Chapter I

INTRODUCTION

India was not a major influence in the development of western civilization, but it represents an important civilization that is almost as ancient as China’s. India was invaded and largely taken over by an Aryan people around 1500 to 1200 B.C. the primary religion was Hinduism, which was also a social system and thus a factor of importance in the development of Indian civilization. The caste system within this religion eventually became very rigid and severely limited the flexibility of Indian society. The people were divided by the system into castes, or social classes. Because they could not move either upward or downward in caste, their positions in life were unchanging.

The primary aim of a person under Hinduism was to be virtuous. Asceticism, which was also stressed by the religion, could take almost any form from a simple moderation of the wants of the individual to self-torture (only occasionally) depending on the strength and direction of the persons religious views.

Education was based upon a person’s caste, for the castes dictated the type of occupation the members could follow, even though the occupation might not have any relationship to a person’s talents or abilities. No stress was put upon individuality; emphasis was placed on the future life. The Hindus believed in reincarnation—that is, in the soul of the person returning to earth after the body’s death to inhabit another body, which might be human or animal depending upon how well that person’s previous life was lived.

There was little interest in physical education, though there were some recreational sports and games and some dances that were used for ceremonies and religious observances. Some physical training was necessarily provided for members of the military, who entertained themselves with hunting activities when there was no war. Physical exercises were sometimes used to promote health, but the care or exercises of the body were not major concerns of Hinduism.
Physical activities of the children of a society are the reflection of its culture. However, Fragmentation of India could not promote a composite culture and physical activities for the children mainly due to lack of organized educational system. Thanks to the British that the country was brought under one rule, thereby paving the way for unification and integration of land and culture. The British rulers not only provided organized education system but also introduced their cultural activities. Their efforts to curb the surge of Indian culture provided a new range of activities called developmental activities.

As independence dawned on India in 1947, there were fervor efforts to project a new image of India by adopting whatever is latest. In the field of child education too major thrust was directed to development of modern games than developmental games. However, this effort failed and we are where we were in 1947.

Physical education starts from very birth of a child. The very moment it comes into being, it begins to cry and move its limbs. Thus is necessary for its very survival. The parents are its first physical instructors. It is they who instructs it how to work, run, jump or leap. In older times, it was they who first taught it how to climb a tree, use bow and arrow, a spear or swim or catch a fish. These were its main physical activities.

MEANING OF EDUCATION

According to Prof. Drever, Education is a process in which and by which knowledge, character and behavior of the young are shaped and moulded. According to John Dewey, Education is a process different from the process of preparation for future life. It is a gradual repletion of experiences and feelings.

The instructions and knowledge given in schools is known as education by the ordinary people. In this process, teachers impart knowledge to students with specific aims. Here teacher dominates the scene and learners are only passive listeners who receive only what is given to them. When the process is over, they receive the certificate of pass or fail at the end of the year or course. This concept of education is very narrow in the sense that it is only the communication of information by the teacher and acquisition of knowledge by students. Here no emphasis is given on all
round development of Childs personality. As a result, this type of education fails to prepare a child capable of facing future challenges and hardships.

**PHYSICAL EDUCATION**

Physical education has been defined by different authorities at different times in a variety of ways. According to Edward hitch cock, “physical education” as understood is a cultivation of power and capabilities of students as will enable him to maintain his bodily condition in the best working order intellectual and spiritual life”. According to Dundley Allen sergents and to give them as much health, strength and stamina as possible to enable them to perform the duties that await them after they leave their college”.

Form the above definitions, it can be inferred that in physical education, the greatest stress is laid on the development of big and strong muscles. The programmes are to be elective and selective. An individual has to participate in these programmes to get any benefit. Physical education should enable effective use of body, mind intellect and soul. All the activities of a human being –physical, mental, intellectual, social, economic and political are inter-related and physical education helps greatly in the evolution of a whole man. Physical education is the only process which helps every aspect of life. Physical education is quite natural. It does not come in the way of education.

The aim and goal of physical education is very broad based. It does not touch only its physical well-being. It should benefit the whole individual and he should be in a position to promote well-being of the society. It should increase physical, mental and intellectual capabilities for benefit of the society. It should help him in developing the quality of leadership.

Physical education involves the process of acting in a particular way. The purpose is closely linked with its aim and includes determination, courage, bravery, and change in behavior and alteration in life style. It is enjoyable and various patterns of exercises fulfill various needs which go no changing in a fast changing world.
PHYSICAL FITNESS AND HEALTH

Over the decades, the society in general has realized the need for keeping fit and healthy through organized physical activity programmes. Scientific evidence from biological science has made it clear that unless man engages himself in organized vigorous physical activity programmes the real benefits would not come.

According to Morehouse and Gross, (1975) health fitness and performance are three separate and poorly correlated phenomena. Health is generally defined as the freedom from disease. Fitness strictly relates to a man’s ability to meet the demands of his environment. A person can be healthy without being fit. He can be in poor health and perform superbly. Sick athletes break records all the time. Every Olympic Competition is populated by athletes with cold, fever, infection and diarrhea. They invariably compete, and perform to their level. If health is defined as a disease free condition, then fitness is not health. Only when the definition of health includes functional wellness – meaning the ability to cope with his environment health, fitness and performance go together.

Physical fitness is highly influenced by human health. A nation’s true wealth lies not in its lands and waters, not in its forests and mines, not in its flocks and herds, not in its dollars but in its healthy and happy men, women and children.

Many researchers strongly support that regular exercise helps one to keep a strong and healthy heart and prevent cardiovascular diseases. A physically fit heart beats at a lower rate and pumps more blood per beat at rest. As a result of regular exercise, an individual’s capacity to use oxygen is increased substantially. Energy production depends on internal chemical process or metabolic changes.

Human body is one of the most beautiful as well as the most complicated systems that God has created. The intelligent ways with which this unique creation acts, reacts and interacts is a rare phenomenon. Not only should it look out-worldly ‘beautiful’ but also ‘work’ efficiently to enable man to achieve the ultimate goal of life. Neglect of the body leads to decay, disintegration and destruction whereas its proper care enables a man “to live most and cherish best”. 


Adequate nutrition and proper exercise are two wings of achieving and maintaining fitness. Bob Anderson writes, “If you don’t find time to exercise you’d better find time to be sick”. Physical inactivity, improper eating habits and obesity are inter-related factors that give rise to serious health problem. The principles of good nutrition for the athlete are the same as for all persons, to eat a variety of food – meat, milk, eggs, cheese, fish, fruits, vegetables, cereals and bread – every day and to maintain weight at the desired level.

The human body works exactly like an engine. It obeys the laws of Physics, principally the law of Conservation of Energy. The energy that translates into work must first enter the body as food. When a person uses more energy than he receives in caloric food content, he loses weight. It is a physical principle. On the other hand, when a person takes in more caloric food content than he expends in energy, he gains weight. The average size adults eat about 2,400 calories a day (Morehouse and Leonard Gross).

The youth of our nation are affected particularly by the existence of push button gadgets and other devices tending towards habits of inactivity. The school, colleges and homes need to compensate for this immobility imposed upon our children by increased mechanization and material wealth. Individual who is physically fit has a well proportionate and well developed body and the posture is usually good.

**ANTHROPOMETRY**

Anthropometry, measurement of body structure is the oldest type of body measurement known dated back to the beginning of recorded history. Sulpiastri investigated the outline of the body by dividing it into 480 parts. The ancient Egyptians also used a rough sort of Anthropometry during the period from the thirty fifth to twenty second Century B.C.

“Anthropometry, measurement of the biological oneness of mankind is far more significant than the relatively superficial differences”. Anthropometric measurements have been a part of physical education since its inception in this country.
The two Greek words ‘Anthropos’ and ‘Metrien’ gives birth to a new term ‘Anthropometry’. Anthropos means ‘Man’ and ‘Metrien’ means to measure. Therefore when we speak literally Anthropometry is the measurement of the body to discover its exact dimensions and the propositions of its parts.

Anthropometric measurement consists of objective measurement of structure and of functions of the body. The measurement of structures includes such items as Weight, total Height, and girth of muscles, the width, the depth and the circumstance of the chest. The measurement of function includes such items as pulse rate, venous and Venus blood pressures muscular strength, basal metabolic rate estimated from cardio vascular variable, posture and breathing capacity.

Two of the accepted biological principles are “Function decides structure and structure decides function”. Organs and muscles that are well used will develop the proper growth and development. Right from the very beginning the selection of the athletes is based on a complex of physical qualities.

“The human performance can be viewed on the expression of a number of components called performance factors, some of which are general factors and some of which are specific factors”. Historically some very comprehensive human capabilities have been suggested, such as general intelligence, physical fitness and general athletic ability. For scientific training and special factors like physique and body composition play an important role. Top performance in any sport normally bring with them elements which makes the previous technique appears less economical and less effective, such elements assert an influence only if they are accompanied by physical condition (Rasch and Burke, 1973).

Anthropometric variable and body composition are very important factors for achieving high level of performance in standard competition. Body size characteristics may become important in determining success in many sports. Height is an advantage in sports such as Kabaddiplayers and arm reach is an asset to the reach the touch line and boxer (Reilly, et al. 1990).
The research carried out by Quetlet (1870) to obtain the measurement of the average man according to Gauss Law had the objective of discovering the ideal, harmonious proportions for each body section and marked the beginning of anthropometry, a branch of anthropology which studies the measurable characteristics of mechanical (morphological, physiological and pathological). Research in this field was continued by a number of scientists including Ricver (1890) who was the first to use Calipers, Oeder (1910) who used the umbilical fold as measurement of obesity, Matiegka who worked out a series of equations for predicting the values for muscle mass, frame size, body lipids desired from structure and the circumference and with of the folds. When we speak literally anthropometry is the measurement of human body, discover its exact dimensions and proportions of its parts.

Anthropometry constitutes the earlier form of measurement in physical education study of the human body (Physique) and its proportion began many centuries ago. Anthropometric measurement was the full type of testing used it physical education in the world. So separate measurements were recommended by the American Association for the advancement of physical education.

Anthropometric measurement may be useful in choosing the descriptive for individual since, it is very essential for enhanced performance. For example, longer legs and longer hands are helpful to shoot in Basketball. Long limbs help to clear the hurdles easily. Almost all the sports and games tall structure can be a better performance especially in volley ball, basketball, high jump, pole vault, hurdles, etc. The modern world analyses the athletes through computer. This is possible only through body measurement.

The anthropometry examination can be administered by trained persons who can aid the health administer in appropriate follow ups. The earliest research was in the area of anthropometry with the emphasis on changes in muscle size brought about through exercises.

It was also an early type of testing in physical education. On the theory that exercise should be prescribed to affect muscle size emphasis was placed upon muscle symmetry and proportion. In the year Hit Chock and Sargent (1861), produced
profile charts to reveal how individuals compared with their standards. **Sargent chart** continued 44 anthropometric measurements as well as number of strength tests. Fifty such tests were recommended by the American Association for the Advance of Physical Education (AAHPER).

Height has the potential placement as a preferable pre-requisite for the performance excellence in many sports or games. Anthropometric measurements have revealed correlation between body structure and physical characteristics and sports capabilities. The physical structure especially the Height, Weight and arm length have definite decisive advantage in many games and sports. Similarly segmental length of individual body parts especially the leg length, and arm length are at considerable advantage in certain athletic events.

Human motor performance is a composite of many variables one of which is structure of the body, the specific measurement of limb length, circumference chest and build indices can reveal the relationship between anthropometry of the athlete and his motor fitness measurement of body size includes such descriptive information as Height, Weight and circumference of various body segments. It has been found that top athletes are some sport tends to have those proportions that bio – mechanically aid the particular performance required. For this study Height, Weight, chest, arm length, hip, thigh and calf were chosen as anthropometric parameters (**Zeigler and Earle, 1982**).

Height is a vertical measurement from the heel to vertical of skull of the human body. Height of the player is advantage for the game like basketball, volley ball and high jumpers because they can easily reach the maximum Height (**Hornby and Parnwell, 1962**).

Weight is the measurement of total body mass. It is measured by weighting machine. Weight of the player is advantage for the game like wrestling, shot put, hammer throw because those persons can use the Weight easily (**Hornby and Parnwell, 1962**).
Body Mass Index (BMI) is calculated (in Kg/m$^2$) by dividing body Weight (in Kg) by the square of Height (in m). BMI standards are used to classify obesity and to assess disease risk. As BMI increases, mortality rate from cardiovascular disease and diabetes increases as well (Bray and Gray, 1988). A problem with the BMI is that it does not differentiate between lean body mass and fat mass. As a result is not appropriate to use with an athletic population.

Skinfold measurement is a popular assessment of body composition. It takes significantly less time to complete than hydrostatic weighing, DEXA, or ADP. The principle behind skinfold measurement is that subcutaneous fat is proportional to total body fat. By measuring the skinfold thickness at various sites on the body, Percent Body Fat can be calculated through a regression equation. Because the proportion of subcutaneous fat to total-body fat varies according to age, gender, and ethnicity (Lohman, 1981), the appropriate regression equation must be selected. Regression equations also vary in the number of skinfold site needed. Even when the appropriate regression equation is used, there may be a 3% to 4% error in the calculated Percent Body Fat (Lohman, 1981). Thus, the correct regression equation must be carefully selected.

**PHYSICAL FITNESS**

Physical fitness is one of the aspects of total fitness. Physical fitness is not only one of the most important keys to a healthy body, but also the basis of dynamic and creative activity. Fitness is active not passive, because from birth to death, cradle to graveyard, an individual is an active organism. One point of consensus is that physical fitness is a desirable quality which one cannot afford to neglect.

Physical fitness is of fundamental importance to all human beings. A man cannot move even an inch without proper amount of physical fitness. Many prominent people in the field of medicine and in other fields have spoken and written about the need for exercise to maintain an organically sound body from birth to old age. Functioning of the body requires energy, which depends on the ability of the heart, lungs and blood vessels to process oxygen and deliver it to the muscles, where it becomes the fuel for energy.
Age is no bar for keeping oneself fit. To an older person, it might be the feeling of youthful vigor; to a stenographer it is the ability to type for eight hours at a stretch without developing aching shoulder muscles. To a coach, it something which comes with training; whereas to a physician, it is a functional state of the body defined in technical terms. There is no prefix to his name as ‘EX’. We have seen Ex-service man from military, police and other departments, but a person whose character and physique are molded by physical education and sports is “ever green” and the term ‘EX’ could never be prefixed to his name.

Fitness is for everybody, and not just for youth. This makes fitness everybody’s business. It is a part of education but it is also a part of life. Everybody who wants to be fit must do exercise. The basic problem is that the human body is designed and constructed for movement and vigorous activity, not for rest, and it functions more effectively when it is active. “Most people take better care of their automobile than they do of their own bodies”. The old saying is “if you don’t use it you lose it”. If people are to develop and maintain a desirable level of health and fitness, they must participate regularly in well-designed exercise programme.

A person who does not exercise regularly according to a well-designed programme will have an extra energy reserve because of the increased efficiency of the body. There is an old saying “Exercise may not necessarily add years to your life, but will add life to your years”. Indeed it is true.

“Fitness is the ability of an individual to live a full and balanced life, it involves physical, mental, emotional, social and a spiritual factors and a capacity for their wholesome expression” (Bucher, 1958).

“We must change a nation of softies to a nation that is physically fit”. The profession of physical education is grateful to President Eisenhower for using people to be more physically active. President Kennedy urged the schools to lay more stress on physical education programmes and physical fitness (Bucher and Man, 1958).
COMPONENTS OF PHYSICAL FITNESS

Physical components, physical fitness is one’s richest possession, it cannot be purchased, it has to be earned through a daily routine of physical exercise (Uppal, 1992).

The ability to endure muscular work is a universally accepted component of physical performance. In practice, most physical fitness tests include a distance run to measure aerobic capacity anta test (usually sit ups) to measure muscular endurance. Muscular endurance and aerobic endurance are important components of performance. Researchers do not agree as to which components are involved in all the physical performance common to sports, physical fitness testing and heavy industrial occupations. The interacting functions of physiological systems contribute to the difficulty. The following qualities are basic to physical fitness should receive due to attention such as speed, endurance, agility, flexibility and power.

Physical fitness is one of the most important keys to health. To lead a life, physical fitness is highly useful to everybody. Everybody has some degree of fitness. Physical fitness is a positive quality, extending on a scale from infancy to well grown adult full of life. But it varies from individual to individual and in the same individual from time to time. Therefore, physical fitness is a basic fitness as well as a part of total fitness and is a combination of physical attitudes, social adaptability, emotional stability and mental efficiency.

Physical fitness is a combination of several components rather than a characteristic. To develop and maintain physical fitness, vigorous effort by the individual is required. Cardio vascular endurance, muscular endurance, strength, power, speed, agility, co-ordination and flexibility are the basic components of physical fitness. The term physical fitness is somewhat exact in its meaning, indicating to us specific components we might measure to reflect a person’s fitness status. The sensible organic ingredients of physical fitness include muscular strength, muscular endurance, muscular flexibility, cardio vascular or cardio respiratory fitness and neuro muscular co-ordination (Mathews, 1968).
Muscular endurance is a universally accepted component of physical performance. In practice, most physical fitness tests include running over a distance to measure aerobic capacity and a test (usually sit-ups) to measure muscular endurance. Muscular endurance and aerobic endurance are important components of performance. Researchers do not agree as to which components are involved in all the physical performance common to sports, physical fitness testing and heavy industrial occupations. The interacting functions of physiological systems contribute to the difficulty (Berger, 1992).

Strength is the ability or capacity of a muscle or muscle group for exerting force against resistance. Strength is needed in all kinds of work and physical activity. Muscles that are strong result in better protection of body joints and fewer sprains, strains and other muscular difficulties. Furthermore, muscle strength helps to maintain proper posture and provides for greater endurance, power and resistance to fatigue. Strength is also a very important element in the field of sports. The best athletes pay particular attention to develop strength in various muscle groups.

Agility is the ability to change directions quickly and effectively while moving as nearly as possible at full speed. This quality may be essential to success in certain games. The common tests of this parameter involve such tasks as the zig-zag run for a time through a maze of obstacles or shuttle run (Updyke and Johnson, 1990).

Power is seen in quick movements when body Weight is propelled either upward or forward. It is characterized by one short burst of energy and is seen in such test as the standing long jump, vertical jump and short run (Bucher, 1983).

Speed is which is essential for many physical activities. Without speed there is no sports and physical education. Speed of muscle contraction is an innate quality, but speed of movements can be gained through movements. Speed is a valuable factor in games like football, basketball, hockey and track events. Strength is highly related to the speed. Generally; the higher team wins because it is the faster team.

Cardiovascular function is regarded by fitness experts as the most important of the fitness qualities, particularly, in the area of health related physical fitness. The
vigorous physical activity improves cardio vascular function and thus reduces the incidence of circulatory disease \textit{(Bucher, 1983)}.

Co-ordination is the ability to use senses together with body parts to perform a motor task”. Co-ordination is essential to highly complex movements. It is the ability of performance to integrate various types of movements into specific patterns. Different kinds of activities and bodily movements require different kinds of co-ordination to perform co-ordinate movements which involve agility, balance and speed.

Flexibility is the quality that permits freedom of movement. It is a measure of the range of motion allowed by a body joint or joints. Flexibility is important for performance in most active sports \textit{(Bucher, 1983)}.

\textbf{SELECTED PHYSIOLOGICAL VARIABLES RELATED TO PHYSICAL FITNESS}

Exercise physiology is one of the important areas. The physiological traits depend upon the race, geographical and climatically conditions of human beings. Therefore, it is receiving spotlight attention all the time. Exercise physiology explains the process of muscle type, how muscles are improving in proper manner, what are the weaknesses of muscles, etc. and the most of the employees need brisk movement of muscles and need strong muscle. Otherwise they cannot lift more Weight while lifting the Weight; their muscle will get strong automatically. While lifting the Weight most of the big muscles are involved, normally often hard work the muscles will get tired we take some diet to retain their energy mostly industrial employees do not take proper diet after hard work consequently, it will affect their physiological condition of the body. The improvement of muscle power and successful performance in emergencies need a high level of fitness of respiratory system, cardio vascular system and physiological components.

The physical exercise may produce extensive change in the respiratory system; the increased stretching of the long tissue can accommodate more air. So the amount of vital capacity may be increased after a period of training programme \textit{(Miller and Morehouse, 1971)}.  

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All activities require energy in different degrees. The energy supply process plays a greater role in all the activities of work. The energy is supplied by the use of oxygen supply the better would be performance. The oxygen supply depends upon four elements – ventilator capacity, capacity of lungs, and efficiency of the heart and capacity of oxygen transfer from blood to the working muscles.

An aerobic exercise helps in increasing the supply of oxygen to the working tissues. The greater capacity of oxygen supply depends upon maximum ventilator. A number of physiological variables will improve in proportion to physical activities. Some selected physiological variables are taken into account for this study is vital capacity, resting pulse rate maximum speed of expiration (peak flow meter rate).

The vital capacity as a pulmonary measure often used to represent the capacity of the lungs. It is defined as the largest volume of air that can be exhaled after the deepest possible inhalation (Clarke, 1975). The major factors affecting the vital capacity are 1) the position of the person during the vital capacity measurement 2) the strength of the respiratory muscles and 3) the dispensability of the lungs and chest cage. Normally vital capacity for men is 4.6 liters and for women it is 3.1 liters (Guyton, 1986). The average Indian adult men has only 3.9 liters And women has only 2.6 liters. A tall thin person usually has a higher vital capacity than an obese person and a well – developed athlete may have a vital capacity thirty to forty per cent above normal (Sarada and Madavankutty, 1987).

The vital capacity gives an indication of the ability to respond to the additional oxygen requirements of the body during exercise. The daily exercise will definitely improve the vital capacity (Howard and Payne, 1981).

The various lung volumes measured under resting conditions are larger in trained than in untrained individuals. The majority of these changes can be attributed to the fact that training results in improved pulmonary function and therefore in larger lung volumes. It should be mentioned, however, that there is little, if any, correlation between athletic performance and the lung volumes changes. Athletes tend to have larger diffusion capacities at rest and during exercise than do non-athletes. This is particularly true for endurance athletes. It is thought that diffusion capacity per second
not directly affected by training but rather that the larger lung volumes of athletes provide a greater alveolar – capillary surface area.

Peak expiratory flow rate (PEFR or PEF) is the maximum rate of airflow which is sustained for a period of 10 milliseconds during a forced expiration after a maximal inspiration. It is not a spirometric measurement. It can be obtained using a pneumotachograph, but is usually measured with a Wright peak flow meter. This is a small portable hand-held instrument which does not require electric power and is suitable for population survey studies. Normal values are 400-600 litres/min. in young men and 300-400 litres/min. in young women. PEFR is reduced in many lung disorders especially when there is obstruction in larger airways. It is useful for monitoring functional changes in asthma; a still smaller inexpensive mini peak flow meter is available, which patients with asthma can purchase and use for daily monitoring at their homes, so that the drugs and dosage can be suitably adjusted. (Electronic spirometers also record PEF).

Resting pulse rate is the heart rate in resting condition. The average heart rate under resting (not basal) is about 78 beats per minute for men and 84 per minute for women (Morehouse and Miller, 1971).

The resting heart rate denotes how hard the heart is working them active. The advantage resting heart rate for women is 78 to 84 per minute, these on an average but it varies. The resting heart rate has been popular for a number of years as an index of fitness on the premise that a low resting heart rate indicates the large stroke volume that is usually associated with a large cardiac output and a high aerobic fitness (Mac Dougall and others, 1991). The view that training has very pronounced effect on heart rate even at rest. There will be marked difference of resting heart rate for the trained and untrained persons of both sexes (Fox and Mathews, 1981). There is fear of permanent damage of heart of young children if worked in high heart rates (Shaver, 1981). The latest researches shows that this fear is baseless and it is proved that high heart rate only give a parallel growth rate. The regular exercise will improve stroke volume and so that heart is able to bat at a slower rate and get more rates between beats (Sharkey, 1984). The human heart beats about 1, 04,000 times every 24 hours and pumps 60 barrels of blood per day. The American Heart Association
suggests that the normal range should be 50 to 100 beats per minute. For an untrained young adult the maximum rate of beat is said to be 200 to 220 and for trained athletes it is 170 to 180 under physical exercise.

Posture, sex, age and emotion are the basic factors which affect the heart rate. Environmental factor like high temperature and attitude also influence the heart rate (Sharkey, 1984).

Resting pulse rate averages 60 to 80 beats per minute. In middle aged, unconditioned, sedentary individuals the resting rate can exceed 100 beats per minute. In highly conditioned endurance – trained athletes, resting rates in the range of 28 to 40 beats per minute have been reported one’s resting heart rate typically decreases with age. It is also affected by environmental factors; for example, it increases with extremes in temperature and altitude.

The heart rate at rest decreases markedly as a result of endurance training. If one is a sedentary individual with an initial resting heart rate of 80 beats per minute, one’s heart rate will decrease by approximately 1 beat per minute each week for the first few weeks of training. So after ten weeks of moderate endurance training, one’s resting heart rate should drop from 80 to 70 beats per minute. The actual mechanisms responsible for this decrease are not entirely known, but training appears to increase parasympathetic activity in the heart while decreasing sympathetic activity. Highly conditioned endurance athletes often have resting heart rates lower than 40 beats per minute, and some have values lower than 30 beats per minute (Wilmore and Costill, 1994).

Normal quiet breathing is an involuntary, unconscious process. But unlike visceral functions, it can enter into consciousness when attention is directed towards it. A normal subject becomes aware of increased breathing when pulmonary ventilation is doubled, and discomfort develops when there is a four of five-fold increase in ventilation.

Apnoea and Breath Holding: Apnoea literally means absence of breathing though the term is generally used to imply a temporary cessation of breathing. Apnoea
following voluntary hyperventilation, vagal apnoea, adrenaline apnoea and deglutition apnoea have been referred to elsewhere. Brief periods of apnoea may occur normally during sleep (sleep apnoea), but if frequency and duration of its occurrence is high it is pathological (sleep apnoea syndrome). Apnoea can be voluntarily maintained for a very brief time. Breath–holding time or apnoea time, after a maximal inspiration, ranges from 40-80 seconds in normal subjects, though some individuals can hold the breath for slightly longer periods, by training and force of will. During apnoea the alveolar $O_2$ falls to about 8% ($PO_2$ – 65 mmHg.), and alveolar $CO_2$ rises to about 7% ($PCO_2$ – 49 mm Hg.). Both hypoxia and hypercapnia powerfully stimulate respiration. So a “breaking point” is reached when it becomes impossible to hold the breath any longer. Apnoea time can be prolonged by creating an initially high alveolar $PO_2$ by breathing pure $O_2$ or reducing the alveolar $PCO_2$ by voluntary hyperventilation prior to breath holding. Apnoea time is reduced in exercise and after breathing $CO_2$ rich gas mixture. Hence it is apparent that the distressing symptoms of breath holding are largely due to the low $O_2$ and high $CO_2$ content of arterial blood. But the following observations indicate that blood gas composition alone is not responsible for the effect. When subjects at breaking point are made to take a few breaths from a bag containing a gas mixture of the same composition as their alveolar gas at breaking point, there is a relief from the urgent desire to breathe and the subjects could continue to hold breath for another 20 seconds. Breath holding time can also be prolonged if respiratory movements are made behind a closed glottis. It has been suggested that the unpleasant sensations are the result of the chest wall and lungs being kept immobile preventing the normal response to afferent stimuli. Apnoea time is longer in subjects with sinoaortic denervation, vagal blockade or phrenic nerve blockade. Hence the mounting unpleasant sensations may be due to afferent impulses sensations may be due to afferent impulses from chemoreceptors, pulmonary vagal receptors and from the receptors in the respiratory muscles and joints.

Physiological components it is universally accepted that the physiological functions of the body improve with use and decline with disuse. More specifically the heart, lungs and muscles become stronger and more durable the more they are used. The following physiological qualities are pulse rate, Cardio Respiratory Endurance and blood pressure. The research shows that strongly supports the theory that regular,
vigorous exercise helps keep heart healthy and may prevent cardiovascular diseases (Berger, 1982).

**SOCIO – ECONOMIC STATUS**

Socio–economic status of a child is very closely related to physical fitness, motor ability, health status and academic achievements. A child with good or high socio–economic status will have access to better education, food and nutrition, health care environment, physical education facilities and opportunities which will affect their physical fitness, motor ability, health status and academic achievements.

Education and socio–economic statuses are closely related; secondary educational is a very important stage of education in the education system of any country. Majority of people will have either lower secondary stage or higher secondary stage as their final educational career. Hence it is a stage, which is concerned with the majority of population (Murthy, 1982).

Socio – economic status assumes a continuous running at society from high to low on the basis of occupation, income, education, wealth, life style cultural way of life and so on. Socio – economic status emphasis the economic condition of society and their behavior in life. Status is the position that a person occupies on the scale or losses of esteem in the eye of other members of their society. Status may depend on a variety of factors such as birth, wealth, ability occupation, type of education, etc.

*Frost (1971)*, explained that “An individual socio – economic status may influence their opportunity for participation, his desire to excel, his choice of activity and his success”.

According to *Page, et al. (1979)* socio–economic status refers to a person position in any group, society or culture as determined by wealth, occupation education and social class.

Physical education is an excellent vehicle of socialization. Social development is important and physical education activities have potential for the accomplishment
of this objective. Traits of leadership moral character and perseverance, physical fitness to name only are positively affected in physical education programmed.

THE INFLUENCE OF SOCIO–ECONOMIC STATUS AND PHYSICAL FITNESS

The most widely accepted definition of socio–economic status is defined as “socio–economic status as “the position that an individual or family occupies with reference to prevailing average standards of cultural possessions, effective income, material possessions and participation in group activity of the community” (Chapin’s Chapin, 1928).

Attempts made by scholars to understand and explain physical performance and achievement of individuals have pointed out the existence of a very close relationship between social status and physical performance. Several studies have shown that physical fitness scores are high in the case of the individuals who hailed from upper, middle class families and those individuals in general do not come from disadvantaged section of the population and that lower classes give less importance to sports and value more their routine responsibility (Luschen, 1981).

SOCIO – ECONOMIC STATUS AND ITS DETERMINANT

According to Terry Page, (Thomas and Marshall, 1929), socio–economic status is refers to “a person’s position in any given group, society or culture as determined by wealth, occupation, education and social class”. The authors also opine that social class is “Grouping of people on a scale of prestige in a society according to their social status. It is determined by many factors, such as occupation, income, moral, standing, family history, social groupings and organizations, type of schooling, area of residence, etc.

The socio–economic condition of a family obviously refers to the social and economic status of its members. It has been observed in democratic societies that families differ from one another not only in terms of income, but also in terms of occupation, education, type of dwelling, life style and culture, while the core socio–economic factors appear to be the same, the relative importance of those factors differ from country to country and from society to society depending upon local conditions.
(Savitri Sharma, 1979). The socio – economic background has a relationship with the performance of the children in the examination. The socio class status and high occupation, profession provides enough motivation for high academic achievement (Beenashah, 1990).

Thus the above and many other such findings reveal that education, occupation, income of parent, social, family, community and total assets labeled as socio – economic status are potential variable for psycho – physical performance.

1.1 TIRUCHIRAPPALLI DISTRICT (Trichy)

The district has an area of 4,404 square kilometers it is bounded in the northwest by Namakkal District, in the northeast by Perambalur District, in the east by Tanjavur District, in the southeast by Pudukkottai District, in south by Madurai District, in the southwest by Dindigul District and in the west by Karur District, Kaveri river flows through the length of the District and is the principal source of irrigation and water supply. The Pachamalai is important settlements of Tribal.
Pachamali are organized into 3 nadu of which two are in Tiruchirapalli District and the third one covers Gangavallitaluk in Salem district. The Pachamalai are less elevated than the other ranges. Its length is 19 Kilometers from the north to south. The total extension of the hills is 193.63 square Kilometers.

Total population of the Trichy district according to the census held on 2001 is 1897081 persons, consisting of 957543 males and 939538 females. Rural population of the district is 1048314 persons (525615 males and 522699 females) and urban population is 848767 persons (431928 males and 416839 females). The tribal population according to Census is 14,351. It is 47.10% Urbanized. The district has a literacy of 79.16% higher than the states average.

Tamil is the principal language spoken and Tamils are predominant linguistic group in the district, also languages spoken in the district are Kannada, Malayalam, Telugu and Urdu. Considerable amount of Sri Lankan Tamils are also found in certain packets of Tiruchirapalli. Hindus formed the majority of the population at 84.39% followed by Christian at 9.02% Muslims at 6.46% and others 0.12%.

Urban area is characterized by higher population density and vast human features in comparison to areas surrounding it urban area may be cities, towns or conurbations, but the term is not commonly extended to rural settlements such as villages and hamlets. With growing trade and commerce and contacts with other parts of the world, the urban has modified his tastes in clothes, social habits, and cultural pursuits and has more time to devote to them. Cultural and sports clubs, radios, telephones, cinema, theatre, swimming pools, and restaurants play increasing part in the lives of the urban middle classes. Many wealthy urbanites live in spacious and luxurious houses, fitted with latest modern appliances. They travel abroad, and send their children to the best and most modern schools at home and overseas. They belong to golf and tennis or other leading clubs of their cities and engage in such activities as sponsorship of cultural arts, establishment of collections of object d’art, and the general nurturing of other social and cultural activities. The middle class forms a crucial and most vocal section of the urban population. They are dedicated and, politically conscious and have abiding faith in democratic traditions. Most of them are lawyers, professors, doctors, engineers and government servants.
Rural area or the country (or) countryside is areas that are not urbanized, though when large are described country town and smaller cities will be included, they have a low population density, and typically much of the land is devoted to agriculture. Rural area and tribal area are mostly same life style and also it’s opposite to urban area. The term tribe commonly signifies a group of people speaking a common language, observing uniform rules of social organization and working together for common purpose. The other typical characteristics of tribe include a common name, a contiguous territory, a relatively uniform culture or way of life and tradition of common descent. According to another contention tribe is generally used to denote group of primitive or barbarous class under recognized chiefs.

The meaning of term “Tribe” has been deeply rooted in the vocabulary of Anthropology and the Social Sciences. It is derived from the Latin word “Tribes” which means one third. Tribes originally referred to one of three man who grouped together to found Rome. Later the Roman and Germanic groups occupying a common territory under common leadership were called as tribes, more recently, any group of people occupying a common territory and following common customs rather than State Law and conveniently called as “Tribes”. *Encyclopedia Americana, France to Veninansin.*

The Malayali is socially, economically and culturally backward. Because they are living in remote hill areas. So out of the main stream of Indian social life. They followed their traditional customs and habits. The government is taking up all possible measures to uplift to them. The objective of this study is to given an idea about their nativity and traditional way of life. The Government aids and voluntary organization Tribal Development programme for their uplift, etc. Their main stay is agriculture. Most of them are agricultural form laborers. They are sturdy people capable of hard work both men and women equally work in the land.

The tribes suffer due to shortage of lands. After independence, when the government has taken over the tribal areas under its custody under Bhoomidhan Movement (Land Giving Movement) the tribes have lost most of their lands. They have no lands for their cattle to graze. They are quite miserable due to alienation of lands and indebtedness. The land mongers from the plains cheat the tribal leader and
get permission to hill the land. The government has taken a large portion of the forest for the forest department. The land distribution has been prevented to some extent by the government board standing order 15(4) by which lands of tribes cannot be sold to non–tribes, but patta lands which do not come under this category are purchased by the outsiders. (ITDP – Project Report –Pachamalai, 1978 – 1983).

They were settled in different place in Tamil Nadu such as the Districts of Salem, Namakkal, Dharmapuri, Villupuram and Tiruchirappalli. The major occupation of Malayalis was agriculture and agriculture labour. The general agriculture producers were changed. They follow modern method of agriculture. They also cultivate paddy, solam (jawor) sugarcane, bananas, nut and maravalli (kappu) (Interview with Karuppan, 2011). The main cultivation on the Shervoroys is coffee. Most of the coffee estates are owned by the outsiders. Malayalis work in those estates and are not interested in becoming estate owners themselves. After the government has taken the tribes under its custody it is trying to solve the problems of the tribes so as to make them economically sound, educationally and culturally modern.

The main problem of the tribes is illiteracy. Illiteracy and ignorance are responsible for their exploitation and backwardness. The statistics of 1991 Census reveals that still 53.24 % of the Scheduled Caste people and 72.11% of the Scheduled Tribe people are illiterate. The Tamil Nadu Government has taken much care for the tribal education advancement (Report by Government Policy Note, 2002 – 2003).

Education is free for them at all stages. At present, the tribal welfare department is running 1017 schools and 245 tribal residential schools for the welfare of Adi Dravidars and Scheduled Tribes respectively. 1076 Adi Dravidar student hostels and 26 tribal student hostels are being run by this department. Text books, note books and uniform are supplied free of cost to all students of Scheduled Caste and Scheduled Tribes. For the financial year 2002 – 2003 a sum of Rs.10.12 crores is allocated for this scheme Information, Adi Dravidar and Tribal Welfare Department, Trichy.
OBJECTIVES OF THE STUDY

The study has been devised to test the following objectives

1. To find out whether there is any significant difference in the mean scores of select Anthropometric variable for the sample of Urban, Rural and Tribal area school Boys and Girls.
2. To find out whether there is any significant difference in the mean scores of select Physical variables for the sample of Urban, Rural and Tribal area school Boys and Girls.
3. To find out whether there is any significant difference in the mean scores of select Physiological variable for the sample of Urban, Rural and Tribal area school Boys and Girls.
4. To find out whether there is any significant difference in the mean scores of select Socio Economic Status for the sample of Urban, Rural and Tribal area school Boys and Girls.

STATEMENT OF THE PROBLEM

The purpose of the study was to analyze the select Anthropometric, Physical, Physiological Variables and Socio–Economic Status of urban, rural and tribal area of School students.

HYPOTHESES

1. It was hypothesized that there would be significant difference in the Anthropometric variables among urban, rural and tribal area school boys and girls.
2. It was hypothesized that there would be significant difference in the Physical variables among urban, rural and tribal area school boys and girls.
3. It was hypothesized that there would be significant difference in the Physiological variables among urban, rural and tribal area school boys and girls.
4. It was hypothesized that there would be significant difference in the Socio–Economic Status of urban, rural and tribal area school boys and girls.
DELIMITATIONS

The study was delimited in the following aspects:

- The study was confined to 1355 school students in Trichy district of Tamil Nadu.
- The study was confined to the age group of 13 to 16 years only.
- Only 231 boys and 217 girls in rural area school students.
- Only 237 boys and 214 girls in urban area school students.
- Only 234 boys and 222 girls in tribal area school students.
- Anthropometric variables were delimited to Weight, Height, Body Mass Index and Percentage of Body Fat.
- Physical variables were delimited to Muscular Strength and Endurance, Abdominal Muscular Strength and Endurance, Agility, Explosive Leg Power, Speed, and Cardio Respiratory Endurance.
- Physiological variables were delimited to Peak Expiratory Flow Rate, Resting Pulse Rate, and Breath Holding Time.
- A modified Kuppusamy’s Socio Economic Status Scale was used to assess the Socio Economic Status of the students.
- The component sub-divisions of Kuppusamy’s Socio-Economic Status scale have been changed into existing conditions in the case of each variable (ie. Education, Occupation and Income) whereas the scoring system was kept constant.

LIMITATIONS

The study has the following limitations:

- No effort was made either to control or assess the quality of the food ingested, the quantum of Physical exertion, lifestyle Psychological stresses and other factors which are recognized as limitations of this study.
- Changes in atmosphere pressure, temperature, relative humidity and such other meteorological factors during the period of administering the test could not be controlled or assessed, and their possible influence on the selected Physical, Physiological test performance was also regarded as a limitation.
- Heredity and environmental factors which contribute to Psychological, Physiological and Sociological factors have not been controlled.
The internal and external factors which may discourage or motivate the participants while performing Physical, Physiological and Psychological tests are not been controlled.

No special motivation techniques were used during the test. Therefore the difference that might have occurred in the test due to lack of motivation was recognized as a limitation for this study.

The general mood and understanding of the questionnaire at time of responding to the questionnaire may affect the answer and this was considered as a limitation.

**SIGNIFICANCE OF THE STUDY**

- The study would analysis variation in selected Anthropometric, Physical, Physiological variables and Socio Economic Status among rural, urban and tribal school boys.
- The study would help to identify the difference in selected variables among urban, rural and tribal area school students.
- The results of the study may identify the variables that have contributed more for physical performance and competitive sports.
- The results of the study would be of much help to the physical education teachers and coaches to develop certain Physical and Physiological capacity for better performance.
- The study provides an opportunity to physical education teachers and coaches, to spot out the latent talents of the students and to select potential Students for different sports and games.
- This study is more useful in planning our educational curriculum.
- Through this study pupil can be encouraged to participate in physical fitness Programmes.
- The present study enables us to estimate the present physical status for the school students in the Trichy District area.
- On the basis of the result of this study, proper physical education programme can be planned effectively for the school students.
DEFINITION AND EXPLANATION OF THE TERMS

PHYSICAL FITNESS

“The state physical fitness is appropriately related to the type of activity being considered. A physical characteristic of Weight lifters is wholly different than for long distance runners” (Cansal, 1987).

STRENGTH

“It is defined as the capacity to exert force or the ability to do work against resistance” (Navaraj Chelliah, 1989).

ENDURANCE

Endurance is the ability to continue necessary task without undue fatigue, “Endurance is the physiological condition manifested by the length of time one can persist in an activity (Lawther, 1991).

MUSCULAR ENDURANCE

“The ability of a muscle to repeat identical movements or pressures or to maintain a certain degree of tension over a period of time” (Johnson and Nelson, 1982).

MUSCULAR STRENGTH

Muscular strength is defined as “the maximum contraction that can be voluntarily applied in a single contraction” (Clarke and Clarke, 1963).

SPEED

This is the ability to move from one place to another in the shortest possible time. It is primarily an innate yet it can be improved through practice by technique and movement efficiency (LeBlane and Lowry, 1981).

POWER

“The ability to transfer energy into force at a fast rate of speed” or “the capacity of an individual to bring into plays maximum muscle contraction at the fast rate of speed” (Darothy Young, 1979).
EXPLOSIVE POWER
“Explosive power is the ability to release maximum muscular force in the shortest time as in executing a standing broad Jump” (Baumgartner and Jackson, 1987).

AGILITY
According to Phillips and Hornak, the Agility is the ability to change directions rapidly and accurately. It depends essentially on strength, speed of reaction and movement, and big muscle coordination.

CARDIO RESPIRATORY ENDURANCE
“It is the capacity of the circulatory-respiratory system to function during sports or other physical activities, which require sustained effort” (Margaret, 1981).

BREATHE HOLDING TIME
States that this type of training is that in which the amount of oxygen is stopped or reduced to the working muscles by means of holding breath of reducing activity. It is duration of time through which one can hold his breath without inhaling or exhaling after a deep inhalation (Strukic, 1981).

PEAK EXPIRATORY FLOW RATE (PEFR)
A peak Flow Meter measures air flow when you breathe out. This is known as the peak flow. It tells you how well your lungs are working and how well your asthma is controlled. When peak flow stags lower than your normal reading, your asthma may be getting out of control.

It is found more convenient and informative to measure the rate at which one liter of air is expelled over the fastest part of the expiratory curve and expresses this as maximum forced expiratory flow rate or Peak Flow Rate (Shah and Mehta, 1961).

PULSE RATE
The number of beats of pulse per minute or the number of the beats of the heart and entries per minute (William Goddie, 1964) the number of beats felt in exactly in one minute is known as pulse rate.
ANTHROPOMETRY

Anthropometry is making external measuring of the human body. This measurement may be either objective, by using instruments such as calibers or subjective using a list of characteristics (Mayers, 1974).

WEIGHT

Weight of the nude human body with empty bowels, is known as body weight (Kansal 1996). Weight is the measurement of total body mass (Krik Cureton, 1974).

HEIGHT

It is the maximum height of the individual when standing erect on a horizontal surface with his head and face in F.H. plane or it is the straight height of the subject (bare-footed) up to the point vertex (Kansal, 1996).

BODY MASS INDEX

Body Mass Index provides a ratio between body weight and height and is quickly becoming the standard way of defining obesity for the public (Garrow and Webster, 1985).

SKINFOLD MEASUREMENT

Body fat composition may also be reasonable estimated from measurement of subcutaneous fat as reflected by skinfold thickness. The thickness of the fold reflects the amount of fat underneath the skin and it is measured in millimeter with the skinfold caliper.

PERCENT BODY FAT

The amount of body fat (adipose tissue) that is stored is determined by two factors, the number of fat storing cells, or adiposities and the size, or capacity, of the adiposities, it has been shown that the number of fat cells cannot restriction once adulthood is reached during weight reduction involving fat loss in adults, it is the size but not the numbers of adiposities that decrease (Adam, 2007).

TRICEPS SKINFOLD

It is the thickness of the double layer of skin plus subcutaneous fat on the posterior side of the upper arm over the triceps muscle in the middle of upper-arm (Kansal, 19
SUBSCAPULAR SKINFOLD

It is the thickness of double layer of skin plus subcutaneous fat below the inferior angle of left scapula (Kansal, 1996).

ABDOMINAL SKINFOLD

It is the thickness of double layer of skin plus subcutaneous fat to the right of the belly button (umbilicus) (Bishop, 2008).

SOCIO-ECONOMIC STATUS

Status was originally a lawyer’s term referring to the legal standing of persons legally enjoying certain rights subject to certain limitations. Later this meaning of the word was extended to cover an individuals or groups position in society in a more general sense (Helen Ware, 1981).