CHAPTER - I

THEORETICAL ORIENTATION OF THE STUDY

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CHAPTER - I
THEORETICAL ORIENTATION OF THE STUDY

1.1 Introduction

"Tenth Nehru Memorial Lecture, on the Role of Scientific Outlook in the Development of Science and Society" was given by J.V. Narlikar of T.I.F.R.; Bombay in 1977. Nehru Centre Bombay arranged a seminar in 1979 on 'Science, Technology and Society in Developing Society'. Again in 1981, the eminent P.N. Haskar, Raja Ramana and Bhargav released "A Statement of Scientific Temper." Ashis Nandy in the same year called for humanistic temper. Indian Constitution in Article 51A Part iv A (42nd Amendment Act, 1976) also incorporated the need of development of scientific temper, humanism and spirit of enquiry as one of fundamental duties. Three basic questions: why, how and what of an object is essential for rational thinking and action. To know about a thing is a product of curiosity, capacity to doubt and debate, spirit of enquiry, right to question and to be questioned are fundamentals to it (Haskar et al 1981). To a large extent, the credit for making the scientific temper as a subject of discussion in India goes to J.L. Nehru a visionary of India.

Science is a product of human activity in the form of a systematic and organised body of knowledge comprising concepts, generalisation, laws and theories. But the science is not only the product but the process also. The knowledge itself is important but more important is the method and process of
explaining and accumulating the vast knowledge and its interrelationship. It guides us in the solution of problems objectively without any bias and prejudice and it directs us in the real pursuit of truth. In this way we can conclude that science is a process as well as the product of that process. In its process form it suggests the ways and means of exploring the truth and in its product form it presents a systematic and organised body of useful knowledge. The process form of the science is more important than its product form as the way of exploring the truth and acquiring knowledge is always preferred to mere memorisation of gained facts/knowledge. The science constantly remains in search for truth and what it obtains as a result of it can never be absolutely and permanently true. These results can be challenged, and modified after further research. Hence science is always dynamic. The scientific method, a unique method applied by science, is logically sound, highly valid, sufficiently reliable, impartial and objective in its procedure and approach. Science helps to bring a typical change in the attitude of its readers and followers and their environment. Such developed attitude is known as scientific attitude which is distinct from the attitude towards science (mere liking). The person having such attitude is found to have love for the explanation of truth by adopting true means for such exploration and believing in the results of such true findings. Thus science, in its true nature and temperament has three functions to perform: the first is related with investigation and exploration of the facts i.e. process and the second with building of a systematic and organised body of information and findings.
comprising scientific facts, concepts, generalisation, laws and theories-the product and the third function is related with its impact on our life and environment on this planet.

Science has revolutionised our way of living to the extent that it is now termed as 'Modern Living'. Our thinking, our attitudes, our interests, our outlook etc. have undergone tremendous change. Man's material environment has been radically transformed by the magic of science. The average span of human life has been doubled. The nuclear energy and the green revolution are far reaching benefits of science. Kothari Commission (1964-66) has rightly remarked "The basic approach and philosophy underlying to reconstruction of education adopted by us in this report rests on our deep conviction that progress, welfare and security of the nation depends critically on a rapid, planned and sustained growth in the quality and extent of education and research in science and technology".

The present civilisation and culture is a scientific one. We have seen great marvels of science. But science has been proved as a blessing as well as a curse. It has rendered very useful services to mankind but has also played havoc with them. The modern civilisation is the product of modern science. Our thinking and ways of life have been greatly affected by the tremendous advance in industry, agriculture, entertainment, transport, communication, treatment of human diseases etc. It has also changed our mental outlook. Age old superstitions, taboos and unfounded beliefs are fading away. Old customs are
being replaced by simple formalities. Ignorance and illiteracy have no place in the present day world. Our moral ideas, our attitudes towards religion, marriage, and birth control etc. have undergone drastic changes.

Science finds a respectable place in the school curriculum. All the world over, the feeling is being generated. In India, through the efforts of National Council of Educational Research and Training (NCERT), science has been made a compulsory subject throughout up to the Matriculation Standard.

Kothari Commission (1964-66) stated that "We lay great emphasis on making science an important element in the school curriculum. We, therefore, recommend that science and mathematics should be taught on a compulsory basis to all pupils as a part of general education during the first ten years of schooling. In addition, there should be provision of special courses in these subjects at the secondary stage, for students of more than average ability".

UNESCO’s International Education Commission (1972) recommended as under:

"Science and Technology must become essential components in any educational enterprise; they must be incorporated into all educational activity intended for children, young people and adults, in order to help the individual to control social, as well as natural and productive energies thereby, achieving mastery over himself, his choices and actions and finally, they must help a man
to acquire a scientific turn of mind so that he becomes able to promote science without being enslaved by it”.

Regarding the shape of science and its relation with humanities this commission hoped that: “The natural science will one day incorporate the science of man, just as the science of man will incorporate the natural science. There will be a single science.”

National Policy of Education (1992) : The National Policy has made science as a compulsory subject at school level. It goes further saying that science education may be given even to out of school youth and adolescents. The policy recommends as under:

“Every effort will be made to extend science education to the vast numbers who have remained outside the pale of formal education.”

The well known National Policy on Education, passed by the Parliament of India in 1986 and modified in 1992 has laid great stress on Science Teaching. Reiterating the importance of science education as well as inculcation of scientific temper in the core curriculum in schools, the policy states as under:

1. Science education will be strengthened so as to develop in the child well defined abilities and values such as the spirit of enquiry, curiosity, creativity, objectivity, the courage to question and aesthetic sensibility.

2. Science education programmes will be designed to enable the learner to acquire problem-solving and decision-making skill and to discover the
relationship of science with health, agriculture, industry and other aspects of daily life. Every effort will be made to extend science education to vast numbers who have remained outside the pale of formal education.

Keeping in view the above recommendations of the National Policy, the Govt. of India have taken important steps for the implementation of the same.

Kalra (1996) mentions that in third world countries like India where the technology of teaching elementary science has been reduced to gaining knowledge of objects or analysis of the whole into parts, science has altered much of our material life but its essential spirit has not touched or changed our basic attitude. Science should not only encourage gathering facts and knowledge as such but also the process of discovery of knowledge which will inculcate in them a truly scientific temper. Even in the midst of chaos, disorder and disintegration of the present day world, there is a ray of hope of the evolution of better human beings through improving skills, knowledge, understanding and environment. The main objective of teaching science should be to develop the scientific temper, to raise scientific and technological competence, to encourage creativity and to solve the problems relating to daily life in and outside the school.

Many people feel that scientific method is nothing but scientific thinking skill which involves systematic approach having many steps to be undertaken. It is through the adoption of scientific method, that certain scientific attitudes are consequently developed. The student gets insight into scientific process i.e.
means of acquiring knowledge. Scientific method helps to develop in a student the power of reasoning, critical thinking and application of scientific knowledge etc. It also helps in developing positive attitudes amongst the pupils. It helps scientists to describe, explain and predict.

Science is considered an extraneous activity, a sub-culture borrowed from outside, a tool and addendum, a source for providing means to good life, a way of acquiring power and capabilities to influence others, sometimes to dominate others and for solving problems of growing population i.e., impact of science and technology on society. But this is not true picture. Science is to be part of culture of the society, integral to our living and thinking and connected with our dreams and concepts of ethics, beauty and spirituality: If it is so, all benefits come naturally. It is, therefore, science in society and not science and society is important feature to be adopted. Mythologies of the society, a beautiful mixture of facts, imagination and poetry, and creative values are compatible, and both have their own importance. Hence the urgent need of the present study by the investigator.

1.2 Scientific Temper

Science teaching can not escape the snowballing effect of national efforts being made by N.P.E.1992. A distinct feature has been the inclusion of science and scientific temper in the core-curriculum. This has necessitated a second look at the contemporary practices in school science teaching. In this context, the most urgent need is to take a holistic view of science rather than laying
emphasis only on the knowledge aspect of science. A holistic view of science includes:

- concepts in science.
- process of science.
- social and moral aspects of science and
- ethical responsibilities of science.

This approach and its need has been recognised all over the world. The author feels that such changes are necessary for the Indian classrooms too. This will provide material that will stimulate science educators and teachers to examine their own thinking on science teaching and to develop plans for change in order to fulfill the emerging needs of today and tomorrow. In the beginning, science will be introduced as a study of environment by making the child observe his physical and social surroundings. Later on, environmental studies gradually will lead to the study of science and social sciences in the elementary form in an integrated way. It is expected that science education would develop well defined abilities in cognitive, affective domain and also psychomotor skills. It should help in the development of certain abilities and values such as spirit of enquiry, creativity, objectivity, experimentation, courage to question and aesthetic sensibility.

It is true that science began with the Age of Reason and Enlightenment to study man as whole but in recent past it has become deeply concerned with the economical, social, cultural, moral, ethical and philosophical dimensions. Such
dimensions encourage creativity, humanness and ethical context along with values of rationality and objectivity. Jawahar Lal Nehru in the Discovery of India (1946) has rightly pointed out that science ignored the ultimate purposes and looked at facts alone. For the first time man could triumph over and shape his physical environment. Man became almost a geological force. There was no knowledge of ultimate purposes and not even an understanding of the immediate purposes, for science had told us nothing about any purpose in life. Perhaps new developments in biology, physics and physiology and similar sciences, and their interpretation may help man to understand and control himself more than he has done in the past. Or, before any such advances influence human life sufficiently, man may destroy the civilisation he has built and have to start anew.

Scientific method of observation is not always applicable to all the varieties of human experiences and can not cross the uncharted ocean that surrounds us. With the help of philosophy, it may go a little further and venture even on these high seas. When both science and philosophy fail us, we shall have to rely on such other powers of apprehension as we may possess. For there appears to a definite stopping place beyond which reason can not go.

Keeping in mind these limitations of reasons and scientific method, we have still to hold on to them with all our strength, for without that firm basis and background we can have no grip on any kind of truth or reality. It is better to understand a part of truth and apply it to our lives than to understand nothing at all and flounder helplessly in a vain attempt to pierce the mystery of existence.
The applications of science are inevitable and unavoidable for all countries and people today. But something more than its application is necessary. It is the scientific approach, the adventurous and yet critical temper of science, the search for truth and knowledge, the refusal to accept anything without testing and trial, the capacity to change previous conclusions in the face of new evidence, the reliance on observed fact and not on pre-conceived theory; the hard discipline of the mind—all that is necessary, not merely for the application of science but for life itself and the solution of its many problems. Too many scientists today who swear by science, forget all about it outside their particular sphere. The scientific approach and temper are, or should be, a way of life, a process of thinking, a method of acting, and associating with our fellowman. That is a large order and undoubtedly very few of us, if any at all, can function in this way with even partial success. But this criticism applies in equal or even greater measure to all the injunctions which philosophy and religion have laid upon us. The scientific temper points out the way along which man should travel. It is the temper of a free man. We live in a scientific age, so we are told, but there is little evidence of this temper in the people anywhere or even in their leaders.

Present day science deals with the domain of positive knowledge but the temper which it should produce goes beyond that domain. The ultimate purposes of man may be said to be to gain knowledge, to realise truth, to appreciate goodness and beauty. The scientific method of objective inquiry is
not applicable to all these and much that is vital in life seems to lie beyond its scope-sensitiveness to art and poetry, the emotion that beauty produces, the inner recognition of goodness. The botanist and zoologist may never experience the charm and beauty of nature; the sociologist may be wholly lacking love for humanity. But even when we go to the regions beyond the reach of the scientific method and visit the mountain tops where philosophy dwells and high emotions fill us, or gaze at the immensity beyond, that approach and temper are still necessary. Whereas method of religion-devoid of objective inquiry and relying on emotions and intuitions, when goes beyond its regions, applies to every-thing in life, encourages a temper which is the very opposite to that of science. It produces narrowness, and intolerance, credulity and superstitions, emotionalism and irrationalism. It tends to close and limit the mind of man and to produce temper of a dependent, unfree man. Too much dependence on the super natural factors (say god) if it exists may lead, and has often led, to a loss of self reliance in man and blunting his capacity and creative ability. And yet some faith seems necessary in things of the spirit which are beyond the scope of our physical world, some reliance on moral, spiritual and idealistic conceptions or else we have no anchorage, no objectives or purpose in life. Whether we believe in God or not, it is impossible not to believe in something-say creative life giving force (vital force) inherent in matter which gives it its capacity for self movement and change and growth something real though elusive.
As knowledge (science) advances, the domain of religion, in the narrow sense of the word, shrinks through unfolding mysteries and supernatural causes leading to make life richer and more complete. It is therefore, with the temper and approach of science, allied to philosophy, and with reverence for all that lies beyond, we must face life. Thus we may develop an integral vision of life embracing present, past and future.

Science has dominated the western world and every one, there pays tribute to it, and yet the west is still far from having developed, the real temper of science. It has still to bring the spirit and flesh into creative harmony. In India in many obvious ways we have a greater distance to travel. And yet there may be fewer major obstructions on our way, for the essential basis of Indian thought for ages past, though not its later manifestations, fits in with the scientific temper and approach as well as with internationalism. It is based on a fearless search for truth on the solidarity of man, even on the divinity of everything living and on the free and co-operative development of the individual and species, ever to greater freedom and higher stages of human growth.

It is an attitude and approach to problems, mode of thinking, rather rational - a rational and scientific approach to the comprehension and solution of problems, acquired purposefully and maintained consistently. Scientific Temper involves passion for facts, clarity of vision and expression, interrelations of thing-a spirit of science.
Scientific temper means a spirit of true critical enquiry that demands the freedom to inquire, to question the prevailing ideas and to alter, modify or discard them in favour of new ones (Kunnath, 1977). In other way it implies freedom of speech, academic freedom and freedom of the press (a sense of critical attitude that discourages blind submission), rationality, tentativeness of truth, objectivity and humanism. Science has to be humane because value-neutral science can cause immense misery to mankind. Science and, religion differ in many ways: kinds of beliefs, eternity of values, permanent nature of authority. Worldly, idealistic, materialistic, positivistic, human hopes, fears, and aspirations have no place in science. But in Indian context religion and science can be blended without any difficulty. Religion is regarded as spirituality. Both aim at wisdom, freedom and fearlessness. Scientific temper demands a change in beliefs, traditions, customs and such values as - emotional neutrality and organised scepticism - a temporary suspension of judgements and detached scrutiny of beliefs in terms of empirical facts and logical criteria.

Fourth Survey of Research in Education (1988) emphasized the need of research in the study of scientific temper. Science Education at the individual level is concerned with the cultivation of scientific temper, which includes a spirit of enquiry, a disposition to reason logically and dispassionately, a habit of judging beliefs and opinions on available evidence, readiness to reject unfounded theories and principles, the courage to admit facts, howsoever unsettling or disagreeable they might be and finally recognising the limits of
reasoning power itself and the ability to use the scientific method of problem solving in handling the problems of life or society. Science has two major aims the first social i.e. to equip individuals to participate in the creation of a society which is free from poverty, hunger, diseases and evils such as violence, exploitation, oppression etc. and the second one at individual level which includes the identification and development of abilities and dispositions of mind.

Ogunnigi (1988) said that conversion to a Western world view should not be the goal or prerequisite of science education. Instead the goal should of assisting the people to meet modern challenges by sharing appropriate technology and understandings and to realise that in many circumstances, it is both possible and legitimate to hold 'a scientific view as well as traditional view of the world'.

The development of scientific temper often remains confined to the cultivation of a mere attitude of questioning. But there are many important ingredients of scientific temper and all of them need to be developed as adequately as possible. A few of them are impartial observations, untiring experimentations, unprejudiced considerations of every point of view relevant to the enquiry and courage to go to the end of the enquiry until ascertainable truth emerges through a process of verification and utmost possible synthesis of arguments and counter arguments. But in order to enhance the pace of progress, to develop scientific temper to solve economical and cultural problems through the right use of scientific and technological knowledge, positive
encouragement should be given to the contemporary teachers for embodying in themselves this ideal. Scientific temper is necessary for all and not only for professionals who practise and deal with their applications. It is a dynamic device to minimise exploitation and enables one to question high priests-to minimise authoritarianism, and to wither the estate of science-criticism, even self-criticism for self-reliance through innovation. But Allport (1937) defined temperament as the characteristic phenomena of an individual's emotional nature, including his susceptibility to emotional stimulation, his contemporary strength and spread of response, the quality of his prevailing mood and all peculiarities of fluctuation and intensity in mind, these phenomena being regarded as dependent upon constitutional make up and, therefore, largely hereditary in origin.

1.3 Personality in Eysenck's View

In educational world the term 'personality' has a wide significance. Personality includes the totality of one's behaviour and hence both inner and outer (covert as well as overt) behaviour towards oneself and others as well should be taken into consideration. It includes everything about the person, his physical, emotional, social, mental and spiritual make up. Its subjective nature doesn't allow to reach a clear cut, well agreed definition. Allport (1937) describes it as: "personality is a dynamic organisation within the individual of those psycho-physical system that determine his unique adjustment to his environment". The contemporary psychologists like K.B.Cattell and Eysenck feel
very strongly that if personality can not be demonstrated, measured and quantified, it should be called philosophy or art. Eysenck (1952) says: "Personality is the more or less stable and enduring organisation of a person's character, temperament, intellect and physique, which determine his unique adjustment to the environment. Character denotes a person's more or less stable or enduring system or organisation of connative behaviour (will). Temperament denotes a person's more or less stable and enduring organisation of affective behaviour (Emotions). Intellect denotes a person's more or less stable or enduring organisation of cognitive behaviour (Intelligence). Physique denotes a person's more or less stable or enduring organisation of bodily configuration and neuro-endocrine endowment (glands and nervous system and bodily configuration)".

This definition gives a balanced consideration to hereditary and environment in building one's personality. Eysenck stresses the concept of structure and organisation and criticises just naming some of the behavioural characteristics like bricks in describing a home. He gives personality a physiological base. It gives complete picture of the human behaviour patterns by including cognitive, connative, affective and somatic (constitutional) aspects. This makes personality somewhat measurable and assessable and thus gives it a scientific base. Eysenck advocates that personality must have physiological base. It is not so always. Every time we can not have a physiological base due to the very complex nature of personality. Moreover, his definition leads us to
form an opinion that personality is fixed and can not be changed. Both point to an extreme situation. It is true that personality should be evaluated on the basis of generality of the behaviour. The behaviour must be consistent in a number of situations but on the other hand, changes cannot be denied. The person who is extrovert may turn into introvert depending upon so many intervening factors. In fact, the concept of personality, like sound and electricity etc., is difficult to be explained; as their impact can be felt but their real nature is always a matter of secrecy. Thus personality is something unique and specific, dynamic, self-conscious and includes all things about a person whether conscious, subconscious and unconscious activities, well organised as unified whole and not collection of so many traits or characteristics, a product of heredity and environment and end product of process of learning and acquisition, goal oriented resulting into the life style of an individual. Personality may act as a stimulus (outer appearance), sometimes as response (inner) and as an intervening variable- interaction between the inner and outer - a final adjustment. It is both a process and a product. Personality is thus a unique, dynamic, continuous, whole and end product of inner heredity and outer environment (learning)-outer aspect resulting into overt and covert function based on conscious and certain unconscious motivations.

Three main approaches to classification of personality are worth mentioning (1) Type approach (2) Trait approach (3) Developmental approach. According to type approach the entire humanity is divided into certain broad
types and an individual is fitted into one of these. According to this usage a person can be said to be dominant or recessive, social or seclusive. Trait Approach-A trait is dimension of personality which can be measured and must describe the consistent behaviour of an individual. It is better if a trait is statistically established and should have emotional contents. The description of personality in terms of traits is clearly superior to its classification under type approach. A trait as a dimension is conceived quantitatively as a continuous scale of measurement from extreme positive end to the extreme negative end. Few persons, however, lie at either extreme. Most show the characteristic in a moderate or an intermediate degree. Common traits which exit in some degree in almost all people can be studied statistically. Usual method of investigation is to discover characteristics that vary together. It may be found, for example, that idealists are also co-operative, friendly and truthful, and that the opposite of these qualities also go together. This cluster of characteristics then defines a trait that has a broader meaning and is, therefore, more useful for description than the component qualities taken separately. The famous statistical method used for this purpose is known as factor analysis which makes use of inter-correlations to reduce those factors which vary together. For example, as a result of factor analysis, psychologists now agree that introversion, extraversion is a trait. It is a collection of a number of imperfectly correlated traits like social introversion (shyness, withdrawal), thinking introversion (meditation, philosophizing), depression (unworthiness, guilt), cycloid tendencies (ups and
downs of mood) and rhapsody (happy-go-lucky or carefree disposition). It is now clear that since these five traits are not perfectly correlated, it is quite possible that a person who is shy need not be meditative.

Eysenck—Synthesis of Trait and Type Approach

Hans Jurgen Eysenck (1965) has been influenced in the theory of personality by Jung's typology of extroversion and introversion and also by the work of Kretschmer and body or constitutional dimension. At the same time he has tried to synthesise the trait and type approaches as we will see presently. As a theorist of personality, Eysenck is a strong advocate of parsimonious practicality in theory construction. He believes in making a sharp distinction between philosophy and science as a basis of psychology. Psychological concepts couched in philosophical language, do not and will not carry us very far. This is a considered opinion of Eysenck. He is not against philosophy as such. He is just not in favour of philosophy being used as medium of explaining psychological phenomena. He felt the need of finding the dimensions of personality before a theory could be constructed. Experiment without theory is blind. Theory without experiment is lame. There is perhaps no field in psychology where this saying of Kant applies with greater force than in the study of structure of personality. What should be a unitary field of study is tragically cleft into two. As an example, we may take the definition of the very term 'personality itself where opposition between those who lay stress on behavioural acts and those lay stress on dynamic concepts. A proper definition must stress
upon both the empirical source of our data and the theoretical nature of our unifying concepts. Allport's definition of personality is very acceptable but definition given by Eysenck is more exact from the view point of measurement. His famous test, Maudsley Personality Inventory (1957) measures character in terms of extroversion and temperament in terms of neuroticism. He further points out that the seat of extraversion is central nervous system and the seat of neuroticism is autonomous nervous system. In addition to these two dimensions he adds psychoticism as a new dimension resultant of the imbalances between other dimensions of personality. He has added intelligence also which has an orthogonal relationship with extraversion and neuroticism. Unlike Cattell who emphasises traits Eysenck emphasises types. Though he does take into consideration traits as well. For example introversion is a type and its various traits, habitual responses and specific responses are shown in the figure given below:-

```
Type (General factor) INTROVERSION

Traits (Group factors) Persistence Irritability Subjectivity Shyness Rigidity

Habitual responses (Specific factors) Will Will not pickup friendship Doesn't lose himself in group

Specific Responses (Error factors) Situation, 1 Situation 2 Situation etc.
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As is clear from the above schemata of 4 types of factors, the personality types grow out of general factors. Eysenck makes a strong point that traits must be operationally defined and be capable of being measured. He finds that traits are approximate to consistent habit of behaviour. Specific factors grow out of habitual responses which are behavioural acts and which recur in similar circumstances. Error factors are the lowest in importance and grow out of specific responses to any single act and can not be used with a degree of accuracy in discussion of personality and its theory. Eysenck attaches highest importance to the general factors and lowest to the error factors.

According to Eysenck, Personality has three basic dimensions.

(a) **Extroversion** - Introversion. It is the level of conditionability and deconditionability. Easy conditionability and easy deconditionability is extraversion, though extraversion expresses itself through social proclivity. Difficult conditionability and difficult deconditionability is introversion. Though majority of the persons are ambiverts, yet we do get extreme introverts and extreme extroverts. Though Eysenck was inspired in these concepts by Jung, yet he came to differ with him regarding the nature of introversion-extroversion.

(b) **Neuroticism** - Non neuroticism. Neuroticism is the liability to break down under emotional stress. It has a high correlation with anxiety.
Intelligence - Psychoticism is another dimension which is a resultant of the dysfunction of the above dimensions.

All these dimensions must have their bases in the physiology and are highly resistant to change and extinction. The dimensions should be measurable. Most of the personality systems while dealing with deviant behaviour rely upon the Gaussian Curve or bell shaped curve. In this representation normal subjects distribute themselves at the centre with neurotics and psychotics being indicated as the opposite sides. Yet another method of delineating the difference between the normal and the deviants assume a dichotomy in which the normal individual deviates either as a psychotic or a neurotic. But Eysenck rejects both of these methods as unsuitable for his purpose. He devises another novel but very interesting and very effective method of viewing the differences between the normal and deviants.

It is the schematic presentation of orthogonal concepts first proposed by Eysenck in his book of 'The scientific study of Personality' (1952), and later in his Maudsley Monograph No.2, 'Perceptual processes and mental illness' (1957).

Thus it is clear that human personality can move from normal to neurotic, normal to psychotic and normal to a mixed, psychotic neurotic behaviour pattern. Movements can also take place from neurotics through the mixed psychotic-neurotic area and into straight psychotic behaviour without entering the normal behaviour area as given in the schematic diagram below:
The reverse of any of these movements is also possible. Eysenck feels that mixed cases of psychoticism-neuroticism are far more likely to occur than pure psychotic or neurotic behaviour. He feels as other do that the preponderance of mixed cases agrees well with the clinical experience. Eysenck feels that on the basis of his data the either - or classification method is a thing of the past rather than an individual is placed on the plane which comes nearer to his true emotional self.

Refer once again to the schematic diagram given above. It is seen that (A) is normal, (B) is psychotic but close to the limits of being a mixed type. (C) is very much at the border line of being a mixed type but also close to the outer fringes of normalcy while (D) is to the right in the area of true neuroticism. Admittedly the above scheme is only a device and not operationally true phenomenon. It does, however, approximate closely Eysenck's Original orthogonal relationships drawn from his factorial work. Eysenck also feels that these dimensions of personality are certainly not the only possibilities. Further research will evidently uncover more of them. Some of Eysenck's recent studies with drugs like Meprobamate, Chlorpromazine's Dextro-amphetamine, Sodium Amytal support the postulate that. "Depressant drugs increase cortical inhibitions, decrease cortical excitation and thereby produce extroverted behaviour pattern while conversely stimulant drugs decrease cortical inhibition,
increase cortical excitation and thereby produce introverted behaviour pattern."

Despite the opinion expressed above many research findings are loose and
divergent. Eysenck believes that both Extroversion and Neuroticism have a
constitutional basis. Using self-devised instruments and tests measuring
neurotic behaviour, Eysenck found a correlation of 0.85 between neurotic
behaviour and non-neurotic behaviour in identical twins, while in fraternal twins
the correlation was only 0.21. Eysenck believed at first that his dimensions of
personality have orthogonal relationship to each other. Of late, he has changed
his stand. Eysenck's latest studies on personality found a correlation though
slight and negative one between Extraversion and Neuroticism.

1.4 Environment And Its Meaning

Psychologically a person's environment consists of sum total of
stimulation which he receives from conception to death. Thus environment is
every thing that affects the individual minus his genes. The subjective
perception plays a dominant role in determining the environment. For example,
a snake below my cot if not perceived by me, does not appear in my
environment. If there is a rope below my cot and I take it to be a snake, then a
snake does exist in my environment. Two siblings living in the same room in a
family and receiving the same treatment from every one will be said to have
'similar' environment. But the very fact that the younger one has an elder sibling
in the environment and the elder one has a younger sibling in the environment,
brings the differences. Food, geography, culture, religion, literature, music,
family, school, radio, press, television etc. are some of the prominent elements of the environment. The term environment is broad in its scope. Whatever is present around the living beings and above the land, on the surface of the earth and under the earth, is environment. The word environment is used for the surroundings. Literally it means, whatever surrounds or covers the individuals.

Douglass and Holland say, "Environment is a word which describes, in the aggregate, all of the external forces, influences and conditions which affect the life, nature, behaviour and the growth, development and maturation of living organisms. Whereas Woodword says "The environment is everything that affects the individual except his genes. Environment covers all the outside factors that have acted on the individual since he began life".

Environment is mainly of the following types:

1. Physical Environment (Nature)
2. Social Environment (Society)

Physical Environment and Its Impact on Personality

It is related with nature which includes: air, water, forest, lands, minerals, animals, birds etc. i.e. organic and inorganic substances. Adjustment to it makes individuals, groups and society to spend their lives joyfully. The environment has been playing an important role since times immemorial, man never gave importance to it which it deserves. As a result of ignorance, carelessness and selfishness man has misused it for his lopsided development. He is exploiting it at every step without caring for the welfare of future generation. Modern age of
science has not only conquered nature but also has misused it. We shall have to think about keeping the human civilisation alive. It is our moral duty to provide them with healthy environment. These days we are using natural resources like air, water, land, light, forests and animals in such an unplanned way that their end is very near. By cutting forests and adopting artificial means of irrigation he has made the land sterile. Population explosion, industrialization and urbanization has decreased the fertile land in agriculture based and agriculture dominant country like India.

According to a Report given by United Nations, “22350 lakhs acre land has become sterile because of soil erosion and saltishness, 2/3 jungles of the world have been afforested (cut down) 200 kinds of animal and birds have become extinct because of human carelessness. About 15000 species of world animals are in serious danger. This tendency continues in all areas. If attention is not paid to this side the future of man will become dark”. Large scale migration of rural population to big cities to find employment has resulted into problems like housing, law and order and transportation etc. A few decades back, man easily fulfilled his primary needs from nature. Industrialisation threw him away from ‘Nature’ at the mercy of twists of commercial world resulting in change of his behaviour and view point towards his fellow beings and family. Population explosion is proving a big drain on our limited resources and putting future of man and his environment at stake.
Social Environment and Its Impact on Personality

Social Environment is expressed in the action and reaction of social relations at all stages and in all aspects of man's life. Social environment includes community, spiritual, and religious groups, domestic and economic conditions, family and educational institutions associations, matrimonial, national and international relations are examples of social environment. Man's birth, existence, survival, development all owe to society. These days, man is moving towards the planet whereas humanity is moving towards the jungle. There is degradation in human values in the society. Insecurity, restlessness and disorder have become the order of the day. If humanity is to be saved, environmental education has to be an integral part of education of today. Besides sex, difference in temperament is also an important aspect of personality. Temperament develops according to the environment in which child grows. Thus the difference in environment affects temperament. Family relations, society, circle of friends and working conditions all have an effect upon the temperament of an individual. In poverty, temperament becomes hard, irritable, over-bearing etc. Even though it may not be accepted as a law, no man of experience will deny that the financial status, occupation, nature of life partner and living conditions all have profound effect on temperament. But the effect of hereditary on temperament is more profound than the effect of environment. Temperament depends to a large extent upon internal drives which are deeply affected by endocrine glands. In modern times extensive research has been
carried out to find out the effect of endocrine glands on temperament one of the
essential part of personality. Scientific discoveries have proved beyond dispute
that many traits in temperament once attributed to the environment are actually
due to glands. The change which occurs in the temperament of boys and girl
with the coming of youth caused by increased activity of the sex glands is
inevitable. Besides, as the secretion of the thyroid increases, an individual
becomes restless and active and if it decreases he becomes slow and lazy.

Researches on the effects of glands located in various parts of the body are in
progress. Attempts are being made to bring about artificial increase or decrease
in the glandular secretions. But to conclude that temperament is determined by
glandular secretions would be completely one sided. A big change in personality
is effected by cultural and social environments. For example, the mental
disturbance through which adolescents in our civilisation pass when they attain
youth, is absent in many tribes because in those tribes there are no restrictions
upon sex relations. Obviously, the change is not exclusively due to the activity
of sex glands, but it is also due to social customs. Hereditary then does not
mould the personality. Biesanz and Bleasanz has said “Personality is the
organisation of person’s habits, attitudes and traits and arises from the interplay
of biological, social and cultural factors”. We know from experience that heredity
had most pronounced effect upon physical appearance, somewhat less on
intelligence and least of all upon personality. This conclusion is supported by
scientific researches on Jukes and Edward Families. The effect of environment
on crime is inevitable. The sociological school designates social conditions like poverty etc. as the cause of crime. Gabriel Tarde and Emil Durkhrim of France, Voccaro Coljanni, Loria and Ferri of Italy and Bonger of Holland are the propounders of this school. But modern criminologists don't give credence to this analysis of the causes of crimes. This theory does not find application in the case of white collar criminals. Actually, social environment and crimes are intimately related. Social environment does affect an individual right from his childhood and its effect continues till the ripe age. Home, playground, college, social trends, values and customs, friends, working conditions in factories, class, religion, geographical conditions are all part of the social environment. In an experiment conducted by Healy and Bronner, 20 to 28 percent of the juvenile delinquents belonged to families having bad habits, unethical ways and criminal tendencies. The preface writer of a book ‘Women of the Streets’ based on study of London prostitutes concludes that the problem of prostitution has its beginning in the parent-child relationship in the families.

Environment has a very significant effect on man from womb to tomb. The status of the child, youth and old man in the family and society is not the same and as a result of this difference a man’s personality, temperament, way of thinking, tendencies, inclinations and character is affected. In the same way, the status of the person in places like school, office, club etc. affects his behaviour to a great extent. Environment can be roughly divided into two types: controlled and uncontrolled in both social and geographical fields. In this context, an
example from family life will suffice. In the opinion of famous psycho-analyst Sigmund Freud, the personality of a person is fashioned in the first few years, the rest of the life being an expression of those tendencies. However, some may disagree with Freud's opinion but most psychologist agree with regard to the effect of the environment of the family upon the character, nature, mental tendencies, habits and behaviour of the individual etc. There are enough existing causes which justify our denial of the full knowledge of the effects of the family upon the individual. This view can be verified by comparison of children brought up in families and those brought up in government institutions. Havelock Elles in his book the 'Problem of Race Regeneration' says "The advantage of a mother suckling her baby are more than merely physical, it is a stimulus to her affection for her child and a guarantee that the child will receive in other respects the loving care it needs". In childhood, parental love affects the stability of emotions of the child. It is inevitable that excessive love and care spoils the child and lack of affection leaves their feelings undeveloped, which are then unnaturally expressed. The balance between the two leads to good personality. The famous psychologist Alfred Alder maintained that even the birth order of the child in the family affects its personality. This may be understood by remembering that in the family mother, father, husband, wife, elder brother, younger brother, elder sister, younger sister, beloved child, unwanted offspring, all have their respective dissimilar status which affects their personality.
The environment of the home has a comprehensive influence on the development of the personality. This influence as a general rule, is according to the patterns found in a particular culture. In the family, the relation of child with the parents is the most intimate. The cultural development of the child is very much influenced by the behaviour of the parents toward him e.g., a child brought up in an Indian home will be very much different in his behaviour than another brought up in a western home. But even in the same culture much difference can be observed in the parent child relationship in different families e.g. generally, the child has a respectable place in an Indian family but all Indian parents (compelled under the circumstances) don't sufficiently love and sympathise with the child. In such circumstances much repression is observed in child's behaviour. He becomes an introvert and often enjoys in his dreams, day dreams and imaginations, of things which are denied to him by his parents. The influence of the parental love is again not the same in the case of all children. In the same circumstances a child may become aggressive while another may become submissive. On the other hand, if the parents show excessive affection towards the child, the child may become an extremist and excessively dependent upon the parents. A child excessively ignored shows different types of conflicts in his personality. According to Sigmund Freud, the tendency to depend upon the parent in childhood is manifested in the tendency to depend upon the leader in the adult age. If the child is allowed freedom in
the matters concerning his belongings and food, he becomes strong or more creative in his group.

Home and school have greatest influence on personality pattern of the individual and educate one in a unique manner. Parental acceptance, rejection of the child, or their over dependence, greatly influences the child in early years. Studies show that infants who were separated from their mother in their first year show depression and retardation in growth (Kurt Glacer and Leon Eienberg). Living and adjusting with parents and siblings is a first lesson of group interaction. Play situation is the best for more group interaction of pre school children.

Entering school is a major departure for a child from family into the outside world. Class acts as a social group. Peer group develops the adequacy and acceptance feeling and need more freedom from the parents, the denial of which invite rebelliousness and bitterness in the child's behaviour. In school, various group activities are provided. Playmate or 'best pal' relationship are developed in early years where as in middle years the child faces the conflict between the need for affiliation and need to achieve. The adolescent confronts himself with expectations of adults and peer groups resulting in making some kind of compromise- a necessity for his mental health. Class climate determines personality pattern of the child. Most of the children become part of their sub group and lend strength to it. Due to individual differences and various social experiences, different in each case provided in school and at home, different
types of persons, with different personality patterns such as leader, the deviant, the isolate etc., are found. Gang leaders are born in absence of proper direction and healthy influences.

A deviant being nonconformist becomes a fun for others due to strict discipline of school developing serious disturbance in him. The isolate, though physically present, is not a member of the group. His isolation is the result of deliberate flouting of a major norm. Unaccepted, personality or unresolved confrontation with the leader of his group, makes life of the isolate extremely traumatic and maladjusted. Other students of the school make him an object of entertainment. Sometimes isolation is imposed deliberately by the child belonging to low social-economic strata or a low caste. The Isolate develops inadequate self-concept consequently, he may undervalue or overvalue himself. If given few responsibilities, he develops faulty behaviour pattern showing no respects for rights and opinion of others etc. So positive social interaction is necessary for healthy development of an individual. Through the trauma of role conflicts readjustment takes place. We become better person through resolution of role conflict, if role conflict is excessive and remains unresolved, it may make a person neurotic or psychotic.

Man is a social animal. Group life is a common phenomenon of nature. It is impossible for him to live alone. His life from conception to death is due to group interaction. His existence without group is insignificant and inadequate. In a group there is 'give and take of warmth', hostility, support, rejection, fear etc.
affecting socialisation of child. The changes in group may increase or lower productivity etc. or may not affect at all. Change or resistance to change, social influence, pressures, coercion, power, cohesion, attraction, rejection, interdependence, equilibrium and instability, co-operation and competition are few forces to mention that play a vital role in group life such as family, peer group, hobby group, work group etc.

Our personality, general behaviour pattern, our dress, speech, mannerism and character are determined by group influence. Conformity with norms of the group results into the safety and reassurance of the individual. Blind conformity is dangerous where rational behaviour is fundamental to any one’s mental health. Goals of the members are influenced positively, by the group-interpersonal-relations. Socio-economic outlook and beliefs with role conflict are developed among group members as a result of interaction. Multigroup membership forces us as individuals to adapt in a big way and this in turn brings change in mental, physical and spiritual aspects of life of human beings. Life is a co-operative affair and our individual progress is directly correlated to the progress of the group. Individual’s influence on the group is linked to his status in the group such as that of the leader. A deviant member causes conspicuous change in the group.

1.5 Statement of the Problem

The problem under investigation may precisely be stated as:
DEFINITION OF TERMS

In the proposed investigation the term environment includes both home and school environment.

Home Environment

It refers to the psycho-social climate of home as perceived by the student in home. It includes ten dimensions such as:

Control, protectiveness, punishment, conformity, social isolation, reward, deprivation of privileges, nurturance, rejection and permissiveness. The detail of these terms have been discussed in the following pages (cf-3).

School Environment

It refers to the psycho-social climate of the school as perceived by the students in school. It includes six dimensions: creative stimulation, cognitive, encouragement, permissiveness, acceptance, rejection, and control. Detail of these terms have been discussed in the following pages (cf-3).

Personality

Here Personality broadly means extroversion and neuroversion/neuroticism dimensions of personality on Eysenck Personality Questionnaire (Junior). Extroversion briefly stands for extroversion - introversion representing two hypothetical extremes of a dimension - extrovert and introvert types of
personality respectively. Similarly neuroticism briefly stands for neuroticism-non
neuroticism personality representing two hypothetical ends of a dimension -
neurotic and stable (non-neurotic) types of personality respectively.

Scientific Temper

It is the state or condition or bent of mind of a free man working on any
problem, process, situation, incident arising in; and faced by the students in
school, in their daily life, in home, in society and in the world at large. A student
having inculcated the Scientific Temper bears the following dispositions or
dimensions.

Spirit of Enquiry

It includes curiosity, empirical observation, imagination, adventurous
attitude, will power to go to the end of enquiry, search for truth and new
knowledge and search for means to discover new knowledge etc.

Creativity

It includes instinct, towards thrilling and dynamic nature.

Objectivity

It includes intellectual integrity and honesty, detachment, unemotional
nature, ability to suspend judgement, respect for others points of view,
williness to change, free from bias, reliance on facts based on observation
only and not on faith etc.
Courage to Question

It includes questioning attitude, critical judgement, reasoning and logical reasoning etc.

Aesthetic sensibility

It includes intrinsic charm in unfolding the pleasures of nature and natural phenomena and appreciation of truth, goodness and beauty etc.

Experimentation

It includes open mindedness, dynamism, untiring nature, management, testing, self-discipline etc.

1.6 Objectives of the study

The following were the objectives of the study:

- To develop and standardise tool for measuring scientific temper.
- To investigate relationship between scientific temper and extroversion personality.
- To study the relationship between scientific temper and neuroticism personality.
- To investigate the relation between scientific temper and school environment dimensions.
- To study the relation between scientific temper and home environment dimensions.
• To study the significance of difference, if any, in scientific temper of rural and urban school students.

• To study the significance of difference if any, in extroversion personality of rural and urban school students.

• To study the significance of difference if any, in neuroticism personality of rural and urban school students.

• To compare significance of difference if any, in scientific temper and extroversion personality of rural students as well as that of urban students.

• To investigate the significance of difference if any, in scientific temper and neuroticism personality of rural students as well as that of urban students.

• To study the significant difference if any, between various school environment dimensions of rural and urban students.

• To investigate the significance of difference if any, between various home environment dimensions of rural and urban students.

1.7 Hypotheses

The following null hypotheses were formulated keeping in view the objectives of the study:

1.0 There is no significant relation between scientific temper and extroversion personality.
2.0 There is no significant relation between scientific temper and neuroticism personality.

3.1 There is no significant relation between scientific temper and creative stimulation dimension of school environment.

3.2 There is no significant relation between scientific temper and cognitive encouragement of school environment.

3.3 There is no significant relation between scientific temper and acceptance dimension of school environment.

3.4 There is no significant relation between scientific temper and permissiveness dimension of school environment.

3.5 There is no significant relation between scientific temper and rejection dimension of school environment.

3.6 There is no significant relation between scientific temper and control dimension of school environment.

4.1 There is no significant relation between scientific temper and control dimension of home environment.

4.2 There is no significant relation between scientific temper and protectiveness dimension of home environment.

4.3 There is no significant relation between scientific temper and punishment dimension of home environment.

4.4 There is no significant relation between scientific temper and conformity dimension of home environment.
4.5 There is no significant relation between scientific temper and social isolation of home environment.

4.6 There is no significant relation between scientific temper and reward dimension of home environment.

4.7 There is no significant relation between scientific temper and deprivation of privileges dimension of home environment.

4.8 There is no significant relation between scientific temper and nurturance of home environment.

4.9 There is no significant relation between scientific temper and rejection dimension of home environment.

4.10 There is no significant relation between scientific temper and permissiveness dimension of home environment.

5.0 There is no significant difference in scientific temper of rural and urban school students.

6.0 There is no significant difference in extroversion personality of rural and urban school students.

7.0 There is no significant difference in neuroticism personality of rural and urban school students.

8.0 There is no significant difference between scientific temper and extroversion personality of urban students.

9.0 There is no significant difference between scientific temper and extroversion personality of rural students.
10.0 There is no significant difference between scientific temper and neuroticism personality of urban students.

11.0 There is no significant difference between scientific temper and neuroticism personality of rural students.

12.1 There is no significant difference between school environment (Creative Stimulation) of rural and urban students.

12.2 There is no significant difference between school environment (Cognitive encouragement) of rural and urban students.

12.3 There is no significant difference between school environment (Acceptance) of rural and urban students.

12.4 There is no significant difference between school environment (Permissiveness) of rural and urban students.

12.5 There is no significant difference between school environment (Rejection) of rural and urban students.

12.6 There is no significant difference between school environment (Control) of rural and urban students.

13.1 There is no significant difference between home environment (Control) of rural and urban students.

13.2 There is no significant difference between home environment (Protectiveness) of rural and urban students.
13.3 There is no significant difference between home environment (Punishment) of rural and urban students.

13.4 There is no significant difference between home environment (Conformity) of rural and urban students.

13.5 There is no significant difference between home environment (Social Isolation) of rural and urban students.

13.6 There is no significant difference between home environment (Reward) of rural and urban students.

13.7 There is no significant difference between home environment (Deprivation of privileges) of rural and urban students.

13.8 There is no significant difference between home environment (Nurturance) of rural and urban students.

13.9 There is no significant difference between home environment (Rejection) of rural and urban students.

13.10 There is no significant difference between home environment (Pernissiveness) of rural and urban students.

1.8 Delimitations of the Study

The proposed study has been delimited with respect to:

Area: The study has been confined to Sr. Sec. Schools only of Sonepat District of Haryana State in India.
Discipline: The study has been restricted to the students of Science discipline.

Methodology: The present study has been carried out through Normative survey method.

Tools: The study has been confined to the following tools:

a) School Environment Inventory by Misra K.S. (SEI)
b) Home Environment Inventory by Misra K.S. (HEI)
c) Eysenck. Personality Questionnaire (EPQ): Extroversion and Neuroticism only.
d) Scientific Temper Scale developed by the Investigator.

Grade: The study has been limited to 10+2 Science students.

Sample: The sample has been restricted to 505 students only.

Sex: No gender distinction has been considered in this study.

1.9 Need and Justification of the Study

Industrialisation and technology advancement have made the society more complex. Efficiency need for modern society leaves no room for the growth of human consciousness for guiding human volition in taking critical decisions. We are dreaming of the possibility of a `planetary civilisation due to technological advancement. But we have not yet developed the human consciousness to sustain it. The need of the hour as reflected in N.P.E. 1986 is a radical transformation of human consciousness through an integral and value oriented education. Learner of today should not only develop his rational faculties but pursue also moral and aesthetic tendencies. Personality can be
developed in harmony with the wisdom of the humanist, the skill of the technologist, the disciplined will force of the moralist, the reflected imagination of the artist and scrupulous knowledge of the scientist. In the domain of mental development, the values of utmost impartiality and dispassionate search after the truth, calm and wide possible synthesis; and in moral domain values of sincerity, faithfulness, obedience, the honesty, freedom from egoism etc., are of paramount importance.

Today people are facing many perplexing situations in daily life. Society demands public issues amicably settled without fervour and favour in a rational manner. In surcharged atmosphere and prevailing imbalances, it is felt that there is need to develop scientific temper among the future citizens so that they act rationally. Value like scientific temper is a value frame, i.e., outlook for the world and man's own world. It is both value and method of attaining human rights. Legislative prescription, executive control and the army can not bring about peace and change in outlook. Rationality, honesty, open mindedness, tolerance of other views, respect for evidence, critical awareness, have important place in our rational thinking. Healthy criticism, questioning and unbiased attitude, curiosity, quest for knowledge, objectivity, creativity, truthfulness, courage to question, systematic reasoning, acceptance after proof and verification, search for perfection and team spirit are some of the basic values needed to develop scientific temper among the nursery of modern India. Development of scientific temper has been recommended as one of the core
elements of the national curriculum framework for primary and secondary education. Scientific temper/outlook/thinking is the tendency or disposition not to take things superficially or at their face value based on merely subjective experiences but to examine them objectively in a rational manner based on facts or to make valid inferences from facts. It includes a spirit of enquiry, a disposition to reason logically and dispassionately, a habit of judging beliefs and opinions on available evidences. Readiness to reject unfounded theories and principles, the courage to admit facts, however, unsettling or disagreeable they might be and finally recognising the limits of reasoning power itself in certain areas like ethics etc. Scientific and technological information, for example nuclear energy and application of biotechnology in human genetics, in the context of individual and society raises the questions of values and ethics. Questions involving values should find place in science education research. Development of value based curricula could be of greater interest to the society at large than is generally realised. In this nuclear age, we should make our teachers well equipped mentally, morally, physically and give them a sound education of recent facts and values of science originating in society. The environment of science education depends upon the science environment provided in the school and home to develop a dynamic personality among the children to face the challenges of today and the future and to make the future bright, peaceful and enjoyable for our generations to come. Scientific temper is more than science. It is art of thinking and feeling scientifically to gain not only
knowledge but to realise truth and appreciate goodness and beauty also. Scientific method alone is not applicable here. It is guiding and controlling emotions in a scientific way i.e., harmony of head and heart. Scientific temper developed is a product of many factors like personality of students, school and home environment etc. How far these factors are related to the development of scientific temper among the students at the school level is the subject matter of the present investigation.