CHAPTER II
CHAPTER – II

THEORETICAL VIEWS ABOUT PREDICTORS

In order to get the conceptual understanding of the various variables considered for the present study, and also to understand the rationale of the relationship of these variables with scientific attitude of 9th class students, the theoretical views of the variables under consideration are presented here.

2.1 INTELLIGENCE

‘Intelligence is intellect coupled with knowledge’.

‘Intelligence is the capacity to solve new problems, to accept challenge and to learn’.

‘Intelligence is a biological mechanism by the effect of which a complex group of stimuli are brought together to act on behaviour in a unified way’.
'Intelligence is essentially the perception of relations, especially the perception of difficult or subtle relations’.

- Spearman, 1923.

‘Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment’.


‘Intelligence is the ability to undertake activities that are characterized by:

1) difficulty
2) complexity
3) abstractness
4) economy
5) adaptiveness to a goal
6) social value
7) the emergence of originals
8) to maintain such activities under conditions that demand a concentration of energy, and a resistance to emotional forces’. (Stoddard, 1943).
From the variety of definitions given above, it is clear that there are mainly three aspects which are stressed:

1. Adjustment or adaptation of the individual to his total environment.
2. Ability to learn.
3. Ability to carry on abstract thinking.

(1) Ability to Adjust to Total Environment

Intelligence is the general mental adaptability to new problems or new situations of life. In other words, it is the capacity to reorganize one’s behaviour patterns so as to act more appropriately and more effectively in the novel situations. Operationally, the more intelligent person is one who can more easily and more extensively vary his behaviour as changing conditions demand; he has numerous possible responses and is capable of greater creative reorganization of behaviour, whereas the less intelligent person has fewer responses and is less creative, less dynamic and less adaptive. Naturally, the more intelligent person can deal with greater number and a greater variety of situations than the less intelligent; he is able to encompass a wider field and to expand his area of activity beyond that of the less intelligent.
(2) **Ability to learn**

A person’s intelligence is a matter of extent to which he is educable. The more intelligent the individual is, the more readily and extensively he is able to learn. Hence, also greater is his possible range of experience and activity.

(3) **Ability to Carry on Abstract Thinking**

This means the effective use of concepts and symbols in dealing with situations, especially those presenting a problem to be solved through the use of verbal and numerical symbols. Binet’s conception of intelligence belongs largely to this category; for he maintained that intelligence is the capacity to reason well, to judge well, and to be self critical (Dutt, 1974).

Terman (1921) has defined intelligence as ability to do abstract thinking. Colvin (1974) has defined intelligence as ability to adjust to environment. Thorndike (1962) has defined intelligence as the power of making good responses from the point of view of truth and fact. Woodworth (1947) has defined intelligence “as intellect put to use”. In simple words, intelligence means intellect as is applied in
practice. On the physiological side intelligence means the facility and vigour with which the nervous system can adapt itself to normal situations of life. Thus we may say that Intelligence is an indicator of the ability to cope successfully with novel situations. We may also say that intelligence is the capacity to learn. Intelligence is not a single or simple faculty, but a compound of various elements. Although psychologists differ among themselves in defining intelligence, yet they agree that it is the ability-

i. To carry on the higher process of thinking.

ii. To learn

iii. To adapt oneself to a novel situation.

Binet (1916) defines in this way: “To judge well, to understand properly, to reason well are the essential springs of intelligence”. Burt (1949) says it is the “power of readjustment to a relatively new situation”. Stern (1914) says Intelligence is the ability to adjust oneself to a new situation.

In the views of Ross (1942) conscious adaptation to new situation is intelligence. According to Burt (1949), ‘it is capacity of flexible adjustment’. According to
Buckingham, “Intelligence is the ability to learn”. Spearman (1904) defined as, ‘Intelligence is relational thinking’.

Some definitions seem to be comprehensive as under:

In the opinion of Gates and others (1963), “It is the composite or organization of abilities to learn, to grasp broad and subtle facts, especially abstract facts, with alertness and accuracy, to exercise mental control, and to display flexibility and ingenuity in speaking the solution of problems”.

Kinds of Intelligence

Intelligence can be classified into three main categories.

They are:

1. Abstract Intelligence

Abstract intelligence refers to the “aptitude for learning to read and to solve problems presented in the form of words, symbols, numbers, formula and diagrams.”
The school education needs this type of intelligence for having good marks. We can predict the abstract intelligence of an individual, by testing his level of aspiration, capacity to do various types of work and his speed of work.

2. Concrete or Mechanical or Motor Intelligence

“It is the ability to deal readily and effectively with machines and mechanical contrivances” the motor intelligence is more related to physical education and plays an important role in learning dances and participating in games and sports.

3. Social Intelligence

Social intelligence refers to the ability to adjust and to adapt with the people. It is the capacity to behave effectively in social situations. Socially intelligent persons may establish friendship easily with other people and also quickly understand social relations.
Theories of Intelligence

On the basis of factors of intelligence, we can divide the theories of intelligence as follows:

1) Unitary or Monarchic Theory
2) Two Factors or Electric Theory
3) Three Factor Theory
4) Sampling or Oligarchic Theory
5) Multiple or Anarchic Theory
6) Group Factor Theory
7) Hierarchical Theory
8) Three Dimensional Theory
9) Fluid Dimensional Theory
10) Fluid and Crystallized Theory
11) Intelligence ‘A’ and ‘B’ Theory.

1. **Unitary or Monarchic Theory**

According to this theory, ‘Intelligence is one power or energy which affects all activities of the individual’. This view was emphasized by Binet (1916), Terman (1921) and Stern (1914). All of them consider intelligence as a single function e.g. according to Binet,
intelligence is the ability to have good judgement or according to Ebbinghous it is the capacity of synthesis and so on.

2. Two Factors Theory or Eclectic Theory

Spearman (1904) was the profounder of this theory. Spearman has given two factors of intelligence in his theory by using correction technique. The first factor was called “g” general mental ability or common ability and the second was ‘s” which stands for specific abilities.

According to this theory ‘g’ factor is always the same for the same individual and the ‘s’ factor varies from task to task. Individuals differ both in general and specific intelligence. In every work or activity or task has got ‘g’ factor essentially, and some of the “S” factors are also involved. (The ‘g’ is common for all activities). This ‘S’ factor can be divided in smaller groups e.g. Reasoning ability may be divided as abstract or concrete and also as deductive and inductive.
This fig. shows that the test – 1 needs more ‘g’ and less ‘s’ while the test 5 and 6 need more ‘s’ and less ‘g’ abilities. However, all these tests need both type of intelligence indifferent amount.

3. Three Factor Theory

Spearman (1923) added one more factor to his Two Factor Theory, i.e. ‘group factor’. Group factor is less
general, widespread and homogenous than ‘g’ and more
general widespread and homogenous than ‘s’ factor. Thus, the
modified theory has got three factor (1) g, and (2) s, and (3)
group factors.

4. Sampling or Oligarchic Theory

This theory was advocated by Thomson. According to his theory, “Intellectual abilities belong to
certain groups which are not related to each other but there is
close relationship between the abilities belonging to the same
group. This means that the individual who is intelligent in one
group of knowledge may not be intelligent in the other group
of knowledge. But he may be equally intelligent in the various
subjects of that very particular group”.

This theory is based on correlational technique. In brief, we can say that the individual has got
number of mental abilities. When he has to perform certain
type of work, he makes ‘sampling’ of abilities and samples out
certain important abilities out of the whole world of his
abilities. Here, the individual has to select the abilities through
sampling this theory is also called as Thomson’s Sampling
Theory of Intelligence.
In this theory ‘g’ factor is not considered as important as in Spearman’s theory. At first, Thomson neglected this factor but later on he realized its importance. He realized ‘general ability’ was different from Spearman’s theory and he considered general ability of second order factor.
5. **Multiple or Anarchic Theory**

This theory was put forwarded by Thorndike (1962). It is also known as Atomistic Theory of Intelligence. According to this theory ‘Intelligence’ is the mean of undetermined, independent, rudimentary elements. Intelligence is composed of many factors. All these factors are independent to each other e.g.

1) Numerical reasoning
2) Vocabulary
3) Classification etc.

This theory believes that every task needs different abilities, some times they may have one, or some times they may possess 2 or 3 abilities also e.g. if a person gets 50 marks on A and B task. It means there may be 2 or 3 or more than 3 factors are present and they are correlating to each other. This means a group of abilities are manifested in one single task and therefore Thorndike concluded that in every task, few factors play their role and correlation between them may be there. This indicates that some of the factors are common in these tasks. These common abilities may belong to certain faculty. Thus, it becomes clear that the intelligence is composed of highly particularized and independent faculties.
There is no significant difference found between these faculties (though the correlation exists between the different elements of one faculty).

According to this theory, “we can not infer or predict anything as to man’s ability to do another kind of work from man’s ability to do one activity in one sphere”.

6. Group Factor Theory

This theory is also known as Thurstone’s theory of Primary mental abilities. As the name suggests it was put forwarded by Thurstone (1938). He has used the factor analysis method for formulating his theory.

Thurstone conducted a number of experiments and came to the conclusion that intelligence is made up of the following seven primary abilities:

a) Verbal comprehension – It is the ability to use words in planning, thinking and communication.

b) Numerical Ability – It is the ability to work with numbers, fast and accurately.
c) Perceptual speed – It is the ability to perceive or see small detail quickly and accurately.

d) Space visualization – It is the ability to visualize space and form mentally.

e) Reasoning – It is the ability to see relationships in situations described in symbols. It may be inductive or deductive type of reasoning.

f) Word fluency – It is the ability to call up relevant ideas where the quantity and not the quality is emphasised. It is the total number of relevant responses.

g) Memory – It is the ability to recall and associate previously learnt items.

According to Thurstone, the performance on any task will require one or more of these abilities.

Thurstone has not rejected the concept of general ability, but he could not get any ‘g’ like in Spearman’s theory, through factor analysis technique. He
considered these factors independent and thought that there is no correlation with each other in his factors. But after analyzing the results he found some correlation between these factors. 'This could mean that in addition to the special factors there was a general intelligence factor that could not be subdivided'.

Thurstone's correlation between different primary abilities have been shown as follows:

![Hierarchical Theory Diagram]

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1. General Mental Ability
   - $G$
   - II Major Group Factor
   - III Minor Group Factor
   - IV Specific Factor

   - V.D.
   - K.M.

Fig. Hierarchical Theory
Previous Fig. can also be represented as below.

Fig. Group Factor Theory
7. Hierarchical Theory

This theory has been put forward by Buyt and Vernon. They have given the hierarchical importance to different mental abilities. They have divided these abilities into two main classes:

1) K.M. – Practical, Mechanical, Spatial, Physical
2) V.D. – Verbal, Number, Educational.

8. Three Dimensional Theory

This theory was profounded by Guilford (1967). He made a number of studies and attempted to classify
the intellect abilities into a systematic framework called the ‘structure of intellect’. He has produced a three dimensional model to explain his viewpoint and claimed that the human intelligence can ultimately be classified into 120 factors. (Not all of these have been discovered yet). Eysenck (1967) described this theory by writing, “Guilford classified the intellect into operations, which it can perform; different contents of these operations, and different products by taking all possible interactions we obtain 120 cell corresponding to different mental abilities of these, Guilford claims to have evidence in actual factorial studies for eighty, he is optimistic about discovering the remainder”.

According to this theory the intellect is a logical structure, in which each factor can be classified as to operation, product and content. There are five kinds of operations – evaluation; convergent production; divergent production; memory and cognition. 6 kinds of products – units, classes, relations, systems, transformations and implications and 4 kinds of content – figural, symbolic, sementic and behavioural. This structure of intellect has been shown through the following figure:
(1) OPERATION

Divergent thinking
Convergent thinking
Evaluation
Memory
Cognition

(2) CONTENT

Figural
Symbolic
Semantic
Behavioral

(3) PRODUCT

Units
Classes
Relations
Systems
Transformations
Implications

Fig.: Guilford’s Three Dimensional Theory
This theory has many implications for education. It does not consider the student as a S-R mechanism only, but it encourages him to acquire, preserve and use the information and knowledge. According to this theory, intelligence is a complex process and, therefore, no single test can measure it. Therefore, there is a need to make studies to develop accurate methods of testing and scoring the intelligence.

9. **Fluid and Crystallized Theory**

This theory has been put forward by Cattell. He has classified the human intelligence into two categories:

1) Fluid Intelligence and
2) Crystallized Intelligence.

He has made the use of general ability factor in his theory. ‘Fluid Intelligence’ includes the general potentiality while the Crystallized Intelligence is based on environmental factors.
10. **Intelligence ‘A’ and ‘B’ Theory**

This theory was advocated by Hebb. He has given the concept of Intelligence A and Intelligence B. It is one of the recent concepts of intelligence. According to him, “Intelligence A represents the capacity of the central nervous system for forming, retaining and recombining Schemata, and it is ultimately determined by the genes; whereas Intelligence B represents the cognitive abilities which have been built up during infancy and childhood, and which do not develop in the absence of suitable environmental situation”. (Vernon, 1962).

Mathur, (1977) concludes after explaining some important theories, “The theories discussed above are some of the major ones. How valid and useful they are cannot be clearly decided at present. Only future researches can lend us to get a correct notion about intelligence. In education we are concerned with the measurement of abilities which can do by having reliable and valid instruments of measurement. Our task at present is to do that, rather than to indulge in discussion about the nature of intelligence.

The most influential model was however, proposed by Vernon (1950) as a hypothetical integration of all
the factorial investigations that have been carried out. In the Vernon model, factors of at least three degrees of generality are identified: the general factor, major group factors and the minor group factors. Among the major group factors Vernon distinguishes between verbal numerical educational (V:ed) and spatial practical – mechanical – physical (k:m) ability. The V:ed factors subdivides into minor group factors, such as verbal and number factors and reading spelling linguistic and clerical abilities, and also into fluency and divergent thinking abilities. The k:m factor subdivides too and this complex includes minor group factor, such as perceptual, physical, psychomotor, spatial and mechanical factors. At the level below minor group factors are almost indefinitely subdivisible, depending only on the degree of detail to which the analysis is carried. (Vernon, 1950).

The Vernon model thus represents the most influential hierarchical model from the British tradition of research while the Cattell-Horn model (1971) represents the most elaborate and influential of the hierarchical model developed within American research. There are obvious similarities between these models, but there are also differences: The Cattell-Horn model lacks the g-factor which has such a prominent place in the Vernon model and there are
only two broad group factors in the Vernon models, while there are several broad abilities in addition to GF and GC in the Cattell-Horn model.

Research experiences have revealed that intelligence is distributed according to the law of normal probability curve. Very few individuals possess a high degree of intelligence and few others have low degree of intelligence. But majority of individuals possess average intelligence. Intelligence affects the reasoning power of students, which in turn is one of the components of intelligence. Intelligence adds to the keen observation, curiosity and objectivity, hence scientific attitude of students.

2.2 SCIENCE ACHIEVEMENT

Despite many varied statements about the aims of education, the academic achievement of a pupil continues to be the primary concern and the most important goal of education and the main area of educational research. Stephens (1960) states, "Not that other aspects of educational objectives are to be ignored but the main fact remains that academic achievement is the unique responsibility of all
According to Crow and Crow (1956), "Achievement means the extent to which the learner is profiting from instruction in a given area of learning". In other words achievement is reflected by the extent to which skill or knowledge has been acquired by the person from the training imparted to him; it is the outcome of general and specific learning experience. Therefore, the special acknowledgement of a person's skill, the range and depth of his knowledge or his proficiency in a designated area of learning or behaviour is indicative of the extent of his achievement.

More often academic achievement refers to degree or level of success or proficiency attained in some specific area concerning school or academic work. In view of Good (1959), Biswas and Aggarwal (1971) there seems to be considerable similarities in as much as all of them place emphasis on knowledge attained or skills developed in the academic subjects usually designated by test scores.

Pressey, Robinson and Horrock (1959) define achievement as, "the status or level of person's learning
and his ability to apply what he has learned”. According to them, achievement would not only include acquisition of knowledge and skills but also attitudes and values as aspects of achievement. Achievement as manifested by the application of acquired skills and knowledge is a product of learning attitudes and interests since these factors would implicitly influence the extent of achievement. According to Travers (1964) the term refers to any desirable learning that occurs. It is obvious that whether a particular learning is referred to as an achievement or not depends upon whether some body considers it desirable or not. Hence any behaviour that is learnt may come within a definition of achievement.

Good (1973) defines academic achievement as “knowledge attained or skill developed in the school subject, usually designated by the test scores or by marks assigned by the teacher or both”.

The need for measuring academic achievement is based on two fundamental assumptions of psychology. First, there are differences within the individual from time to time known, as behaviour oscillation i.e. academic achievement of the same individual differs from time to time from one class to another and from one educational level to
another. Secondly, there are individual differences. Individuals of the same age group, of same grade usually differ in their political abilities and academic proficiency whether these are measured by standardized measure of achievement or by teachers grading or by marks obtained in tests and examination.

Science is one of the important subjects at the secondary stage. Science achievement is the extent to which a learner progressed in Science subject. It is measured from the marks secured in previous year's examination.

2.3 SOCIO-ECONOMIC STATUS

According to Champin (1928) “Socio-economic status is the position that an individual or family occupies with reference to prevailing average standards of cultural possession, effective income material possession and participation in group activity of the community”. According to Louveinger (1940), socio-economic status is a “cluster of factors including occupation, income and cultural features of the home”. Young (1951) contends that “status is the function of interaction and that results from acceptance by the self and others, of the role which the person plays in the interaction”.
Correlation has been found between parents’ social class and their children’s educational performance both in terms of years of schooling and level of academic achievement. The influence that a family’s socio-economic status exerts over a child’s educational attainment stems from a variety of sources and important one being the value that a family places on education.

It is studied that parental expectation has been in service of discovering casual factors to explain achievement differences among ethnic groups and among groups differing in socio-economic status. Parental expectations correlate positively with social status; parental expectations alone cannot explain achievement differences.

Black parents of low socio-economic status often have expectations for their children that are equal to or higher than those of middle class parents. In some cases, high parental expectations may actually inhibit school performance. Children of middle to upper class families tend to have to continue their studies regardless of their own attitudes towards school. Another factor is the effect of the values of the peer groups on the children’s development standards of goals.
Socio-economic status of the parents affects the attitude of their children. Parents belonging to high socio-economic status are more aware of the importance of education, whereas parents belonging to low socio-economic status are less educated and are not enlightened about their surroundings. Children belonging to high socio-economic status can avail themselves of better facilities like library etc. which helps them to improve their knowledge whereas poor children are deprived of such facilities. (Gakhar, 1981). So socio-economic status of the parents affect their children’s attitude towards education.

When the home is one in which the standard of living is low because of inadequate family income, we speak of such a home as “impoverished”, the family lives in poverty. Lewis (1961) is a sociologist with wide experience in several countries. He observes that over a billion people in 75 nations of Asia, Africa, Latin America and the near East have incomes less than the equivalent of $ 200 per year, as compared with over $ 2000 a year in United States.

On the other hand, there are certain pressures upon the more privileged children. Middle and upper class children are subjected to pressure for social acceptance by
“the right people”. Hence they come to fear failure, not only in the accomplishment of long range ‘life’ goals, but also in the accomplishment of immediate goals. The underprivileged child, as a rule, has no such expectation of success, hence little of the same kind of fear of failure. Especially in school, success is demanded of children in quite different proportions, depending upon family status in the community. Middle and upper class parents put constant pressure upon their children for school success, whereas the lower class parent more readily accepts special classification in retarded classes, quitting at the end of the eighth grade and so forth.

In a review of research and theory relating to social structure, Miller (1963) pointed out that a social system can have three different dimensions:

a) Organized and unorganized social units.
b) Structure; and
c) A set of social positions.

An individual’s status is ordinarily, but not necessarily, influenced by the position he holds in a social system. Position is described here in terms of the occupation held by the individual. Each occupation may be defined by the
roles assigned to it by society. Roles influence the values that tend to be held by persons occupying the position, values, influence attitude, attitude influence percepts, or the way in which the individual views himself and his environment; the individual’s percepts influence his roles and the way in which he plays them. An individual’s status depends at par on the position he occupies and the status that is accord to him by other members of society which enables him to occupy the position.

Most of the people are still identified with service occupation, as government employees and businessman as teachers and social workers, as undertakers and public relations representatives. Chief values of the middle class include a high regard for education, thrift, self-improvement, cleanliness, the pleasures and duties of family life, home ownership, responsibility for one’s own actions and respectability. In contrast to the lower class individual, the typical middle class person is still concerned about impulse control, in a great deal more aware of the consequences of his behaviour and as a consequence acts with more restraint. Family reputation and family ties are generally given a degree of importance in upper class circles. Whereas a middle class youth expects to attain economic and social success through his
own efforts, with a minimum of help from his parents, upper class youths know that their economic and social future is assured.

A significant influence of socio-economic status or the background from which a person hails has been found to be an existent factor in the final outcome of a person’s behaviour. Poresby and Henderson (1982) found it in the infant’s motor and mental development, Sans (1982) in intellectual achievement, Hota (1983) in sex, grade and socio-economic status as regards mental set. In all the above studies, the lower socio-economic status has led to negative consequences and vice versa.

2.4 SCIENCE INTEREST

Interests are one of the important traits of the personality of an individual which have significance for educational and vocational success and satisfaction. These traits are manifested as likes, dislikes, indifferences, preferences and evaluation.

Interests are related to some extent with educational and vocational choices but are too deep seated and
too general to be perfect indicators of any such specific outcomes as educational or vocational choices.

The knowledge and understanding of a child’s interests become a major factor in educational guidance. And educational plan related to the child’s ability and aptitudes may fall short of realization because it is not consistent with his interests and fails to stimulate the desired application of effort on his part.

“Millions of the items of the outward order are present to my senses which never properly enter into my experience. Why? Because they have no interest for me. My experience is what I agree to attend to. Only those items which I notice shape my mind – without selective interest, experience is an utter chaos. Interest alone gives accent and emphasis, light and shade, background and foreground – intelligible perspective in a word”. (By James, as quoted by Taneja, 1972).

Interests thus are very important traits of the personality of an individual. Let us try to find out what interests are.
No clear-cut definition of interests exist. At the one extreme is a casual liking or disliking directed towards a single object, person, and idea or job level. At the other extreme is the definition in which interests are structured out of the individual's attempts to match his self-estimate with the competitive reality of jobs and activities in which he chooses to engage or is forced to engage. Strong (1943) says that interests are the sum total of likes and dislikes for a wide range of stimulus objects and activities. Bingham (1937) writes, "An interest is a tendency to become absorbed in an experience and to continue it". Murphy says, "Interests are conditioned stimuli related to goal objects and expressed as likes or dislikes of activities, objects, characteristics or people in the environment". That means an interest is an expression of like or dislike towards an object or activity, of moving towards or away from the object or activity.

The term "Interest", has been used in many senses. The four most common ways in which it has been used in literature on vocational guidance as given by Super (1950) are as follows:-
(i) **Expressed Interest:**

This refers to the verbal expression of interest in an object, activity, task or occupation. These expressed or “specific interests” as called by Fryer have been shown by research to be quite unstable in the child and in the adolescent though a fair degree of stability has been found in the expressed interests of adults. The lack of stability is due to the fact that the immature individual’s judgement about liking and disliking and activity is considerably influenced by other factors associated with the activity rather than by the intrinsic elements of the activity itself. For instance, a boy likes Mathematics when the fact may be that he likes his mathematics teacher and has no special interest in the subject itself.

(ii) **Manifest Interest:**

This refers to the actual participation in an activity or occupation. Such type of interest is open to objective observation. If a boy, for instance paints, beautiful posters for the school exhibition, we assume that he is interested in artistic activities. The participation, however, may be due to factors other than a real interest in artistic activities, for instance, this may be the one way open to the boy through
which he may get himself accepted as a member of a group of boys whom he very much wishes to join.

Similarly, a real interest may fail to manifest itself in activity due to environmental limitations.

(iii) Tested Interest:

This refers to interests as measured by objective tests, as differentiated from inventories which are based on subjective self-estimates. Such tests measure interest in different types of activities through specialized vocabularies, the assumption being that interest in a certain type of activities should lead to greater familiarity with the terms related to that type of activities than with terms related to the other types of activities. Green’s Michigan Vocabulary Profile Test is an objective test of interest.

(iv) Inventories Interest.

This refers to interest as measured by lists of activities etc. to which the subject responds on the basis of his liking or dislike. These interests differ from ‘professed interests’ in being more subtle, valid and less subjected to ‘faking’ as in the inventory every possible response to every item is given an experimentally determined weight, and the
scores on the various items are added to give total scores for various activities. Research has shown interests assessed by this method to be rather stable 'not only in mature individuals but also in adolescents'.

The interests have certain general features. They are:

a) Interests are an aspect of personality development shaped by both hereditary and environmental factors.

b) Vocation and vocational interests appear to run in similar directions for a large proportion of individuals. The interests of individuals tend to become less varied with increasing age.

Interests and aptitudes are often assumed to go together and interests are inferred from aptitudes or vice versa. The idea behind the presumption is that a person develops interests in the things which he can do well. Aptitude leads to success in particular activity; the success is followed by extrinsic rewards such as feeling of satisfaction for work completed and completed well.
The rewards bring about feeling of satisfaction and pleasure in the individual and to get feeling of satisfaction and pleasure again, the individual repeats the activity. This desire to go in for the activity again and again is what is called interest. On the other hand, the individual who lacks aptitude for a particular activity meets with failure in the end hence with the punishment, e.g. ridicule, feeling of shame etc. These unpleasant feelings thus aroused tend to keep him away from a repetition of this activity; he develops a dislike for that activity.

Research has shown the existence of a low to moderate degree of relationship between aptitudes and interests. This, however, is no proof of a casual relationship between the two. Besides, the relationship is not sufficiently strong to justify the making of inferences about the one on the basis of data about the other.

Abilities, Interests and Achievement

There exists a relationship among abilities, interests and achievement. Strong describes this relationship by the analogy of a motor boat with motor and rudder. The motor (abilities) determine the speed of the boat, the rudder (interests)
determine the direction in which the boat travels by and the distance travelled the boat (achievement) is a result of the operation of both the motor and the rudder. That means interest is not a separate psychological entity but merely one of several aspects of behaviour. Studies have shown that there is a moderate relationship between intelligence and interest, the correlation ranging from +0.4 to −0.4 depending upon the nature of the interest. This means that it is difficult for a person to develop interest for something which he does not have the intelligence to understand.

The problem of educational underachievement may be traced in most cases, to the lack of relationship between the pupil’s ability and his interests. It is no doubt true that often ability is a factor in the development of interests. A child’s success in any task depends upon his ability to perform the task. The achievement of success serves a two-fold need. It brings him social recognition as well as self-esteem. Both are satisfying experiences, and consequently, lend a value to the task, attains a special significance in the child’s life. Failure in a task produces the opposite result. The unpleasant effect is transferred to the task and the child develops a dislike for it. In this manner, interests become related to the child’s intrinsic ability or inability to achieve
success. But all interests are not by – product of the child’s abilities or aptitudes. Interests are also the outcome of the child’s endeavour to satisfy his need for social belongingness and social conformity. The child accepts the norms and values of his social group. This lends special significance to the objects, activities and situations related to those norms and values, either positively or negatively.

Thus, socio-economic and cultural factors also play an important part in the development of interests. The son of a successful medical practitioner often likes to be a doctor in spite of his poor academic ability or his weak scientific aptitude. Similarly, a child’s suppressed hostility for a parent, or the dislike of a school subject teacher, may create in him an aversion for his studies or for a particular subject of study despite his superior ability or aptitude.

Different Types of Interest Factors

It is rather difficult to isolate different types of interests. Some studies have succeeded in isolating them though it is merely a case of different terminology. A synthesis of the result of these studies shows up the following interest factors:
2. Literary: Interest in the use of words and verbal concepts.
4. Artistic.
5. Musical.
7. Contact: Interest in dealing with people for the sake of material gain.
8. Political Interest.

How Interests Develop

Interests are basically determined by environment and heredity. Berdie believes that sex differences in interest are related to physiological or physical variables. He also reports that measured vocational interests apparently reach a point of relative stability soon after physical and intellectual maturity.

Fryer (1931) is of the opinion that interests are primarily of environment origin. They appear to have a chance relationship with abilities. Training and environmental
factors, many of them chance stimulations, are the main cause of vocational interest.

Peter says, family is the greatest single agency in determining vocational choice. School has a great influence on vocational interest. In one group that Berdie studied, 32% reported as the reason for choosing a vocation the influence of a favoured school subject. Another 10% were influenced by their teacher. Berdie believes hobbies and occupations are vital instruments in vocational selection. He concludes, “No one factor, ability, school or work experience plays a large part in determining vocational interests yet all of these factors are related to interests to some extent. Vocational interest is a complex phenomenon resulting from a multiplicity of conditions. Family influences are among the more effective factors; determining interests and abilities are among the least effective factors”.

Stability of Interests in relation to Age

Interests have a reasonably high degree of performance. The correlation between occupational interest scores when there is an interval of ten years is +0.75. Part of the lack of permanence in interest is caused by changes in
interest with age. But according to Strong (1931), the correlation between the likes of 15 years old and 55 year old men is +0.57; that between 15 and 25 year old men +0.32 and that between 25 and 55 year old men +0.88.

Fryer (1931) summarizing the various findings, estimates that there is an increasing performance throughout elementary school, high school and college. However, it should not be inferred that changes in interests do not occur after 18 years of age. There are exceptions. Interests in specific areas may fluctuate to some extent. For example, a person may lose interest in tennis but is unlikely to lose interest in all games. A complete change in basic interest patterns would be the exception to the rule.

Fryer (1931) concludes that there is considerable stability in the individual’s interests and even though the degree of permanence is insufficient for the prediction of future interests.

The assessment of interests of school pupils can be achieved by two methods:

1) Observation, and
2) Measurement.
The observation may be direct or indirect. A school counsellor may have the opportunity to observe the degree of involvement in a task persistently manifested by a child over long periods of time. Or the counsellor may draw his information from the observation made by other persons, like the teachers, parents etc. Interests are measured by a sampling of a wide variety of objects, activities and situations liked and disliked by a pupil. The typical character of these objects, activities and situations, defines a pupil’s pattern of interests. The interest inventories and scales are such measures of interest.

How to Assess Interests

Assessment of interests is very important for providing vocational guidance. The aim is to discover the degree to which the individual possesses the general pattern of interests that characterize successful workers in a specific occupation. Strong and others who have been stressing vocational interests inventories base their work upon this fact that “Men engaged in a particular occupation have been found to have a characteristics pattern of likes and dislikes, which distinguish them from men following other professions”. The
conclusion follows logically that one who possesses to a high degree the interest that characterize physicians as a group and possesses to a low degree the interests that characterize engineers as a group should give weight to this fact in making his vocational plans.

The United States has played the leading role in the development of measures of interests. The inventories which have been developed yield scores that indicate interests according to three types of classification:

a) Interests in specific occupations.

b) Interests in families of occupations.

c) Interests in broad fields, which may cut across vocational groups.

The outstanding example of an inventory of the first type is represented by the occupational scales of the Strong Vocational Interest Blank for Men. Examples of the second type of inventory are the group scales on the Cleaton Vocational Interest Inventory, Brainard Occupational Preference Record and the Lee. Thorpe Interest Tests, the third type, is illustrated by the Kuder Preference Record Vocational.
2.5 HOME ENVIRONMENT

The first social institution to be considered is the basic one, the Home. The most important component of personality those on which later progress depend come being in the give and take of family life, and that many of the customs, ideas, beliefs, and values of the society are transmitted to children by their parents.

Home is viewed as the basic agent of socialization. According to Roe (1951) the emotional climate at the home, i.e. interaction between parents and children develops the basic attitudes and interests which they may express in various aspects of daily life and vocational development. Interaction between families may be of three types–

a) Emotional concentration of the child
b) Rejection of the child and
c) Acceptance of the child.

Parents may be disciplinarian, authoritarian or warm. The type of relationship will lead to development of attitudes and consequently affect vocational development.
It is in and through home that the main components of a child's personality develop. The struggle between feelings of trust and mistrust is first worked out in relation to parents, and it is by family members that the autonomy and initiative characteristic of our society are encouraged or denied. The close emotional ties fostered by the dependencies of childhood make the parents’ and siblings’ attitudes of praise or blame highly important to the child struggling towards a sense of achievement. The integrity displayed by parents, in manifold deeds and attitudes, sets an ideal for their children that later experiences may modify but can seldom eradicate and this often forms the kernel of the new generation's sense of integrity.

It is through the family too, that the child gets his first sense of what is allowed and what is forbidden, what is valued and what is despised in the society, and in the section of the society, of which he is a part. It is his family’s version or these rules and values that he learns or senses, and also the emotional overtones they add to it. The way the culture’s requirements are transmitted to the child determines to a considerable extent what use he will make of them and what their meaning to him will be.
The fact that children are reared in homes varying widely in socio-economic resources, means that they have varying social inheritance as well and this is reflected in all aspects of their lives. Children whose parents believe that they should sacrifice personal interests and activities to devote their time and attention to their children, produce a child-centered home in which the child is treated as the most important member of the family. By contrast, parents who believe that children “should be seen but not heard”, produce an adult-centered home where the adults are the most important members and the children are expected to play subservient roles.

There are many conditions in family life that affect family relationship and in turn the child’s development.

Parental attitudes influence the way parents treat their children and they will be better when parental attitudes are favourable. Many cases of maladjustment in children as well as in adults can be traced to unfavourably early parent–child relationships which developed because parent attitudes even though cloaked in
behaviour that suggested favourable attitudes, were actually unfavourable.

Feeling guilty about not being satisfied with a daughter who they wanted a son, for example, may make parents appear to be very acceptant of the daughter, because they are indulgent in their treatment of her.

Children from broken homes or homes where parents are “emotionally divorced” develop personality pattern that interfere with good adjustments to people outside prolonged and repeated absence of one or both parents from the home also adversely affect the child’s adjustment. Children who have been deprived of a normal home life by wars, natural disasters, industrial dislocation and “social and psycho-social factors are affected physically, ineffectually and emotionally. When parents ignore their children and deviate little to them as they grow older, their poor adjustments frequent by lead to delinquency. If family relationships are seriously disturbed, children are likely to become neurotic or delinquent. Favourable family relationships by contrast lead to a healthy self concept and good personal and social adjustments. In similar way the scientific temper of a child also develops in home under the environment provided. Rationality, open
mindedness or objectivity of parents influences the child’s behaviour directly and indirectly.

2.6 URBAN – RURAL ENVIRONMENT

The human nature is shaped through the interaction which takes place between the human or organism and the environment. Environment is habitation in fullest sense. Not only our physical surroundings but also the people around us, social customs and traditions, cultural, educational training, all constitute our environment. Social heritage, ideas and deals are also part of environment.

The influence of this environment on the interests, attitudes and other characteristics of personality have been systematically studied by a number of investigators.

Every individual bears an imprint of the environment in which he is brought up. The difference between rural and urban background is very sharp. In urban areas, the people lead a very comfortable life and most of them have luxury items like refrigerators, TV, VCR, etc. Radio and Television broadcasts, motion picture programmes and the vast amount of printed reading matter that is readily available, all
contribute to the attitude development of those who are stimulated thereby. In his environment, the child is being constantly stimulated by influences that affect his attitudes either desirably or undesirably.

Life in rural areas is quite hard. They don’t have many comforts. Moreover, the majority of parents in rural area are less educated than the parents in urban areas. Adult illiteracy is found more in rural areas which leads to too many superstitions and believes. On the other hand urban homes provide a better mental and educational environment. There is an availability of good libraries, better schools and advanced educational facilities in urban areas. But there is lack of such educational environment and facilities in rural areas. Social and religious environment is also different in these areas. Rural people have their own philosophy of life, their own beliefs and are more superstitious.

Attitudes are not developed or formed in isolation. The attitudes possessed by a particular person reflect in a large part the kinds of environment the individual has lived through. In order to understand adolescent attitudes it is necessary to know something concerning the differences in
views and values which characterize the different subcultures in which the adolescents mature.

Thus investigator feels that there is difference in the environment of rural and urban areas which subsequently influences the attitudes of adolescents. Adolescents living in both types of environment have their own privileges and handicaps and hence their attitudes vary to some extent according to the environment in which they live.

2.7 SEX – DIFFERENCES

No two individuals are similar in this world. And interesting fact is that variations are not only found between the individuals but even within the same individual. The former are inter – individual differences and later are called intra – individual differences. Individual differences are found in men and women. These sex differences are known as inter – individual differences. The intelligence tests have shown that both genders have an average similar I.Q. but some other differences between boys and girls were discovered by McNemar and Terman (1921). On the basis of some studies they have discovered that women have greater skill in memory, superior in handwriting, skill in making sensory distinctions,
superior in language, more susceptible for suggestions and men have greater motor ability, excel in mathematics and logic, show greater reaction and conscious of size, weight and illusion, superior in physics and chemistry. Srivastva (1980) has also found that boys possess greater scientific attitude than girls.

On the other hand, there are studies, especially studies done in recent years, which indicate that there is no significant effect of sex on attitudes. Sex has little or no relation to aptitudes, attitudes and abilities. Difference in interest, attitudes, aptitudes, and other personality characteristics are becoming fewer and fewer in modern society. Ghosh (1986) found that boys and girls did not differ on scientific attitude and aptitude.

Thus the investigator is curious to find out whether the scientific attitude has any relation to difference in sex.