Chapter - I

INTRODUCTION

The world of games and sports is ever expanding with intensity of competition, and enlarging Scientific Studies of human movement. Sports is dynamic in nature and progressive in outload. It is not confined to "What has been", but its target is to fix new targets.¹

Education in its broad sense means preparation for life. It should help each individual to become all, he is capable of becoming. Therefore, it is inexorably tied in with allround development of a person.

The rapid rise in the sports performance in the last few decades is entirely due to the new scientific and systematic approach of talent identification and development of new techniques, tactics, systems, theories and methodologies of training.

The field of Physical Education and Sports are international disciplines, because they develop international understanding and universal brotherhood in the present politically conflicting lives. Sports movements is considered as one of the major adhesive forces for developing world peace. It may also serve as one of the effective means in solidifying national integration and developing national character. Sports has become the media of international relationship of the countries.²

Today more than ever before, it is necessary for physical educators and coaches to recognise the vital part, Science plays in the successful conduct of physical education and athletic programmes. To contribute to the best of one's ability in all aspects of physical education and athletics it will require good understanding of the available scientific knowledge. Not only will such understanding result in

better teams and better programmes of activities but it will also enable to guard the health of pupils.

Archery is one of the oldest known sports. The bow, as an effective long-range weapon, contributed to the early survival of man, supplying him with meat and leather and fur for clothing, as well as a means of both attack and defence.³

Then too, knowing the reasons why to select a particular training programme for accomplishing a scientific task Scientific knowledge is essential.⁴

Technology permeate every aspects of life. Sports is no exception for modern youth to develop physical capacities beyond anything earlier imagined.

³Encyclopaedia of Archery, 1984, S.V. By W.F. Paterson.

Sports have become highly competitive and records are being broken with great rapidity.\(^5\)

The ideas and expression of the international players is to view the sport not only through the individual aspect by primarily through the national one. Sports is a national prestige and international popularity.\(^6\)

No one knows who made the first bow and arrow. Somewhere back in the vast dimness of time one of our ancestors tied a piece of leather thong to the opposite ends of a stick, fitted another small stick into the thong and the first archer came into being.\(^7\)


The Bow has been a part of a recorded history for more than 50,000 years, but its existence was established well before that time. Archeologists estimates from cave drawings depicting archers that the bow was in use at least 1,000,000 years age. For thousands of years, human beings used propelled arrows to protect themselves from wild animals. At the same time archery skill was used to obtain food. The bow became a symbol of strength and power, it gave man a certain status and advantage to his environment. 8

With the increased interest in archery came some surprising development in equipments. Just as the past two or three decades brought thousands of new fans into the game, they have also brought changes in ideas, design and materials. Basically, archery have remained unchanged for at least five thousand years. But as more and more people from every walk of life took up

archery, they brought to it broader thinking, new ideas and new techniques. 9

The beginnings of international archery as we know it today, can be confidently assigned to 1931, when Poland took the initiation and held an International Tournament at Lwow. It was during that year that F.I.T.A. (Federation Internationale de Tir a L'Arc) was instituted to act as a central authority for archery. 10

In 1972 at Munich, archery was finally included in the XXth olympiad with a strong international following and with firmly established standardised rules of the shooting. Archers from twenty-eight countries, who had reached the required proficiency, thus celebrated the ultimate recognition of archery as a world wide amateur sport. 11

10E.G. Health Faber, Archery the modern approach (Faber and Faber Limited, London 1978), P.144.
11Ibid., P.148.
Today there has been a more systematic search for spotting talent and in determining a combination of factors responsible for ultimate success. The sport scientists, who are working day and night with top coaches in the sports concerned, single out the basic qualities which might be the performance limiting factors. It is, therefore, necessary to find individuals with these attributions and characteristics using a series of tests at a very young age. But, perhaps, the major obstacle in expanding our knowledge on prediction method is the need for longitudinal studies ideally starting in childhood and continuing through adolescence to adulthood, which is infact difficult to continue.

There are numerous factors which are responsible for performance of sportsmen and women. The physique and the body composition including the size, shape and form are known to play a significant role in this regard. Therefore, it is evident that the body build popularly known as "Physiognomy" gets primary emphasise at the time of selection of players concerned
to sports where superior competitions is involved. Hence, the trend of physical education, games and sports are to assess the related components as a part of the total body build and size of each player and also to interpretate how far these components are helpful to perform in games and sports under competitive condition.\textsuperscript{12}

For the physiological system of the body to be fit, the system must function well enough to support the scientific activity that the individual is performing. Moreover, different activities make different demands upon the organism with respect to circulatory, respiratory, metabolic, neurological and temperature-regulating functions. Physiological fitness is specific to activity. Physiological systems are highly adaptable to exercise. Each task requires effective functioning for the appropriate system.\textsuperscript{13}


The primary work of exercise physiologist is to describe the change that occur in organ and organismic function as a result of single (acute) or repeated (Chronic) dosage of exercise and to explain how those functional changes occur. The first part of this task, i.e. describing changes brought on by exercise, is much nearer completion than the second explaining the mechanism that produce changes.14

Today the preparation of an athlete for achievement is a complex dynamic state, characterised by high level of physical, physiological and psychological efficiency and the degree of perfection of the necessary skill and knowledge, techniques and tactical preparation. Many other factors are also brought into action in this preparation means of rehabilitating strength after loads, special nutrition, organisation of general regime in accordance with the conditions of sports activity etc. Thus, athlete's

training today is multi-sided process of expedient use of aggregate factors (means, methods and conditions). So, as to influence the development of an athlete and ensure the necessary level of preparation. 15

The question can be answered very succinctly: Separate, but equal! Before the XIX Olympiad held at Mexico City in the fall of 1968, allowed archery to be listed as an unofficial or demonstration sport for the first time. It seems paradoxical that one of the world's oldest sport forms has only recently been accepted as an Olympic sport. Earlier the archery programme has rarely been treated as an equal to the status what it is the international arena of sports. This can be observed in several ways. The equipments and facilities of the traditional and modern instructional programme; the scientific method employed in selecting and while coaching the archers.

In India there are fewer educated coaches who are well versed with latest scientific knowledge for the archery. But definitely our nation and young generation is solely depending upon the coaches and the seniors of this field, irrespective of their knowledge. So to promote this sports, the leaders should think and act scientifically while training the new generations. When our archers are doing well at the international level still the sports scientists and researchers are not giving due importances and are not taking any keen interest in research to develop further better. Keeping in view the Nation's need and the demand of archery, the research scholar felt it and put his utmost effort to conduct this particular piece of research study on national level archers, to establish a physical and physiological profiles of males and females separately.

Statement of the Problem

The purpose of the study was to know about the physical and physiological profiles of males and females of Indian National level Archers.
Delimitations

The following were the delimitations of the study:

(1) The study was delimited to those who took part in the National Archery Championship in the year 1994-95.

(2) The study was confined to twenty male and twenty female National level Archers.

(3) The study was further confined to the following Physical and Physiological variables:

Physical Variables
i) Age
ii) Height
iii) Weight
iv) Arm Length
v) Leg Length

Physiological Variables
i) Positive breath holding time
ii) Resting pulse rate

iii) Resting respiratory rate

iv) Resting blood pressure
   a) Systolic blood pressure
   b) Diastolic blood pressure

v) Body composition
   a) Lean body weight
   b) Fat percentage

vi) Arm-and-shoulder strength

vii) Grip strength
   a) Right hand grip strength
   b) Left hand grip strength

viii) Shoulder-and-wrist flexibility

Limitations

(1) Regular routine, food habits, social background and geographical factors were considered as limitations of this study.

(2) The performance score was recorded on the basis of actual score scored in the National Archery Championship in the year 1994-95.
(3) Non-availability of sophisticated instruments and facilities were also taken as limitation of the study.

**Definition and Explanation of the Terms**

**Physical and Physiological Profile**

Physical and Physiological profile may be defined as physical and physiological characteristics of an individual including various factors which involved in task performance of an individual.

**Arm Length**

Arm length is the distance measured from the acromion process at the top centre of the shoulder to the tip of the middle finger.\(^{16}\)

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Leg Length

Leg length is the distance measured from the outside edge of the foot to the upper edge of greater trochanter.\(^{16}\)

Positive Breath Holding Time

Positive breath holding time is the duration of time, through which one can hold his or her breath as long as it is comfortable after full inspiration before starting smooth expiration.

Resting Pulse Rate

(1) The heart rate (beats per minute) which is derived during the complete resting condition of the subject.\(^{17}\)

\(^{16}\) Ibid.,

\(^{17}\) Morehouse and Miller, *Physiology of Exercise*, P. 69.
The distension of the arterial walls at the beginning of systolic ejection of blood is not confined to aorta but travels down arteries as a wave followed by a wave of recoil. The arteries that tie close to the body, such as the radial artery of the wrist, the arrival of the wave of distension and subsequent recoil may be felt as a distinct throb pulse which offers a convenient method of counting the heart rate.\(^1_8\)

Resting Respiratory Rate

The number of inspiration and expiration per minute which is derived during the complete resting condition of the subject.

Resting Blood Pressure

The driving force that move blood through the circulatory system when the subject is in resting

\(^1_8\) Ibid.,
condition. Systolic pressure is obtained when the blood is ejected into the arteries; diastolic pressure is obtained when the blood drains from the arteries.\textsuperscript{19}

Body Composition

(1) Body composition is the proportion of the lean body mass and depo fat, and it is one of the most important morphological features characterising human organism.\textsuperscript{20}

(2) Body composition is concerned with obesity. In measuring this aspect of body composition, the total body weight is divided into two components, lean body weight and fat body weight. Lean body weight includes muscles, bones and vital organs. The underlying presumption is that total weight equals lean

\textsuperscript{19} Fox and Mathews, \textit{The Physiological Basis of Physical Education and Athletics}, P.663.

body weight plus fat body weight. The higher the percentage of fat, the higher the degree of obesity.21

Strength

(1) Strength can be defined as the force that a muscle or muscle group can exert against resistance in one maximal effort.22

(2) Strength may be defined as the force that a muscle or group of muscles can exert against a resistance in a single maximum contraction.

Grip Strength

Grip strength can be defined as the strength of grip of each hand.23


22 Mathews and Fox, The Physiological Basis of Physical Education and Athletics, P.554.

Flexibility

(1) Flexibility can be defined as the ability of an individual to move the body and its parts through as wide a range of motion as possible without undue strain to the articulation and muscle attachments.  

(2) Flexibility is defined as the range of movement in a joint.

Significance of the Study

(1) The findings of the present study will enlight a new scientific knowledge to identify and select sports talents in the field of Archery.

(2) The present study will indicate the physical and physiological variables as predictors for successful Archery.

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24 Ibid., 76.

(3) The study will further be helpful for physical education teachers, sports scientists and coaches for preparing coaching and training programme for the archers.

(4) The findings of the study will reveal the extent of Physical and Physiological adaptive changes as a result of training and participation in competitive archery, and can be compared with the data of the Archers of well advanced countries.