an awareness of immunisation programme and a brief discussion on some selected chilhood ailments which are common, frequent and damaging for the physical and intellectual growth of children. In this context, it has meaning and significance.

CHILDREN AT RISK : THE IMMUNISATION PROCESS

Immunisation has become a programme of utmost priority. Immunisation of all children against the six diseases : Diptheria, tetanus, whooping cough, poliomy elitis, tuberculosis and measles is necessary. The schedule is given below which is meaningful by itself.

Immunisation Schedule

Prenatal		
16-20 weeks	Tetanus Toxoid	1st dose
20-24 weeks	Tetanus Toxoid	2nd dose
36-48 weeks	Tetanus Toxoid	3rd dose

Children		
3 to 5 months	Small Pox Vaccine	Booster dose
	BCG Vaccine	
5 to 7 months	Diptheria-perusis	at an interval of 1-2 month.
	Tetanus, Poliomylitis	3 doses at an interval of 1-2 months.
9 to 12 months	Measles	Booster dose
18 to 24 months	Poliomyelitis	Booster dose
5 to 6 years	Diptheria	Booster dose
	Typhoid	One dose
10 Years	Tetanus Toxoid	Booster dose
16 Years	Typhoid	Booster dose

A new vaccine schedule is also available (Vijay Kumar, The Tribune, 1987, May 10).

0-3 days	Polio I	BCG
6 weeks	Polio II	DPT-I
10 weeks	Polio III	DPT-II
14 weeks	Polio IV	DPT-III
9 months	Measles	—
18 months	Polio	Booster

ALLERGY

Allergy is a condition, children are sensitive to certain substances. For example pollen of plants to which some children are allergic. They experience streaming eyes, running noses sneezing normally found in hay fever. Pollen is thus an allergen. Allergens enter the body by being inhaled, swallowed touched, or unjected. Some of the common allergens are : milk, animal hairs, dusts, foods, feathers, dyes, detergents, cosmetics, plastics, pencillin. Allergy reactions can take place anywhere in the body. It does not develop in the first contact but on first contact of the allergen antibodies are formed and remain in the body tissues. Sometimes it develops in second contact or even after.

Most common allergies affect the skin and respiratory system. Hay fever, asthma, itchy swellings or gives, eczema, erruptions in the skin are allergy symptoms. Irritant soap, insect bites, poisonous plants, create skin allergy. Precautions are therfore necessary. Skin tests are often done to dentify allergy.

A particular allergy is not inherited from parents or grandparents but the endency to be allergic can be inherited. Anxiety, fear, anger and strong excitement are likely to precipitate allergy attack.

A doctor's advise is always necessary whenever such allergies occur. The cause of allergy is identified by applying minute quantity of the suspected allergens to the skin of the child's fore arm using potch test or

scratch test. The tests are not painful. Therefore patients should take care to see. that allergens are tested. After ascertaining the allergens by the doctor they should avoid children to come in contact with such conditions or agents. Dust allergy is quite common. Hence, parents should not keep things in room which will make dust due to crowdings. Clean the room thoroughly and do not allow the child to remain present during cleaning.

The next allergy is food. Certain foods like eggs, milk chocolate, seafish do produce allergy in certain children. Breast fed babies are seldom allergic to milk. In case of mild allergy a doctor may prescribe antihistamines or decongestants but in severe cases desensitization treatments are necessary. Parents should after identification keep a note the substance to which their children are allergic as a precautionary measure and avoid exposure to or use of these allergens.

ASTHMA

Asthma is a breathing disorder. It appears in the child periodically. It ranges from slight difficulty in breathing to severe suffocation and attacks. Quite often childhood asthmatic attacks disappear after adloescence. In asthma, there is a sudden contraction of bronchial tubes characterised by spasm which carry air from the wind pipe to lungs. There is irritation and coughing. It is reduced after taking proper medical care and more often it is a nuisance and hazard to health. It can also be quite dangerous.

The first attack is quite frightening for parents. But they should work with patience and care so that the fears of child are lessened. The child lie down can in the bed and rest so that his attention can be diverted. Proper and expert medical care is necessary because by repeated treatment the bronchial tubes may be damaged.

The causes of asthma are quite complicated. It may arise out of dust allergy. One should not use the medicines which worked with other babies for asthmatic attack for each child because the cause may be different. Three types of causes are identified : Allergy, infections and nervous tensions. It occours along with hay fever, due to irritating pollens, other allergy conditions such as dust. Hence, allergy sensitivity should be diagnosed and identified while treating asthmatic patients.

Sometimes bacterial infections especially of sinuses, throat and nose cause asthmatic attacks. Nervous tension and emotional problems are also precipitating factors. For this reason, it is often known as a psychosomatic disease.

When a child is suffering from asthma the best way is to take medical advice and personal care. Parents often think to shift their place of residence from one part of the country to another part but it has questionable effects.

COMMON COLD

Most of the viruses are transmitted through air. Overcrowding, bad sanitation and malnutrition are precipitating factors. The chilling or dampness also increase succeptibility to infection. Onset is abrupt often beginning with sharp rise in temperature or insiduous with running or stiffness of the nose followed by cough. Sometimes decreased appetite, inactivity, irritability, and diarrhoea precide common cold. This lasts 1 to 7 days but at times there are complications.

Children are more succeptible to cold. Cold as such is not more important but it leads to a few complications such as earache, whooping cough etc. Hence, it needs are and attention by parents.

Colds are caused by virus which run to as many as 20 in number. There is no preventive vaccine for this. In spite of all hygienic care, nutrition, rest, exercises babies and children catch common cold. But one should not invite this by sheer negligence and lack of care.

In case of common cold babies and children should get enough rest and are kept preferably under warm condition in homes. If there is fever, plenty of liquids should be given to the child in small quantities but frequently. This will prevent dehydration and its consequent effects. Nasal drops are recommended. Good health habits prevent cold by developing resistance but it cannot be completely prevented.

CONSTIPATION

Constipation occours in children and young babies no matter how mild it is. The frequency of bowel movements vary in children according to body make up, eating habits, physical activity. One bowel movement in a day is average but it is not necessarily right for all children. It is best not to express any concern about the baby's bowel movement. Rather they should see that the baby is getting normal food which is balanced for him, plenty of fluids or milk. Sufficient movement is also necessary. Unless the baby feels pain one can wait 4 to 5 days for bowel movements to occur. Sometimes constipation occurs due to toilet training reactions. Chronic constipation however, needs medical care and advice.

DIARRHEA

Once upon a time diarrhea was fatal. Now a days because of improved nutrition and medical science it has become less fatal. Since diarrhea causes dehydration because of liquid bowel movement it should be controlled immediately.

Diarrhea results out of infection in the intestine, too much sugar in formula milk, rapid changes in the formula, new food intake, too much fruits and vegetables and in older children overeating, allergy, tension.

The infant therefore should be kept away from infectious persons, used bottle and other utensils must be clean and sterilised or washed in hot water.

Young babies have between one to four times bowel movements in a day. In the first six weeks many babies may have 10 to 12 times of bowel movements in a day. But if it becomes loose, their color becomes greenish, then doctors have to be consulted.

The danger in diarrhea however mild it may be, is loss of warter, salt and other minerals from the body leading to dehydration. Therefore, it needs to be checked immediately, in consultation with physicians.

Certain temporary precuations have to be taken to control diarrhea. In case of mild diarrhea, discontinue usual formula food and instead take a liquid consisting of 1 teaspoon sugar, 1 teaspoon table salt, 1 quart boiled water, and repeat this intake in small quantities every one/two hours. This can continue for 12 to 18 hours. Then substitute it with diluted skimmed milk or diluted formula. This is applicable to the babies on formula.

If the baby is breast fed, then give some boiled water before nursing the baby. Omit unusual things from the mother's diet, and omit orange juice etc. from the baby's food...

Proper diet, care and medical attention would prevent all cases of diarrhea if treated at its onest.

Diarrhea is caused mostly by unclean feeding bottles, dirty water, spoilt food, dirty nails, flies, dirty toilets etc.

The following are the danger signs of dehydration when one must see the doctor and take care of the baby.

(*a*) Eyes are Sunken and dry
(*b*) Tongue dry, thirsty
(*c*) No firmness in skin, looks wrinkled
(*d*) Voice hoarse
(*e*) Fast breathing
(*f*) Convulsions
(*g*) No Urination
(*h*) Stomach is disturbed.

EARACHE

Babies have earaches. It is caused due to bacterial infections in the middle ear among other casues. The middle ear is most common sign of ear infection

in children. Bacteria enter the eustachian tube during respiratory infection, sore throat, head colds and pressure in the ear. There is ringing in the ear. In infants fever and irritability are the signs. Unless treated very timely it may lead to perforation, or soaring of the ear drums and hearing impairment. Medicines such as sulpha drugs and antibotics have made ear infections easy to control. Until the doctor attends one can control it by using a heating pad or hot water bottle against the affected ear or using aspirins made for infants and children.

EYE PROBLEMS

Eye injuries in children are by and large preventable. On several occasions of festivity, crackers, bow and arrow games, sharpened household articles like needle, knife, and pointed toys cause eye injuries. Watering is a common eye problem in infants which starts a few days after birth. This results due to non canalisation of the membrane at the lower end of lacrimal passage. So the tears donot drain into nose. If not treated early it can lead to ulceration and other serious problems. Eye specialist are to be consulted. In the mean time eye drops like soframycin, gentamicin can be used 3 to 4 times a day.

Conjuctivities are also seen in children due to infections. Eyes itch, look reddish, and thready discharge takes place. A frequent eye wash with tap water and antibiotic eye drops are the main treatment.

Vitamin A deficiency also causes blindness and corneal problems. Retinoblastoma is the commonest intraocular tumour in children which appears during 1-2 years. The child may also have a cats eye *i.e.*, white reflex. This has to be treated immediately without ignoring it.

BLINDNESS

Blindness or partial sightedness children are due to vitamin 'A' deficiency. Nearly 30,000 children go blind due to vitamin A deficiency in India. The national programme for control of blindness initiated in 1976 aims at reduction in incidence of blindness for 1.4 per cent in 1982-83 to 0.3 per cent by 2000 AD. Lack of vitamin C causes scruvy, and are more seen among bottle fed babies.

FEVER

Fever is an elevated abnormal body temperature from the normal body temperature. It disturbs the baby and the balanced mechanism that regulates body temperature. Since it can be destructive, as high fevers usually are, attempts should be made to reduce the body temperature from high to normal temperature. Normally rectal thermometer is used in case of babies and the temperature reading in this case is three quarters of a degree higher then

mouth temperature. Mouth thermometer however, can be used with children.

Normally children have a slightly high temperature than the normal 98.4 degree during the later part of day, after play, or lively activity or emotional excitement but these situations are not causes of concern.

In some diseases fever is present. For example, common cold, influence, scarlet fever, sore throat, influenza, measles, diptheria, hooping cough, cuts, burns, appendicitis. In such cases temperature should be taken after every four hours.

The child who suffers from fever is weak. There is softness in muscles and bones and chills, headache, thirst, loss of appetite, dry skin, coated tongue, etc. Occasionally there is convulsion but not serious. Pulse rate is increased by 8 to 10 beats per minute for each degree of temperature rise. The need for fluid is increased. Urine become darkish and frequent.

When temperature exceeds 100 degree by mouth and 101 degree by rectal it is necessary to take immediate care. But certain precautions are necessary. The child should be given plenty of water, liquid food or fluids. When the temperature is very high give the child aspirin or crocin to bring the temperature down and consult the physician or give 1 baby aspirin every 4 hours, whereas a five year old may take one adult aspirin to reduce the high temperature. A wet rub is also advisable is case of sudden high temperature. This can be repeated every half an hour if the temperature does not decline. Medical care is a must even though such preventive care is taken by parents.

MEASLES

It is a highly contagious virus disease of childhood. Although it has been eradicated and/or prevented yet it does occur in children. It is an airborne disease which is transmitted from sneezing, coughing or talking, touching an article which was used a measles attacked child such as handkerchief, towels. It appears during winter and spring. Its incubation period is eleven days. When the child catches the disease he can give it to others three/four days before the rash appears. One attack of measles gives a life time immunity to the individual.

The child when gets the attack has cold, running nose, fever. He feels tired, uncomfortable, cough, pain in head and neck. His eyes are reddened and he can not see light easily. The second stage begins on 3rd/4th day of attack. Temperature becomes 103 degree to 104 degree. Small white dot like grains of salt are seen in cheeks. Rash appears in the whole body within a day and half. After five/six days the rash disappears.

When the child gets the attack he should be given rest and he should lie down as long as fever and rash continue. Water and fluids can be given in plenty and the room should be well ventilated and warm.

If care is not taken, it might lead to encephalitis causing mental retardation. If the symptoms continue after the rash disappears, doctors should be consulted to prevent further damage to the child. Preventive immunisation against measles is given by 1 year or before exposure to the disease.

POLIOMYELITIS

This is a serious disease. Every child should be vaccinated or immunised against this at an early stage. Even at times immunisation does not guarantee attack. Hence, parents need to remain careful about the symptoms and causative factors.

This is an infantile disease by a virus. It attacks the central nervous system by destroying the motor nerve cells in spinal cord that move the muscles. Polio ordinarily occurs in legs but it can occur in the breathing and swallowing organs. However, it does not affect the mind or sensory nerves. This disease is not a killer but it affects the motor functions quite significantly. It is an airborne disease. The polio virus is found in the throat during first few days and then it enters the intestines where it remains as much as 4 months or a little more. The incubation period is one to two weeks.

The symptoms include high fever, vomiting, sore throat, pain and stiffness in back and neck and drowsiness. Polio may be paralytic type and non-paralytic type. Many common childhood diseases begin with similar symptoms. Therefore, it is necessary for parents to take medical advice.

There is no full cure of polio excepting that proper care and treatment reduces the magnitude of crippling effects. Bulbar polio cases which happens in case of swallowing and breathing difficulties, have to be treated in hospitals.

For prevention purposes both the salk and sabin vaccines have good effects in terms of safety and effectiveness. When any one suffers from Polio nearby the children should be kept aloof. They should keep their hands clean, they should not be over tired and should take rest. These children can be rehabilitated safely.

THRUSH

It is a mouth infection which is caused by a yeastlike fungus. It is characterised by white patches that may occur any where in the mouth although they are most likely to appear on the inner cheeks. Pain and fever

are occasionally present. In case of the new born one notices this thrush quite often.

The cause may lie in use of antibiotics. These are harmless bacteria in the mouth. These antibiotics destroy these bacteria which prevent the thrush causing fungus. Children with sore throat have thrushes. They should be treated otherwise they enlarge themselves, become inflamed and will even bleed.

WHOOPING COUGH

It is a contagious disease. The child coughs excessively, grasps, and sometimes becomes out of breath. It is quite frequent in babies and children under five although it is also seen among children upto age 10. It is infected from others while sneezing, coughing or by touching objects which the other affected baby has used. It is caused by a germ which is settled in throat. Infants are vaccinated against whooping cough quite early in a series of injections.

It starts with a common cold, running nose, slight fever. After 2 weeks he begins to cough eight to ten times at a stretch. This forces air from his lungs and the face turns purple or blue. Then the child catches his breath in a long noisy intake. Often vomiting appears in whooping cough. It is usually severe at night and lasts about six weeks from its first occurrence. During the first three weeks the child should be kept isolated so that infections do not spread. Isolation is recommended till the germs are killed and treated on the basis of bacterial culture of his sputum.

The child or infant should be properly guarded from people who suffer from cough/cold. Once they get the attack they should be isolated. Cough provoking atmosphere in the room may be avoided and the child is given rest. Antibiotics are given to prevent secondary infection. Constant nursing and care of the baby is essential. A proper diet may be given as per doctor's advice to prevent vomiting. But the baby should be immunised against this at a very early age.

WIND

Formation of wind or gas formation is quite common in infants since food is not well regulated in the beginning. This causes pain because air accumulates in the stomach or intestine and exert pressure and then lead to feeling of pain sensation. There is swelling of abdomen, belching and discharge of gas or wind from the rectum. Whether the infant is breast fed or fed through formula unless the wind swallowed is removed by burping of the baby it may cause gas pains. In older babies, gas pains or wind formulation may occur due to over eating, hasty eating, poor diet, allergy to food, spices, eating under tension.

Use of laxatives and other forms of treatment conventionally used in homes are found to be harmful and therefore should not ordinarily find a place in the treatment for wind or gas pain. It is always desirable to seek medical advice as soon as the syndrome are seen.

DIPTHERIA

Diptheria is a bacterial disease which can be mild or life threatening. In developing countries where sanitation and hygiene are poor it appears as a skin disease primarily. One out of 10 children having throat Diptheria die.

It is acquired through personal contact. It is contagious upto 4 weeks. Initial symptoms include fever, malaise, mild sore throat. Membranes may develop in throat. It produces a toxin which passes into blood and may attack the heart or the nervous system with fatal results. There are also paralysis of the palate, eye muscles, throat, respiratory tract, arm or legs.

DPT vaccine is given in three doses at 6, 10, and 14 weeks of age of the child.

TUBERCULOSIS

All forms of the disease begin initially as pulmonary (Lung) tuberculosis. TB can affect the brain, spinal cord, bones, joints, kidneys.

TB afflicts approximately 10 million a year and of these 2 million are under age five. It is often a family disease which spreads from person to person without treatment. Ofcourse treatment is very long. Pulmonary TB is contagious and fatal.

The symptoms in this case include, low fever, cough, blood in the sputum, chest pain, sweating at night, weight loss. This often leads to meningeal type (Brain and spinal cord) or other types. Once a person is affected by TB its bacilli remain dormant and can be active at any time when resistance is lowered due to malnutrition, extreme fatigue, and stress. BCG provides protection against TB during childhood as per immunisation schedule.

INFANT MORTALITY

Infant mortality rate is defined as the number of infant deaths per 1000 live birth in one year. Infant means a child who has not attained one year of age. In India the infant mortality rate is 146. It is the largest single age category of mortality. Death at this age is due to a particular disease or conditions to which the infant is exposed. Due to improvement in child care and health there is a steady decline in infant mortality rates.

Advances in standards of living, better control of communicable disease, advances in chemotherapy, antibiotics, better nutrition, and better obstetrics

have reduced infant mortality rate. In developing countries however the rate is high. In India the infant mortality rates were 204 in 1911-1915, 161 in 1936-1940, 146 in 1963, 140 in 1969 and 146 at the present. Situation has not drastically changed from 1970.

The causes are :

Neonatal mortality (0-4 weeks)
(1-12 months)
Immaturity Birth injury and difficult labour
Congenital anomalies
Haemolytic disease
Conditions of placenta and cord
Enteritis and other diarrheal diseases
Acute respiratory functions

Postneonatal mortality

Enteritis and diarrhea
Respiratory infection
Whooping cough
Malnutrition
Congenital anomalies accidents

Besides these medical causes the biological causes are : less birth weight, young age of the mother (under 20) order of birth (1st borns), short interval between births, multiple births, large family size leading to maternal deprivation, high fertility.

Low social-economic status, illiteracy of parents, lack of breast feeding, ignorance of child care, broken families, poor sanitation, illegitimacy, brutal habits, the indgenous dal, differential attention to female child are some of the socio-cultural factors that are responsible for infant mortality.

It is usually prevented by prenatal care of mother, immunization, breast feeding, family planning, medical care, improvement in standard of living. Health education in India, and postneonatal mortality is dominated by environmental socio-cultural factors and the causes of death are due to combination of malnutrition and infection.

MATERNAL MORTALITY

Maternal morality rate is a fine measure of the quality of maternity services. It is defined as the number of deaths from puerperal causes per 1000 live births. The causes include complications of pregnancy, child birth and puerperium. It occurs during pregnancy, child birth and puerperium. It occurs during pregnancy or within six weeks of delivery. In India, during 1969 the maternal mortality rate is 3.0. Maternal mortality rates are separate for Bombay, Madras, Calcutta, Delhi hospitals and these range from 0.9 to 6.1 in rural areas. It has however declined from 20 in 1946 to 3 in 1969.

The causes of maternal mortality are both medical and social. Social causes sometimes preceeds the medical causes.

The medical causes in India are : Toxemia of pregnancy, Haemorrhage, sepsis, vascular accidents, anaesthesia, Transfusion, shocks or accidents, anaemia, cardiac, nenal, hepatic, metabolic infection, malignancy, accidents.

The social causes are : age of mother at birth, birth interval and parity, too close pregnancies, large family size, malnutrition, poverty, illiteracy, ignorance of health habits, lack of maternity service, delivery by untrained dais, poor environmental sanitation, social customs, poor transport.

Antinatal, intranatal and postnatal care are necessary for prevention of maternal mortality in India. The measure also should include-community improvement, improvement in environmental sanitation, nutrition education and care of the mother. Infact, in any society mothers and children constitute priority group. In India, children and mothers constitute nearly 65 per cent of the total population. They are not only the large group but they are the vunerable group. The risk is connected with child bearing in case of women and growth, development and survival in case of infants and children. Therefore, maternal and child care are important areas of concern.

REVIEW EXERCISES

Answer the following questions within 500 words each :

1. What are some of the common childhood ailments ?
2. Write a note on infant and maternal mortality.
3. Write the characteristics, causes and preventions of each of the following ailments : (each within 200 words)
   (*a*) Asthma
   (*b*) Allergy
   (*c*) Common cold
   (*d*) Constipation
   (*e*) Polio myelitis
   (*f*) Fever
   (*g*) Diarrhea
   (*h*) Earache.

Write the answers to the following in about 50 words :

1. Allergy
2. Asthma
3. Common Cold
4. Constipation
5. Earache
6. Fever
7. Measles
8. Polio

9. Thrush
10. Whooping Cough

Write whether the statements are True or False :

1. Asthma is a breathing disorder
2. ORT is applied to Diarrhea
3. Ear ache is caused by bacterial infection
4. National mortality is the number of deaths from puerperal causes as per 1000 births.
5. Infant mortality is the number of infant death per 1000 like birth in one year.
6. A particular allergy is not inherited.
7. Booster doses are given for measles when the child is to 12 month old.