Introduction

The major defect of modern Indian education which is of paramount importance, is the absence of value education in it. The growing in-discipline and lack of human touch, to problems faced by us today are the major outcome of education being given in school and out of the school. Social and moral values in younger generation of India are by and large disappearing which is a matter of grave concern for those who are affected by it directly or indirectly. If this state of affairs is given free hand; it may create serious threat to the very fabric of our society and country. The role of teachers' is very important at this juncture. The teachers represent the conscience of a nation. It is the example rather than precept which makes the difference. The teacher must convince the students why a particular action or behaviour is good. Industrialization and technology advancement have made the society more complex. Efficiency needed for modern society leaves no room for the growth of human and spiritual consciousness for guiding human volition in taking critical decisions and to sustain the development. This can be achieved through an integral and value oriented education as reflected in N.P.E. 1986. Personality of child is to be developed in harmony with the wisdom of the humanist, the skill of the technologist, the disciplined will force of the moralist, the refined 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 etc. and in moral and spiritual domain values of sincerity, obedience, honesty, freedom from egoism etc. are of great importance.

Today people are faced with 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 a need to develop Scientific temper among the future citizens so that they act rationally. Honesty, open mindedness, tolerance of other views, respect for evidence, critical awareness and rationality have an important place in our rational thinking. Healthy criticism, questioning and unbiased attitude should be inculcated 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, 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 inquiry, 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, however, unsettling or disagreeable they might be; and finally recognising the limits of reasoning power itself.

Some research investigations have been carried out to study the value pattern of behaviour of teachers and students. Some popular investigators are
Some studies have been undertaken to explore the different aspects of science education. Joshi (1981) found that the environment outside the class is potent enough to initiate learning and hence environment education should be considered essential at least at primary level. Unfortunately, teachers and syllabii are responsible for limiting the growth of this approach. While preparing a curriculum in environmental studies at college level, Pai (1981) also found that experimental group gained more than the control group in environmental activities. Also the students perceived clearly and vividly their environment and environmental problems Gupta et al (1981) studied the awareness of environment among rural and urban schools and nonformal education centers with the help of 20 rural, 35 urban and 60 nonformal centre students of class IV. It was found that school going rural children did better than the urban sample. Also nonformal centre students were more aware them urban students. Misra (1982) studied the effect and relationship of home and school environment on scientific creativity. The home environment and school environment were found to have a significant effect on and relationship with the scientific creativity of 197 students of class XII (medical group) of U.P. studied for the purpose. The Central Regional Centre (1981) not only ascertained the local environment and developed study material for students and teachers relevant to local environment but also trained teachers implemented the programme in selected schools, evaluated it and got encouraging results. S.C.E.R.T. OF Andhra
Pradesh (1980) compared the old and new science curricula in environmental studies of class III and V and found that the new curriculum relevant to the environment was more effective.

Sood (1974) studied the attitude toward science and scientists among students and teachers and found the understanding of science positively relates to it. Srivastana (1980) also measured scientific attitude and found that the amount of scientific knowledge or general exposure to science courses made an impact on scientific attitude. Saxena (1985) found that science students have a favourable attitude towards physics. Shinde (1982) found that the scientific attitude of secondary school children is not related to involvement in non formal activities. Bandopadhyey (1984) found that parent education and S.E.S. led to favorable attitude towards science besides other contributory factors like teachers' influence, pears' influence, vocational value of science and the future aim in life. Ghosh (1986) found positive relation between scientific aptitude, attitude and academic motivation. Golwarkar (1986) found that nontribals were superior to tribal on scientific attitude and creativity. Pattnaik (1986) tried to develop an ideal type definition of Scientific Temper. He defined it as the making of the basic methods, values and norms of science along with humanism as a process of thought and action. Thompson (1927) gave four fundamentals of scientific bent of mind: a passion for facts, cautiousness of statement, clearness of vision and sense of inter-relatedness of things. Singh H.L. (1988) studied scientific temper as a theoretical value frame, a world view and work
situation Dubey (1992) also studied scientific temper and tried to measure it. Gupta (1995) made a study of relative effectiveness of some information processing models of teaching on mental process and attitude towards science. Rao (1995) viewed scientific literacy as an effective tool to use their reason and critical ability in making decisions regarding impact of science on their lives and human race. Khatoon (1996) made a comparative study of attitude of Hindu majority and Muslim minority students. Some studies on scientific attitude were conducted abroad. Scientific and technological information, for example, nuclear energy and application of biotechnology in human genetics, in the context of individual and society raises the question of values and ethics. Questions involving value 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 realized. 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. The environment of science education depends upon the science environment provided in the school and home. Scientific temper developed is a product of many factors like personality of the students, school and home environment etc. How far they are related to the development of scientific temper was a subject matter of the present investigation. The survey of related literature have clear indication that no such type of work had been undertaken so far. The study was entitled as below:
Statement Of The Problem

"A STUDY OF SCIENTIFIC TEMPER IN RELATION TO PERSONALITY AND ENVIRONMENT"

Definition Of Terms

In the present investigation, the term environment included both home and school environment. Home environment included the following ten dimensions.

(i) Control; (ii) Protectiveness; (iii) Punishment; (iv) Conformity; (v) Social isolation; (vi) Reward; (vii) Deprivation of privileges; (viii) Nurturance; (ix) Rejection and (x) Permissiveness.

School Environment

In the study underhand the term School Environment referred to the psycho social climate of the school as perceived by the students in school. It included the following six dimensions (I) Creative Stimulation (ii) Cognitive Encouragement (iii) Permissiveness (iv) Acceptance (v) Rejection (vi) Control.

Personality

Here Personality meant broadly Extroversion and Neuroversion (Neuroticism) dimension of Personality as on Eysenck Personality Questionnaire (junior). Extroversion briefly stand for extroversion-introversion representing two hypothetical extremes of a dimension - extrovert and introverts types of personality respectively. Similarly neuroticism briefly stands for neuroticism -
non-neuroticism representing two 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 working on any problem, process, situation, incident arising and faced by the students in school, their daily life and society. A student having inculcated the scientific temper showed impartial observation, experimentation unprejudiced, objectivity, creativity, aesthetic sensibility, spirit of enquiry, courage to question and to go to the end etc.

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 neurotism 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.

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

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

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

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

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

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

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

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

**Delimitations of The Study**

The study was delimited with respect to

**Area:** The study was confined to Sr. See Schools only of Sonepat District of Haryana State in India.
**Discipline**: The study was restricted to students of science discipline.

**Methodology**: The present study was carried out through Normative Survey method.

**Tools**: The study was confined to the following tools:

(a) School Environment Inventory by Misra. (SEI)

(b) Home Environment Inventory by Misra. (HEI)

(c) Eysenck Personality Questionnaire (EPQ) Jr. Extroversion and Neuroticism only.

(d) Scientific Temper Scale developed by the investigator.

**Grade**: The study was limited to 10+2 grade students.

**Sample**: The sample was restricted to 505 students only.

**Sex**: No gender distinction was considered in this study.

**Design And Procedure Of Study**

**Methodology**:

Normative survey method was used in the present investigation.

**Sample**: A sample of 505 students, 303 urban and 202 rural was taken through cluster random sampling technique from population of 21 Sr. Sec. Schools offering science discipline at 10+2 level in District Sonepat.
Procedure

First scientific temper scale was standardized. After selection of the sample of science students, Eysenck Personality Questionnaire (Junior), School and Home Environment Inventory of K.S. Misra and Scientific Temper Scale were administered to the students keeping precautions to be taken in mind. Instructions were strictly followed as given in the manual. Then the obtained data were scored and submitted to further statistical treatment.

Statistical Technique

t-test and coefficient of correlation were used to find the significance difference and correlations.

Conclusions And Findings

The following findings were established after statistical analysis:

Extroversion personality is positive and significantly correlated with scientific temper \( r = 0.1892 \ p < 0.01 \). Neuroticism personality is found to be negative correlated with scientific temper and significant \( r = -0.1483 \ p < 0.01 \). Coefficient of correlation of various dimensions of school environment such as creative stimulation \( r = 0.2602 \), cognitive encouragement \( r = 0.3233 \) acceptance \( r = 0.2247 \), permissiveness \( r = 0.092 \) and control \( r = 0.2258 \) are positive and
significantly (at 0.01 level) correlated with the scientific temper of the students. One dimension of school environment - rejection is negative but significantly related with scientific temper \((r=-0.2633 \ p < 0.01)\). It can be concluded that there is a significant relationship between scientific temper and school environment. Various dimensions of home environment such as control \((r=0.1019 \ p<0.05)\), protectiveness \((r=0.1226 \ p < 0.01)\) punishment \((r=0.1456 \ p < 0.01)\), conformity \((r=0.2296 \ p < 0.05)\), reward \((r=0.2189 \ p<0.01)\) and nurturance \((r=0.1125 \ p < 0.01)\), six dimension out of ten are positive and significantly related with the scientific temper. Four dimensions of home environment such as social isolation \((r= -0.1207 \ p < 0.01)\), deprivation of privileges \((r= -0.0951 \ p < 0.05)\), rejection \((r= -0.1923\ p<0.01)\) and permissiveness \((r = -0.1524 \ p < 0.01)\) are negative and correlated in a significant way.

There is no significant difference between scientific temper of urban and rural school students. There is no significant difference in extroversion personality of urban and rural students. There is a significant difference between neuroticism personality of urban and rural students. There is no significant difference between scientific temper and extroversion personality of urban and rural students due to their concomitant nature. There is significant difference between scientific temper and neuroticism personality of the urban students. There is no significant difference between scientific temper and neuroticism personality of rural students. There is a significant difference between creative stimulation of school for urban and rural students; between
acceptance of school for urban and rural students. There is no significant
difference in urban and rural students in respect of cognitive encouragement,
permissiveness, rejection, control of school environment. There is a significant
difference in urban and rural students in respect of protectiveness, punishment,
conformity, reward permissiveness of home environment. There is no significant
difference between urban and rural students in respect of control, social
isolation, deprivation of privileges, nurturance and rejection of home
environment.

In view of the fore-going discussion, following conclusions appear tenable:

- There is a positive relationship between scientific temper and
  extroversion personality.

- There exists no significant difference between scientific temper and
  extroversion personality of rural and of urban students.

- There is negative relation between scientific temper and neuroticism
  personality.

- There is no significant difference between scientific temper and
  neuroticism personality of rural students. Rural students have more
  neuroticism than urban students.

- There exists a significant difference between scientific temper and
  neuroticism personality of urban students.
• No significant difference exists between scientific temper of urban and rural students.

• There is no significant difference between extroversion personality of rural and urban students.

• Dimensions of school environment viz., permissiveness acceptance, control, cognitive encouragement and creative stimulation have positive relationship with scientific temper. Rejection dimension of school environment have negative relation with scientific temper.

• There is a significant difference in creative stimulation and acceptance dimensions of school environment between rural and urban students.

• Six dimensions only of home environment such as control, protectiveness, punishment, conformity, rewards and nurturance have positive and significant relationship with scientific temper, and the others like social isolation, deprivation of privileges, rejection and permissiveness, have negative relation with it.

• Significant difference is only in protectiveness, punishment, conformity, reward and punishment of home environment, between rural and urban students.

Suggestions For Further Research

As is usual with the correlation research, there is a partial support to the hypotheses proposed. Therefore, the partial support arrived at is sufficiently
satisfactory under the field setting. The inconsistency of the findings are mainly due to interaction of many factors leading to a sort of forced levelling of the results. But no worker should feel complacent which may lead to scientific scotoma. Thus field studies should be considered to be of exploratory nature. The present investigation should be treated as such and a pointer for search for other variables. The present research tries to bring out the significance of relation between personality factors: extroversion and neuroticism, school environment and home environment with respect to scientific temper. But any study, however, wide it may be, its scope can not claim to be all inclusive and points out the scope for further investigation with other equally relevant variables. In an attempt for solution of the problem, new problems arise.

It is from this point of view, some suggestions are being made for further investigation of some of the important issues that seem to originate from the present work.

I. Similar studies may be conducted at college level.

II. Correlation studies may be undertaken related to scientific temper, adjustment and anxiety of secondary school students.

III. Similar studies may be conducted in special group of children such as handicapped, gifted and backward.

IV. A comparative study for the development of scientific temper in students of different faculties may be undertaken.
V. Longitudinal studies of development of scientific temper may be undertaken.

VI. Projective techniques may be used to study the behaviour pattern of those students who are having strong scientific temper.

Significance Of Study

The study will fill a vacuum since no such study has been conducted in this aspect. Findings of the study would be helpful to science teachers, educators administrators, planners, and parents to improve science education in the school and inculcating the habits of dealing with situations of any type scientifically as desired by the modern society so that pace of development and progress is enhanced and scientific knowledge is put to right cause of humanity: Hence this study was undertaken by the investigator.