The problem: It’s Background and Related Aspects

The present era is the age of science and technology. The advancement in socio-economic and technological field apart from bringing progress has also created complexities, stress and anxiety in the daily life of people. No longer are the civilized men the victims of famines and epidemics - but the black plague has been replaced by a host of subtler, psychological plagues - worry, insecurity, disillusionment and doubts which have made it difficult for the modern man to lead an adjusted life. The basic requisite for leading an adjusted life is the provision of appropriate environment and the adequate means for living - first survival and then a full term, long, healthy life full of happiness.

Modern man's path to happiness is not an easy one. It is beset with seemingly endless personal and social problems. Excessive competition, conflicting pressure groups, rapid social change, and threat of global wars have aggravated man's insecurities and emotional stress, drained human energy and happiness in a way that can be seen in the millions of victims of depression. Depression triggered by stress has led to dissatisfaction. The growth of prosperity and march of consumerism has not created hope and satisfaction in life. What was once a luxury has now become a common expectation. This makes its absence a source of dissatisfaction. The craving for more has become the way of life. Some want more money while others crave for good position and so on and so forth. Life is mostly seen from quantitative rather than qualitative point of view. The materialistic attitude is prevalent globally and in all spheres. Man has become a victim of passion, jealousy and arrogance. S/he is dissatisfied,
unhappy and discontented due to unaccomplished tasks and desires. There is no harmony between his inner and outer self. The feeling of emptiness, tension and meaninglessness prevails everywhere and in all walks of life.

The beliefs and experience of physical education today rest on the history of this field of endeavor. It is the source of physical education's identity. Many of today's activities have their fore-runners in history. For instance, the first Olympics dates back to 776 B.C. in ancient Greece. Yoga and Karate, activities with much recent interest, date back to ancient oriental societies. Many more facts that will help the physical educators to understand the present better can be achieved by studying the past.

Budha's prohibition of games, amusements and exercises in ancient India did not totally prevent participation in such activities. The Indian physical activities such as chariot races, riding elephants and horses, swordsmanship, wrestling, boxing, kabaddi, kho-kho, atyapayta, dancing, dands, baithak, malkhamb, Laziam, lathi, etc. have been in practice from time immemorial. But neither the names of the inventors of the Indian system of physical culture nor the dates of their origin are known. Yet we are aware of the fact that a scientific system of physical education was in existence in India and was practiced by the people. Yoga, an activity common in India and involving exercise of posture and regulated breathing was popular. This disciplining of mind and body required the instruction of experts and a person fully trained in this activity following routine involving eighty four different postures.

The places where Indian physical activities were promoted and practiced were generally called Vyayamashalas/ Vyayam Mandirs. Ancient India in many ways was similar to ancient China. People in China lived in an environment which was very religious in nature and
closely associated with traditions and culture of India.

In the physical culture of India, the age old Vedas advocated that non-violence is the best of righteous acts. This can be realized properly in its true spirit only by a strong individual and not by weak ones, because physical weakness may be attributed to cowardice. Further, protection is well assured only by a powerful one. Moreover, the Great poet Kalidasa has emphasised that physique is the lease indeed for accomplishment of duty. Vedas have emphasized that just as wealth is essential for the appropriate fulfillment of desire, similarly for the salvation of life, healthy physique is essential.

Physical education in the past was part and parcel of daily life. It was not considered merely as a vocational or free time activity, but was considered as the fundamental factor for self realization. Upanishad has strongly advocated that the attainment of the powerful soul is not possible for a weak individual.

The history of India has witnessed that the society was divided into different classes on the basis of their occupation e.g. teachers, warriors, merchants and servants. They were given social status which ultimately broke into rigid caste system bearing the stamps as Brahmins. Their workshop included Pranayama, Yoga, Namaskar etc. Further, the Brahmins, being teachers, had to master the art of handling weapons and missiles. This included archery, sword fighting etc. The Kshatriyas as the future rulers and protectors of the country had to compulsorily learn the science of archery, sword fighting, horse and elephant riding. The vaishyas and shudras practiced many physical activities of their own will; they were not compelled to learn any particular physical activities. Wrestling was practiced by all irrespective of castes; we also find references about first fighting in Rigveda which indicated the place of
Military Science in Indian system of Physical Education. The great epics "The Ramayana" and "The Mahabharata" are full of stories of great warriors depicting their martial qualities. If we just look into the epics we can well understand that physical fitness was considered as an important factor in all warfare and it was promoted by indigenous system of physical education. All war weapons and war tactics were also of indigenous nature. The warriors were well versed in archery, wrestling, sword fighting, horse riding, elephant riding and chariot racing.

Taxila University is an example, where training of Archery (Dhanurvidya) was of a very high order.

In the last decade of 13th Century and during the 15th century the army of different kings were highly trained in handling the war weapons. The great Rajput kings like Prithviraj, Rana Sangram Singh and Rana Pratap were highly skilled in using the weapons like lances, swords and horse riding.

In the days of Shivaji, the great Maratha King, the Maratha Soldiers were highly skilled in handling weapons in the war front. During the regime of Shivaji, the love for indigenous physical culture reached its peak.

The Indian system of physical culture in general and military training in particular rapidly deteriorated under the British Rule. The Indian system of physical culture and military training came to a halt after rulers passed Arms Act and prohibited the use of indigenous weapons and banned the activities of the Akharas and Vyayamshalas.

Further the indigenous weapons disappeared from the curriculum of Indian Military Science in the presence of Guns / Rifles.

India has faced many foreign invasions and atrocities by Muslims. Portuguese, French and the British till the dawn of independence, the
atrocities of foreign rulers helped the Indian people to fight well against the foreign domination not in a united manner but in an individual way. Though, the result was not much encouraging yet definitely, the practice in indigenous physical activities increased remarkably and resulted in re-establishing a number of Akharas / Military training centres at almost every village.

The first war of independence in 1857 was suppressed and by that time almost whole of the nation was in the strong grip of British Rulers. Very intelligent by they attracted the people towards the aristocrat games.

On the other hand, the revolutionaries who condemned the foreign rule went under ground and continued their efforts of injecting the fire of patriotism in the minds of the members of the Akharas and they were filled with the spirit of independence and freedom, ultimately they were successful in their mission to attract many more strong and young people who were also infused with the spirit of patriotism. Akharas were running to their full swing.

To study the historical development of physical education in India more efficiently we should study the development of physical education from ancient period till this day. Due to our poor cultural habit of not writing history, no concise history of education including in the field of physical education has been found written. Pandit Jawahar Lal Nehru has rightly remarked that: "Unlike the Greeks, Chinese and Arabs, Indians in the past were not historians. This was very unfortunate and it has made difficult for us now to fix dates or make up an accurate chronology". However in the modern time people have started taking interest in writing articles, books, etc.

It appears from available literature related to sports that apart from its social recognition, physical activity adds in man great qualities of head
and heart, that is a way of sports activities in one from or another, have existed in almost every society/community/country. Today sports is an organised and institutionalized from of activity including source of recreation and therapy etc. Modern psychologists and contemporary educationists consider sports to be very important dimension of man’s life.

**Swami Vivekananda point out in 1948:-** "Physical weakness is the sources of one-third of our misery. First of all, our young men must be strong. Religion will come afterwards. You will be nearer to heaven through games and physical activities than through the study of the Gita … You will understand Gita with your biceps, your muscles a little stronger. Strength is goodness, and weakness a sin. Infinite strength is Religion."¹

**Chhagla,** the Education Minister of India in 1964 said: "Sports are a means to achieve national integration and emotional stability."²

Education Commissions, especially, **Kothari Commission (1964-66)** emphasized that physical education activities and sports do contribute not only to physical fitness and health, but also to physical efficiency, mental alertness and development of certain qualities like perseverance, team spirit, leadership qualities, obedience to rules and loyalty to leaders, moderation in victory and balance in defeat, sociability and many other values of life processes and high achievements.³

**Recommendation of National Policy on Education 1986** emphasized that: Sports and physical education are an integral part of the learning process, and will be included in the evaluation of performance. A nation-wide infrastructure for physical education, sports and games will be built into the educational institution. The infrastructure will consist of playfields, equipments, coaches and teachers of physical education as part
of the School Improvement Programme. Available open spaces in urban areas will be reserved for playgrounds, if necessary by legislation. Efforts will be made to establish sports institutions and hostels where specialized attention will be given to sports activities and sports-related studies, along with normal education. Appropriate encouragement will be given to those talented in sports and games. Due stress will be laid on indigenous traditional games.4

The scientific curiosity and interest have made sports, sportsmen/sportswomen and competitions very important for analysis and understanding.

With increasing popularity and complex competitions of sports, nowadays, there is a great concern to identify those characteristics and skills that show potential for developing high level of performance in specific sports at an early age, so that they be developed scientifically to unfold the talent among population (participants). However, considerable research is required to identify such factors as on the basis of natural observation, casual interchanges and sports participation, one is struck by the varieties of individual expressions, physiological set ups, sociological conditions, adjustment, socio-economic conditions, motivation and psychological preparation and many other personal and field situations which seem to depict the best performance and success. It is due to these facts that movement characteristics have been speculated by many as the resultant of the sociological and environmental conditions, physical and motor abilities developments and psychological adjustment.

Letzelter (1978) pointed out that the performance in most of the sports is determined by three major factors, that is, physical fitness, techniques and tactics, though their relative contribution varies from sport to sport. He further added that in addition to these, other factors like
physique, body composition, personality adjustment and psychological traits have also an overall effect on the performance. Scientific investigations and keen observations by coaches, physical education teachers and sports-oriented personnel in the allied fields, have recently brought to light a variety of psychological, physiological, sociological and other factors which are found to be responsible for success in sports. Beside physical strength and skills involved in physical activities, various other factors like socio-economic status, attitudes, interests, adjustment-personal-social, morphological, biochemical and motor abilities factors have been also identified. It has been further found that most of the factors that determine success or best performance of the athletes differ from one activity to another.

It is apparent from what has been foresaid that determination and recognition of an individual’s capacities, capabilities and abilities in terms of his morphological, psychological, sociological and functional characteristics is essential for physical educator and coach in order to guide their pupils/ sportsmen/ sportswomen in the selection of the sports activities most suited to them. Equally important, according to Warner (1966); Dass (1982); Kamlesh (1983); Hirata (1979): Kaur (1989); Carter (1984); Sodhi and Sidhu (1984); Saini (1983), Paul (1992); Kansal et al (1986); Thomas and Sandra (1984) and Rupa (1994) is the acquisition for sportsmen/ sportswomen of various characteristics of fundamental importance in many sportive activities. It is also observed that the lack of knowledge and understanding of such characteristics of participants is likely to limit their performance during competitions.

Some studies have been done to unearth the differences among participants in various sports and also between athletes and non-athletes. But these studies have not been done on throwers (champions). Verma et al. (1979); Bala (1980); Lortia et al. (1982) found intra-sports difference
in physiological characteristics and physical performance.

In literature, a large number of studies are available, that have been conducted to determine the relationship of performance in sports with various psychological and social variables, like personality traits, self-concept, need achievement, aspiration level. Adjustment and socio-economic status (Peterson, 1930, Talman 1969, Wilson. 1969, Darde 1972, Bushan and Aggarawal, 1978, Sidhu 1986, Gin 1982, Wadkar 1989). But very little work has been done concerning the relationship or differences of socio-economic status, adjustment and motor abilities with performance in sports or intra-sports. Although some research evidence are available regarding the role of above independent variables of the present study in games/sports and in general activities, it also appears that most of the generalization and inferences drawn from them may not necessarily be valid in Indian situation. Seeing the great need of such studies, the present investigator planned this study.

**Concept of Physical Education:**

The world physical education is derived from two separate words, "Physical" and “Education”. The plain dictionary meaning of word physical is 'relating to body', it may relate to any one or all of the bodily characteristics. It may by physical strength, physical endurance, physical fitness, physical appearance or physical health. The word 'education' means systematic instructions or training, or preparation for life or for some particular task. A combined meaning of these two words would be that systematic instructions or training which relate to physical activities or programe of activities, necessary for development and maintenance of human body, development of physical powers, or cultivation of physical skill.

Education is a "doing" phenomenon, one learns through doing.
Education is not to class-room alone, it may take place on the playground, in library, or even at home. Such an education is conducive to the enrichment of an individual's life. A well directed-programme of physical education leads to healthy living, social efficacy, good physical health, and worthy use of leisure time. In the modern context, the term 'physical education' has assumed much broader and more meaningful application in our daily life. Physical education is the education of man 'in" and 'by' means of physical activity. It is education of physical through physical. Physical education is that education which starts with physical development and advances towards perfect development of human being, the ultimate result being vigorous and strong body, acquisition of sound health, mental alertness, and social and emotional balance. Such an individual will be able to interpret new situations effectively, in more meaningful and purposeful manner and can be said to be a "Physically Educated Person."

Physical Education is not only an integral part of general education but also promotes harmonious growth & development. The whole curriculum of physical education should be developed with certain aims in mind.

According to National plan of Physical Education & Development, "The aim of Physical Education must be to make every child physically, mentally, emotionally fit and also to develop in him such personal and social qualities as will help him to live happily with others and build him up as good citizen."

Development of a country in general and of a man in particular depends on the quality of education rather physical education of the country. India in 21st century is quite different from the India of 1947, in terms of physical education, education, social, economic, political and
moral education and industrialization. With industrial and electronic revolution India has reached at the threshold of space and made a mark in this information age. This change can be observed clearly in metropolitans like Calcutta, Chennai, Delhi and Mumbai, in every aspect of life and education.

Concept of Stress:

Stress is an enemy that endangers our emotional health. Its concept is elusive. There does not exist a single universally agreed definition of stress. It has been described in terms of the person's response to disturbing environmental conditions, the stimulus characteristics of disturbing environments and the reflection of a lack of fit between the person and his environment. Stress arises from a comparison between the demand on the person and his ability to cope. Demands may arise as a result of social pressure, from the requirements and constraints placed on the pattern and flow of that person's behaviour by his job or home life, or internally as a reflection of the person's needs. Stress is a 'system' produced by emotional and social relations that are going on within an organization-economic, political, social, cultural or educational. Whenever equally strong power units are functioning within an organization, stress is created. Besides, it is the extent of consensus that determines its level. If consensus is low in any organization stress will be high as the units are functionally overlapping. It arises from total organizational structure. Communication control and Mask performance both are responsible for creating stress.\(^6\)

Stress and anxiety affect everyone daily, but research has found that many athletes struggle with these conditions more than the rest of the population. “Despite the well-documented benefits from exercise and sports participation on mental health, some athletes will at times
experience psychological, emotional, and behavioural problems” (Mann, et al, 2007). “Many factors which can influence the performer’s psychological state and so alter it from the optimum required for their performance” (Graham-Jones and Hardy, 1990). Many athletes struggle to handle the stress and anxiety that comes along with a full class load, the demands of their sports, as well as the pressures of their family and friends. Athletic trainers need to be sure they help their athletes utilize the counselling center, and other techniques to help limit their stress and anxiety.

As early as in 14th century, the term stress was used to denote hardship, strain, adversity and affliction (Lubusden, 1981). In 17th century, Hooke used the word stress in the context of physical science (Hinkle, 1973). But its scientific meaning was, in fact, given in early 20th century. Stress is the process that occurs in response to the situations or events (called stressors) that disrupt or threaten to disrupt our physical, or psychological functioning (Lazarus & Folkman, 1984; Taylor, 1995; Pestonjee, 1992; Baron, 2002). In fact, stress is a many faceted process that occurs in reaction to events or situations in the environment called stressors. Although we normally think stress to be coming from negative events in our lives, positive events such as getting married or receiving an unexpected job promotion can also produce stress (Brown & McGill, 1989).^7

Making a survey of definitions of stress, Cox (1978) has described three classes of definitions. Stress can be thought of as a response (that is, stress response to an extreme stimulus), as a stimulus (that is, as a stressor itself) and as an intervening variable emphasizing upon the interaction between individual and environment. A good example of response definitions is one given by Selye (1950) who defined stress as a nonspecific response of the body to any demand. Characteristically, such
response definitions lack the emotional component usually associated with stress. This emotional component is also lacking in stimulus definitions as that given by Levi (1987) who defined stress as conditions causign body to readapt. It can be said that here the term stress and stressor are used synonymously. In addition to these two definitions, stress is defined as intervening variable whose meaning comes closest to the everyday meaning of the term. In fact, such definitions give emphasis upon the individuals perceptions of the demands made by the environment and his ability to meet those demands. When the personal resources and the enviornmental demands do not match, stress arises. Example of such conceptualisations of stress are found in the P.E. (Person-Environment) Fit theory (French, Rodges and Cobb, 1974). Recent researchers have shown that like the natural directions (east, west, south and north) stress has four directins: enstress, distress, hypostress and hyperstress.

A review of literature reveals that the nature of stress as a global phenomenon has been studied by three important models: Physiological model, load of information model and Interactional model.

Physiological model explains stress as a cluster of nonspecific symptoms that helps a person to adapt to stressors. General Adaptation Syndrome (GAS) developed by Selye (1950) is one example of physiological model. GAS consists of three stages: Stage of alarm reaction, stage of resistance and stage of exhaustion. The stage of alarm occurs upon sudden exposure to any situation to which the individual is not adapted. Here the organism becomes mobilized to meet the threat. In the second phase of resistance, the organism makes efforts to cope with threat as through confrontation. The third phase is that of exhaustion which occurs if the organism fails to overcome the threat and depletes its physiological resources in the process of trying.
Load of information model explains stress in terms of stimulus overload/underload (Suedfeld, 1979). It links stress not only to the quality of environmental experiences but also to the structure of experiences. Thus there may be some events that may be extremely aversive but may not involve stimulation levels outside the optimal zone. Conversely, there may be events which are positive in nature and still produce stress. In other words, too much of a good things may be stressful. Thus a U-shaped relationship is formed between stimulus overload and underload.12

In interaction models stress is based upon one’s perception of environmental events. In other words, these models focus on the relationship between the individual and the environment. The basis of the relationship is cognitive one. The cognitive model of stress has been proposed by Lazarus and Folkman (1984) who are of view that when individuals confront a new changing environment, they engage in the process of primary appraisal to determine the meaning of the events which may be perceived as positive, neutral or negative in their consequences. Once primary appraisal of potentially stressful events have occurred, secondary appraisal is initiated in which there occurs assessment of one’s coping abilities and resources and whether or not they will be sufficient to meet the harm, threat and challenge of stressful event. At last, the subjective experience of stress is a balance between primary and secondary appraisal. When harm and threat are high and coping ability is low, substantial stress is felt. When coping ability is high, stress may be minimal (Taylor, 1995).13

There are varieties of sources of stress Pestonjee (1992) has outlined three important sectors of life from which stress may arise: Job and organisation, social sector and intrapsychic sector, Brown (1984) has listed five categories of sources of stress customary life events,
unexpected life events, progressive, accumulating situational events, personality qualities, value dependent traits. Likewise, Taylor (1995) has concluded that there are four major antecedent sources of stressful behaviour: stressful life events, stress in work place and work stress and personality.14

The extent to which stress at work produces a degree of psychological impairment has become a central issue in the current debate on the equality of working life. It is important to study stress states in order to understand their consequences for adjustment and to learn the nature of the (Stressors) conditions that bring them about in the first place. "The concept of stress is a central one in pure conceptions of psychology. It is probably also an essential feature of normal human development." For example Sullinan (1953) considered anxiety as crucial and even positive force in men's efforts to improve himself and the world ranks considered the conflict of wills associated with life and death forces as a basic part of life itself and as a basis of human creativeness.

Stress can be defined as a perceptual phenomenon arising from a comparsion between the demands on the person and his or her ability to cope. An imbalance in this Mechanism, when going is important, gives rise to the experience of stress and to the stress response. Stress may be defined as a real or interpreted threat to the physiological or psychological integrity of an individual that results in psychological or behavioural respones.

"One of the most common notion that stress represents some circumstances or situations external to an individual that makes sudden or extraordinary demands upon him". Thus, we might think of unusual conditions such as anticipated surgery (Joins, 1958) or disorders (Floods, Storms, Fires, Explosions, or Military Bombing) as examples of stress.
“A second major way of viewing stress treats it is as state of individual rather than as an external condition that he faces”.15 For example, the famous psychologist Selevy (1956) makes stress synonymous with what he calls the "adaptation syndrome" as organizational set of biological reactions to noxious situation such as physical injury.

This diversity in the meaning of stress can be confusing because different writers use that term to mean different things. The problem here remains to identify for any person or class of persons the conditions (internal and external) that can be defined as stressors because they bring about stress state (stress) is the dictation of adjustment mechanism, which are associated with both healthy and pathological behaviour”.

Stress and anxiety affect everyone daily, but research has found that many athletes struggle with these conditions more than the rest of the population. “Despite the well-documented benefits from exercise and sports participation on mental health, some athletes will at times experience psychological, emotional, and behavioural problems” (Mann, et al, 2007). “Many factors which can influence the performer’s psychological state and so alter it from the optimum required for their performance” (Graham-Jones and Hardy, 1990). Many athletes struggle to handle the stress and anxiety that comes along with a full class load, the demands of their sports, as well as the pressures of their family and friends. Athletic trainers need to be sure that they help their athletes utilize the counselling center, and other techniques to help limit their stress and anxiety.16

It is a fact that stress can affect the person's behaviour to a great extent. It can affect the process of adjustment in two ways. In the first place, it can interfere with cognition thus making the ordinary adaptive
tasks of life more difficult to perform (the disorganizing effects). Secondly, and perhaps more important mechanisms of defence designed to reduce the stress are produced (the organizing effect).

In the present study stress defined for player community is as follow: "Stress is the adverse consequence arising from failure to meet demands regarding performance, decision and powerlessness, family, gender, team, political pressures and team pressures, responsibility, performance, conflict, over expectation, team relations, behaviour of team members, behaviour of team manager, behaviour of team coach, time pressures and working conditions."

In the above situation mentioned in the definition the volleyball players feel tension, nervousness, worry, frustration, conflict and ambiguity etc. it is an overall process called stress in this study.

The stress factor may be classified in the following four categories as well as defined:-

(a) **Frustration:** We may define frustration as the unpleasant feelings that result when motive satisfaction is blocked or delayed. Frustration is a common emotional response to opposition related to anger and disappointment. It arises from the perceived resistance to the fulfillment of individual will greater the obstruction greater the will and more will be the frustration. Causes of frustration may be internal or external. Conflict can also be an internal source of frustration. Frustration can be the result of blocking motivated behaviour. An individual may react in several different way. He may respond with rational problem solving methods to overcome the barrier. Failing in this, he may become frustrated and behave irrationally.17

(b) **Conflict:** Conflict has been defined as a state of mind in which two or more incompatible behaviour trends are evoked that can not be
satisfied fully at the same time. Conflict situations create tension and a feeling of restlessness in our mind.\textsuperscript{18}

\textbf{(c) Anxiety:-} Anxiety is a psychological and physiological state characterized by cognitive, somatic, emotinal, and behaviour components. These components combine to create an unpleasant feeling that is typically associated with uneasiness, fear or worry.\textsuperscript{19}

\textbf{(d) Pressure:-} Pressure is defined as a force per unit area. It is usually more convenient to use pressure rather than force to describe the influences upon fluid behaviour. Pressure is both physical and psychological, it arises as a result of our body response to physical and psychological stressor like work, task, over burden, over expectation, impending danger or feeling threatened. This is a common complaint in today’s busy life style where we are often faced with an internal or external demands to compelte a task/job or activity within a limited time.\textsuperscript{20}

For an object sitting on a surface, the force pressing on the surface is the weight of the object, but in different orientations it might have a different area in contact with the surface and therefore exert a different pressure.

In psychology the term, stress means tension but metaphysically this word can be used in the sense of bondage which leads to sorrow and suffering. According to Vedic gospel, when human soul (real man) who is actually the part of omnipresent spirit, is hidden behind apparent man by his evil deeds he feels stress.

\textbf{Concept of Adjustment:}

To adjust means to fit, to adapt or to accommodate. Thus, when we
adjust to something, we change, in some way to make appropriate to
certain requirements. Taken in this sense, adjustment is accommodation,
to fit to certain demands of environment. Therefore, the study of
adjustment deals with how we make such accommodations and how
successful we are in solving our problems.

Adjustment may be defined as a continuous process by which a
person varies his behaviour to produce a more harmonious relationship
between himself and his environment and hence better human
achievements. Taken in this sense, adjustment is dynamic rather than
static in quality. When we change, our environment changes too, and our
relation with the environment also changes.

The adjustment process can be explained as: certain physical and
psychological needs produce tension in the individual. The person is
motivated to reduce this tension through need reduction or achievement
and therefore, moves towards the goal. More than often, there is a reality
barrier between the motivated individuals goal and as such the individual
is thwarted. If the individual is able to surpass the barrier, he reaches the
goal; the tension is reduced and he is adjusted. If, however, he fails to
reach the goal, the tension continues and the result is maladjustment.

No matter, how resourceful we may be in coping with problems,
the circumstances of life inevitably involve stress. Our motives are not
easily satisfied; obstacles must be overcome, choice have to be made, and
delays tolerated. Each of us develop characteristics ways of responding
when our attempts to reach a desired goal are blocked. These responses to
frustrating situations determine to a large extent, the adequacy of our
adjustment to life.

It follows from the above that adjustment may be either integrative
or disintegrative. The integrative adjustment comprises sublimation and
creativity, whereas the disintegrative adjustment is multi-channeled and may result in any of the following: Unresolved anxiety, covert/over use of defence mechanisms, neurosis, psychosis, crime, sex-perversion, and alcoholism and drug addiction.

According to Karen Horney, men adjust with reality by moving towards, by moving against and by moving away from it. A person characterized by healthy or integrative adjustment may use any or all of the above techniques in an eclectic manner, whereas a maladjusted person may use any one method exclusively at the cost of the other two.²²

Erik Erikson's statement on individual development (1968), "The ability to accommodate oneself to changing circumstances is a mark of maturity", could easily be interpreted as a definition of "adjustment"²³

According to Shaffer, "Adjustment is a process by which a living organism maintained a balance between its needs and the circumstances that influence the satisfaction of these needs".

According to Crow and Crow, "An individual's adjustment is adequate, wholesome or healthful to the extent that he has established a harmonious relationship between himself and the conditions, situations and persons who comprises his physical and social environment".

According to Kundoo and Tutoo, "The term adjustment refers to a harmonious relationship between the person and the environment". The degree of harmony depends upon two things (i) certain potentialities within a person and (ii) characterstics of the environment.

According to Calhoun and Ross, "Adjustment is your continuous interaction with yourself, with other people and with your world".

According to Fraser, "Adjustment can be thought of in straightforward terms as the capacity to stand up to emotional pressure and one
of the most consistent and inescapable sources of pressure is contact with other human beings, with their moods and feelings, their demands and their irrationalities".  

Dutt (1974) on the other hand, after analyzing various criteria of normality or integrative adjustment, concluded, "That a well-adjusted individual has integrated his basic needs with the demands of social living and has high frustration tolerance. He is capable of experiencing severely frustrating situations without being seriously disorganized. He views problems as challenges and meets stress producing situations with reasonably appropriate and intelligent actions. He tries to modify or destroy the undesirable environment around him and also is ever willing to bring in change within his own perceptions, attitudes and ideals. He faces reality with a certain amount of confidence and courage. He works with vigour and enthusiasm to attain both his immediate and his more distant goals."

It is obvious from what has been fore said that effective adjustment is very important for a healthy and happy living. Whether it is the school or college setting or, home or job setting or playground the well adjusted individuals contribute to their own welfare and high achievements as well as to the development of the society. In fact, it is only such individuals who can be creative and productive and who can realize themselves. Motivated by these considerations, the researcher decided to study the impact of adjustment on the performance of volleyball players. Participation of the extrovert and introvert volleyball players should be a part of this investigation.

For the purpose of this study adjustment has been defined as a satisfactory relationship between the individual and the environment with respect to the five areas of adjustment i.e. home, health, social, emotional
Eysenck has worked extensively on these dimensions of personality. His theory has undergone several revisions.

His personality theory has important implications for memory. In his theory (1967), the descriptive concepts of extraversion introversion (E-I) and neuroticism-stability (N-S) are linked with the physiological constructs, arousal and activation, respectively.

His personality theory is hypothetico-deductive. He gave the postulate of individual differences, based on the physical structure involved in making S-R connections in the neural system. Individuals differ in respect to three characteristics. Firstly, speed or alacrity at which inhibition and excitation are produced in the neural system. Secondly, strength of the inhibition and excitation produced and thirdly, speed at which inhibition is dissipated in the neural system.

He suggests that neurotics, and extroverts-introverts operate at the casual level in the neural system. Neuroticism is based on excitability of autonomic nervous system while the extraversion-introversion is based on the properties of the central nervous system. His theory of extraversion assumes a differential state of arousal (continuum of excitation ranging from a lower extreme e.g. state of sleep to an upper extreme) which determines a person's position on the E-I continuum. Persons with resting patterns of high arousal tend to develop introverted behaviour, while intermediate resting pattern of arousal develop an ambiverted behaviour pattern.

The differential states of arousal are due to the activity in ascending reticular activation system (ARAS). Arousal, in his
terminology refers to cortical activity mediated by the ARAS, activation refers to autonomic activity mediated by the limbic system, co-ordinated by the “visceral brain”. Introvert is a product of cortical arousal mediated by the reticular formation. Introverts are habitually in a state of greater arousal than extroverts and consequently they show lower sensory threshold and greater reaction to sensory stimulation.”

Introverts are characterized by strong excitatory and weak inhibitory potential and extroverts by weak excitatory potential and strong inhibitory potential. Introverts respond to zeitgeber at a more rapid rate. These zeitgebers are stimulus input and as such act as arousing factor.

English dictionary from Johnson (1755) onward contained reference to the term extraversion and introversion and they were defined in much the same way as to-day. Extraversion was typically defined as a "turning outward of a mind on the people and objects in the external world." Introversion as 'inner directedness and a preference for abstract ideas rather than concrete objects'. The term is now being used in a broader sense, extraversion also refers to impulsiveness and sociability and introversion includes constrained and inhibited behaviour.

**Extraversion and Introversion Dimension of Personality:**

Introversion extraversion is a dimension of personality, which is normally distributed, that is most people are around average, while others can be placed towards one extreme or the other. Introverts on the other hand are more easily distractible, quickly find repetitive task boring, like variety, condition poorly and lose conditioned response quite quickly.

Eysenck regards introverts and extroverts as basic personality traits. Eysenck and Eysenck picture the typical extrovert and introvert as follows:
The typical extrovert is sociable, like parties, has many friends, needs to have people to talk to, and does not like reacting or studying by himself. He craves excitement, takes chances, often sticks his neck out, acts on spur of the moment and is generally an impulsive individual. He is fond of practical jokes, always has a ready answer, and generally likes changes, he is carefree, easy going and likes to "laugh and be merry". He prefers to keep moving and doing things, tend to be aggressive and lose his temper quickly, together his feelings are not kept under tight control, and he is not always a reliable person.

The typical introvert is a quite, retiring sort of person, fond of books rather than people, he is reserved and distant except to intimate friends. He tends to plan ahead, "looks before he leaps", and distrusts "impulse of the movement". He does not like excitement, takes matters of everyday life with proper seriousness, and likes a well ordered mode of life. He keeps his feelings under close control, seldom behaves in an aggressive manner, and does not lose his temper easily. He is reliable, somewhat pessimistic, and places great value on ethical standards.

Conklin (1922) defines extraversion "as a more or less prolonged condition in which attention is controlled by the objective conditions of attention more than by subjective, and in which the content of the subjective conditions is most closely related to the objective." Introversion is defined as the reverse of the above.

**Main Characteristics of Extrovert and Introvert:**

**(A).** The main qualities of an Extrovert may be enumerated as follows:

- A strong desire for activity - interested in athletics.
- A dominant or ruling attitude - not easily embarrassed.
- Cool and passionate, flexible and adaptable.
Aggressive, egoistic, unscrupulous, free from worries, usually conservative

Fluent in speech and friendly in manner.

(B). The main characteristics of an Introvert may be cited as following:

A certain lack of activity and reserve. Fond of books and magazines.

A submissive attitude. Easily embarrassed.

Not cool and passionate. Lack flexibility.

Attention directed inward. He reflects a great deal, keeps his feelings to himself.

Submissive, self centered, scrupulous.

Not popular with the masses.

Better at writing than at speaking and is rather reserved.

Careful of ailments and personal belongings.

In sports psychology, predicting athletic achievement from personality characteristics has long been considered one of the attractive applications (cf. Apitzsch, 1995; Cooper, 1969; Deary & Matthews, 1993; Diamant, Byrd & Himelein, 1991; Eysenck, 1995; Greenberg & Greenberg, 1992; Liwei & Leahy, 1993). A wide variation of personality traits have been found to be associated with levels of achievement (Davies & Mogk, 1994; Kirkcaldy, 1982; Morgan, 1979) in a number of sports, including basketball (Evans Quarterman, 1983), hockey (Williams & Parkin, 1980), American football (Daus, Wilson & Freeman, 1986; Kroll & Petersen, 1965; Kroll & Crenshaw, 1968; Schurr, Ruble,
Nisbet & Wallace, 1984), mountaineering (Magni et al., 1985), rowing (Morgan & Johnson, 1978) and other endurance sports (Egloff & Jan Gruhn, 1996; Morgan et al., 1988). However, the specific personality predictors found in earlier research, vary so dramatically from study to study, that they make generalisations next to impossible (Auweele et al., 2001). Not surprisingly, the debate between the “sceptical” and the “credulous” views on personality and sports (Morgan, 1980) continue, despite substantial progress towards its resolution (cf., Rowley, Landers, Kyllo & Etner, 1995; Singer, Hausenblas & Janelle, 2001). Is personality really so irrelevant in sports as suggested by the sceptics? Or has the earlier research just been unable to effectively detect its influence, as would be argued from a “credulous” point of view?²⁷

Modern researches in sport science, which maximally include sports psychology, are directed to determine general and common disposition of sportsmen’s personalities, which appear in sport in general or in some sports disciplines and provoke sportmen to behave in a same or similar way. It is beyond any dispute that the results produced by a great number of researches (Vanek et al., 1974; Singer et al., 1977; Vealey, 1992. /accord. Wann, 1997/; Keramiciev, 1999; Aleksovska, 2002) reflected the fact that it is not possible to identify a unique general model of a successful sportsman’s personality, which was implicitly expected by the researchers. However, there exists an opinion that identification or some specific dispositions or groups of dispositions is possible and especially the ones with the degree of express characterizing the top sportmen behaviour and which, at the same time, determines success in sport. Besides this general approach, it is necessary to continue to apply the results of researches which make the identification of specific personality features or relevant psychological dispositions possible and not only for the purpose of sports in general but also for
specific disciplines of sport. Lots of authors have mentioned the presence of specific psychological structure of a sportsman’s personality depending on the type of sports and which, certainly, includes presence of relevant psychological features in the structure of a sportsman’s personality, which lead to high sports results achievements and which determine sports success very much (Gabrijelic, 1977; Kane, 1978; Vanek et al., 1984; Thakur et al., 1980; Havelka et al., 1981; Kejn, 1984; LeUnes et al., 1989; Keramiciev, 1991; Kamal et al., 1995).

**Concept of General Motor Ability:**

There is a general agreement among authorities that general motor abilities or specific motor abilities play a decisive role in determining one's level of performance in a wide range of motor activities. But some divergence and varying emphasis is there regarding the nature and definition of motor ability, whether general or specific. For developing a meaningful and comprehensive picture of motor abilities, it would be pertinent to make a sample survey of some of the available definitions. It would help us in formulating and arriving at an acceptable and agreed concept of term.

Scott (1959) conceptualizes the term motor ability, as used, to mean achievement in basic motor skill or it may be interpreted as a more general term combining the concept of motor educational ability and achievement.

According to Backert (1974), the ability of an individual to perform specific motor patterns which commonly occur as the acceptable physical activities of our culture, is another aspect of coordination which has been labeled motor ability.

In the words of Johnson and Nelson (1982), ”It is an acquired and innate ability to display fundamental motor skills rather than highly
specialized sports events."

Borrow and McGee (1971) further elaborate the above definition when they define motor ability as "the present acquired and innate ability to perform motor skills of a general or fundamental nature, exclusive of highly specialized sports or gymnastics techniques. It is one's level in wide range of activities." 31

Several experts in the field have defined general motor ability in terms of its elements or components.

According to Cozens (1929), motor ability is composed of the following seven components:

1. Arm-shoulders co-ordination, Arm-shoulder girdle strength,
3. Hand-eye, foot-eye, and arm-eye co-ordination, Jumping or leg strength and flexibility
5. Endurance or sustained effort. Body-co-ordination, agility and control
7. Speed of legs with co-ordination of body.

Larson (1941) defined general motor ability as the "Ability of the
individual in the elements which lie under motor performance, such as, muscular strength, muscular power, muscular endurance, coordination, agility and balance”.

Barrow (1957) used a jury of expert physical educationists who defined general motor ability as composed of the following eight factors: (1) Arm and shoulder co-ordination, (2) flexibility, (3) power, (4) hand-eye and foot-eye coordination, (5) speed, (6) strength, (7) balance and (8) agility.32

According to Clarke (1987) "General motor ability has been considered as one's level of ability in a wide range of activities. It has been thought of as an integrated composite of such individual traits as strength, endurance, power, speed, agility, balance, reaction time, and co-ordination traits underlying performance in many motor complexes."

In a review of research studies in the area, Battinelli (1984) suggested that the general components of motor ability were muscular strength, muscular endurance, cardiovascular endurance, power, speed, balance, flexibility, and agility.

An analysis of aforesaid definitions and the definitions given by Whiting (1963), Knapp (1964), Keogh (1965), Espanschanda and Eckart (1967), Welford (1968), Barrow (1971) Singer (1975), Kelena (1983), Battinelli (1984), Safrit (1986) and Clarke (1987) reveal that in spite of some variations noted in the view points of authorities, a common core of agreement is evidenced in most of them, which helps us to formulate the following generalizations regarding the concept and nature of motor abilities:

General motor ability represents an integrated composite of several elements of factors which influence an individual’s performance in a wide range of activities involving motor
Motor abilities are more concerned with performance in basic motor skills rather than in skills involved in highly specialized sports. This implies that measures of motor abilities must avoid highly specialized skills as revealed in dance or gymnastics.

Motor ability is a result of innate capacity as well as diverse training and experience.

Motor abilities include motor educability and motor capacity. Motor capacity refers to an individual's potential ability to perform motor skills and motor educability is the case with which one learns motor skills (Singer, 1975).

It has been established in the preceding section that motor ability consists of several physical components or factors that help in smooth learning of such basic motor skills as are associated with performance in varied games and sports activities.

It was decided to include in the present study following eight components for general motor ability:-

(1) Speed
(2) Agility
(3) Leg Strength
(4) Arm and Shoulder Strength
(5) Muscular Endurance
(6) Balance
(7) Flexibility
(8) Co-ordination

**Concept of Volleyball**

The volleyball game was invented by William G. Morgan in the year 1895 in Holyoke, Massachusetts YMCA. When Morgan went to
Holyoke after leaving Springfield school in 1894, he found that many people didn't want to play basketball. So a game is needed which is more recreational than anything else and involves more people. The game of volleyball was invented as a recreational game. At first a basketball was used without a net throwing the ball from one group to the other. Then a net was used at seven feet height. Since the basketball was quite heavy, a ball made of soft calfskin was used but it did not last long.

The first demonstration of volleyball was given at Springfield school in 1896. The rules were given by Morgan written in long hand. The game was named as "minotonette". The name was changed to volleyball in the year 1896 as the purpose in this game was to volley the ball back and forth over the net after a demonstration at a school for Christian workers.\textsuperscript{33}

The first article about volley ball was published in 1896 by the name of "PHYSICAL EDUCATION" with the following details:

"Volleyball is a new game that is suitable to be played indoor. It can also be played outdoor. The number of players in each team is fixed. The main idea of this game is to keep the ball in air between two teams over the net without ball touching the ground. It has the characteristics of tennis and handball."\textsuperscript{34}

**Justification of The Study:**

The present study titled as "A Study of Stress, Adjustment and Motor Ability between Extrovert and Introvert Volleyball Players" is based on the rational which has been derived on the bases of some researches findings and assumptions. This study will provide an insight into the nature of stress among players and how stress adjustment and motor ability are affected by personality dimensions of the volleyball players.
The study focuses on the factors responsible for stress among players and their adjustment personality of the players not only determine their performance but also their adjustment with the society, family, team, and institution. This study also provide information that extraversion and introversion personality dimensions contribute a lot in determining stress and adjustment among volleyball players.

In the light of fast growing realization about the importance of sports and their contribution to the wellbeing and fuller development of the participants and society, and ultimately to the well being of the nation as a whole, there is a great need to have the knowledge of personal characteristics and social conditions of individuals who excel in games and sports. Research work in the field has brought out that average level of physical fitness, efficient coaching and conditioning are not the only factors required to become a good athlete or players. Chopra (1984) has optly pointed out that as the civilization advances, human behaviour including practice in sports, tends to be determined by the social, psychological and motor functioning rather than biological physiological and physique. Hirata (1979), Dass (1983), Kaur (1989), Saini (1993) and many others went to the extent of suggesting that selection of players be based on their particular characteristics which are essential for a particular game/event to make the players most successful.

The psychological stress, adjustment and motor abilities and personality dimension play an important role in different fields of human activity. Since games and athletics provide ideal situations or challenge, competition and evaluation - the situations in which psychological stress thrives -there is a justification for planning studies which aim at exploring the differences of this important factor among participants in different activities connected with games and athletics. So, is the case in respect of psychological stress adjustment, the nature of which, research has shown,
influences achievement in different areas.

It can be hoped that the results obtained from this investigation, may provide some important implications for administrator of physical education, physical education teachers, coaches, policy makers, psychologists and organizers in evolving objective and effective criteria for selection and training of individuals in the field of physical education and sports, especially in volleyball players.

The results of the study would add something new to the literature by clarifying the nature of difference of psychological variables stress and adjustment, in various fields and general motor abilities between extrovert and introvert volleyball players.

**Statement of The Problem:**

The investigation was designed to discover and examine significant differences between psychological stress, adjustment (social, emotional health, home, educational and total) and general motor abilities (flexibility, muscle strength, speed and endurance) between extrovert and introvert volleyball players. The problem may, however, be stated as below:-

“A Study Of Stress, Adjustment And Motor Ability Between Extrovert And Introvert Volleyball Players.”

**Operational Meaning of Important Terms:**

1) **Stress:** The word stress is defined as “A State of Affair Involving Demand on Physical or Mental Energy”. Stress is a condition that disturbs the individual’s psychological and or physiological state such that he/she is forced to deviate from the normal functioning. Stress is a perceptual phenomenon arising from a comparison
between the demands on the person and his or her ability to cope.

2) **Adjustment:** Adjustment is a continual process by which a person varies his/her behaviour to produce a more harmonious relationship between himself and his environment and hence better human achievements. In this study adjustment has been defined as a satisfactory relationship between individual and the environment.

3) **Motor Ability:** It may be defined as one’s present innate and acquired ability to perform motor skills of a general and fundamental nature excluding specialized sports skills. It is synonymous with general motor ability. General motor ability is also defined as one’s inherent potential to perform vigorous motor activities to the best of one’s capabilities. In the present study eight components of motor ability are enlisted and defined below:

**Speed:** Speed may also be defined as “rapidity with which a movement or successive movements of the same kind may be performed by an individual.”

According to Barrow and Inc Gee (1971), “One’s ability to perform successive movement of the same pattern at a fast rate”.

**Agility:** Agility is an important component of general motor ability in majority of the sports activities. Especially in badminton, tennis, trampoline, gymnastic, football, volleyball, hockey, basket ball etc.

Agility means quick and swift movements and ability of quick
apprehension of body movements. Agility may be defined as “One’s controlled ability to change body position and direction, rapidly and accurately”.36

**Arm and Shoulder Strength:** Strength may be defined as the maximal muscular force or tension used in the creation or prevention of the movement in one maximal effort of a muscle group.

The ability of a muscle to maintain a certain level of force or to repeat identical movements or pressure over the maximal period time with one’s maximal effort.37

**Leg:** Strength is the component of power which does not usually refer to time and distance. In strength measurement, the object of resistance is nearly representing the maximum load.38

**Balance:** Balance is an important factor in physical activities like gymnastics, defensive position in wrestling and some other individual and team events or games.39

Balance may be defined as one’s ability to maintain the body’s centre of gravity over the centre of supporting base of the body.

**Muscular Endurance:** Endurance is the ability to do sports movements, with the desired quality and speed, under conditions of fatigue. The muscular endurance or stamina enables an individual to perform sustained work by a particular muscle group over a period of time.

The muscular endurance may be defined as “the ability of a muscle to maintain a certain level of tension or to repeat identical movements or pressure over the maximal period of
time with one’s maximal effort”.40

**Flexibility:** Flexibility means the range of movements around the skeletal joints of the body. The flexibility is not a general body character but it is specific to each body region.

Flexibility may be defined as “the range of motion around a joint as determined by the elasticity of the muscles, tendons and ligaments associated with the joint under consideration.”41

**Hand-eye Coordination:** Coordination is one’s ability to efficiently and effectively integrate the movements of different body parts especially during quick momentary actions of various types and the ability of the performer to integrate various types of body movements into specific patterns Coordination skill is characterized by muscle control, accuracy and steadiness in judging such variable factors as speed, distance, direction, size, depth etc. Most important type of coordination involving many sports skills is related with the co-ordination of eyes with hands, feet and head. In many of the sports activities eyes have to concentrate on a moving ball or similar object while body or parts of body have to adjust accurately in relation to the moving object for performing hitting, kicking, batting, catching, throwing, fielding, servicing etc.42

1) **Extrovert:** Eysenk regards the extrovert as a sociable, party goer, has many friends, needs to have people to talk to, and does not like reading or studying by himself. He is carefree, easy going and likes to laugh in one’s sleeve, always has ready answer and generally likes changes.43
2) **Introvert**: Introvert is a quite, retreiving sort of person, fond of books rather than people, they are reserved & distant except to intimate friends and distrust impulsive movement. They keep their feelings under close control, seldom behave in an aggressive manner, and lose their temper easily.44

3) **Volleyball Players**: For the purpose of present study volleyball players are all those players, who play the volleyball game, belonging to North Zone State.

**Objective of Study:**

Following objectives of the study were formulated:-

To compare the stress of extrovert and introvert Volleyball players.

To examine the adjustment of extrovert and introvert volleyball players.

To evaluate general motor ability of extrovert and introvert volleyball players.

**Hypotheses:**

Under this study the following null hypotheses were formulated and tested for significance:-

1) There is no significant difference between extrovert and introvert volleyball players with regard to their stress.

2) There is no significant difference between extrovert and introvert volleyball players on the “frustration” component of stress.

3) There is no significant difference between extrovert and introvert volleyball players on the “conflict” component of stress.
4) There is no significant difference between extrovert and introvert volleyball players on the “anxiety” component of stress.

5) There is no significant difference between extrovert and introvert volleyball players on “pressure” component of stress.

1) There is no significant difference between extrovert and introvert volleyball players with regard to their adjustment.

6) There is no significant difference between extrovert and introvert volleyball players with regard to their ‘home’ adjustment.

7) There is no significant difference between extrovert and introvert volleyball players with regard to their ‘health’ adjustment.

8) There is no significant difference between extrovert and introvert volleyball players with regard to their ‘Social’, adjustment.

9) There is no significant difference between extrovert and introvert volleyball players with regard to their ‘emotional’ adjustment.

10) There is no significant difference between extrovert and introvert volleyball players with regard to their ‘Educational’ adjustment.

1) There is no significant difference between extrovert and introvert volleyball players with regard to their general motor ability.

11) There is no significant difference between extrovert and introvert volleyball players with regard to ‘speed’ component of general motor ability.

12) There is no significant difference between extrovert and introvert volleyball players with respect to ‘Agility’ component of general motor ability.
13) There is no significant difference between extrovert and introvert volleyball players with respect to ‘Arm and Shoulder Strength’ component of general motor ability.

14) There is no significant difference between extrovert and introvert volleyball players with respect to ‘Leg Strength’ component of general motor ability.

15) There is no significant difference between extrovert and introvert volleyball players with respect to ‘Balance’ component of general motor ability.

16) There is no significant difference between extrovert and introvert volleyball players with regard to their ‘Muscular Endurance’ component of general motor ability.

17) There is no significant difference between extrovert and introvert volleyball players on the ‘Flexibility’ component of general motor ability.

18) There is no significant difference between extrovert and introvert volleyball players with respect to ‘Right Hand Eye Coordination’ component of general motor ability.

19) There is no significant difference between extrovert and introvert volleyball players with respect to ‘Left Hand Eye Coordination’ component of general motor ability.

**Delimitations of The Study:**

The field of research is very wide and vast. There are numerous problems. Taking in view the limited time and resources available for the investigation the problem was delimited to the following fields:

The study was conducted on the Volley ball players of North Zone
The present study is confined to extraversion and introversion personality dimensions of volleyball players.

The present study is delimited to stress adjustment and general motor abilities of volleyball players.

The study is delimited to the use of four tools Stress Scale, Adjustment Inventory, Maudsley Personality Inventory and Measuring Tools and Criterion of General Motor Ability.

The size of the sample has been proposed to be 600 volleyball players on the basis of multistage randomizing technique.

The study was delimited to the Volley ball players of three States namely Uttar Pradesh, Delhi and Haryana.

This study is delimited to the best abilities and capabilities of the researcher only.
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