

**A STUDY OF PHYSICAL FITNESS OF  
OKLAHOMA 4-H CLUB MEMBERS**

By

**WARREN RAY GRAHAM**

Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

1963

Submitted to the faculty of the Graduate School of  
the Oklahoma State University  
in partial fulfillment of the requirements  
for the degree of  
**MASTER OF SCIENCE**  
May, 1964

OKLAHOMA  
STATE UNIVERSITY  
LIBRARY

JAN 5 1965

A STUDY OF PHYSICAL FITNESS OF  
OKLAHOMA 4-H CLUB MEMBERS

Thesis Approved:

*Orin B. Harrison*

Thesis Adviser

*Alvin P. Warner*

*J. H. Boyce*

Dean of the Graduate School

569566

## ACKNOWLEDGMENTS

The author gratefully acknowledges the assistance of his major advisor, Dr. A. B. Harrison, who has patiently directed every aspect of this study and carefully examined the manuscript. He has been especially helpful in the organization and administration of the test battery used. Acknowledgment is extended to the Oklahoma 4-H Club leaders who initiated and supported the physical fitness clinic used as a basis for this thesis. To the many who volunteered to help administer the tests go my grateful thanks for their prompt and responsible assistance. My wife, Linda, cheerfully assisted in every phase and suggested many editorial improvements to the manuscript. My thanks go to Sharon Cranston who efficiently typed this thesis.

## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION . . . . .	1
Statement of the Problem . . . . .	1
Limitations of the Study . . . . .	2
Definition of Terms . . . . .	2
II. REVIEW OF LITERATURE . . . . .	5
III. PROCEDURE . . . . .	13
Rope Climb . . . . .	13
Balance Beam Walk . . . . .	14
Flexibility Test . . . . .	15
Swimming Test . . . . .	16
Standing Broad Jump . . . . .	17
Speed and Agility Run . . . . .	17
Fifteen-Minute Endurance Run . . . . .	18
General Procedure for Administrrating Test Battery . .	19
Analysis of Data . . . . .	21
IV. RESULTS . . . . .	24
V. SUMMARY AND CONCLUSIONS . . . . .	42
Recommendations . . . . .	44
SELECTED BIBLIOGRAPHY . . . . .	45
APPENDIX A . . . . .	47
Raw Data . . . . .	47
APPENDIX B . . . . .	59
Balance Beam and Sliding Caliper Diagrams . . . . .	59
APPENDIX C . . . . .	60
Score Card . . . . .	60
APPENDIX D . . . . .	61
4-H Fitness Clinic, Instructions . . . . .	61

# LIST OF TABLES

Table	Page
I. Standards for Boys Fifteen and Older	25
II. Standards for Boys Below Age Fifteen	26
III. Standards for Girls	27
IV. Results of Rope Climb	28
V. Results of Balance Beam	29
VI. Results of Trunk Extension	30
VII. Results of Trunk Flexion	33
VIII. Results of Forty Yard Swim	33
IX. Results of Speed and Agility Run	35
X. Results of the Standing Broad Jump	36
XI. Results of Fifteen-Minute Endurance Run	38
XII. Physical Fitness Scores	40
XIII. Overall Physical Fitness Standards	41

## LIST OF GRAPHS

Graph	Page
I. Comparison of Trunk Extension Scores	31
II. Comparison of Trunk Flexion Scores	32
III. Comparison of Standing Broad Jump Scores	37
IV. Comparison of Fifteen-Minute Endurance Run Scores	39

## CHAPTER I

### INTRODUCTION

Impetus for this study was initiated by the Oklahoma State 4-H Club leaders. They felt that insufficient attention was being given to the "H" which represented health. It was decided that, at the 1963 Oklahoma 4-H Club Round-Up, there should be a physical fitness clinic. At the request of the 4-H Club leaders to the Oklahoma State University Physical Education Department, a battery of physical fitness tests were devised which could be administered to a portion of the club members attending the 1963 Spring Round-up.

In the past few years, there has been a great deal of study and research directed toward measurement of physical fitness in school age children. One of the problems is that it is difficult to find suitable physical fitness tests which have acceptable standards established. Another related problem is having a sufficient number of subjects available to be tested so that acceptable standards can be determined for the test items used. The combined situations of (1) increased interest in physical fitness by the 4-H Club leaders, (2) the interest of the university physical education faculty, and (3) a sufficient number of subjects to be tested presented an ideal opportunity for this study.

#### Statement of the Problem

The purpose of this study was to administer a battery of tests which would assess the physical fitness level of Oklahoma 4-H Club members and

provide standard scores for this group on the tests used. A subproblem was to compare the scores of the Oklahoma 4-H Club youths with those of other groups on selected fitness items.

#### Limitations of the Study

The standards established on these tests may be slightly higher than the standards that would actually represent the Oklahoma 4-H population. The reason for this being that the members took part in these tests on a voluntary basis and the ones which were interested in their physical fitness may have been more physically inclined than those who did not participate.

The rope climb was used as a test of strength. It was possible for a subject to make a perfect score or climb to the top of the rope. Many of the subjects (53 per cent) made perfect scores. The balance test also had an upper limit which made it possible for the subject to get a perfect score. Since these scores were not continuously distributed, it was not possible to distinguish each subject's capacity from those of the other subjects on these two tests. For this reason, no attempt was made to produce standards on the strength test and the balance test.

A greater number of subjects would have been more desirable. Several hundred volunteers were anticipated, but only 199 took part. As in most statistical studies, a larger sample provides a better replica of the entire population.

#### Definition of Terms

Physical fitness has been a consistently accepted objective of physical education throughout the history of the field; however, there is much

difficulty in measurement in this area due to the lack of a concise and generally accepted definition of the term physical fitness.<sup>1</sup> The problem is further complicated by the lack of agreement and understanding of what should be included in a definition of physical fitness and the degree of interrelationship among its components. Although there are many viewpoints on physical fitness, that of Dr. T. K. Cureton, University of Illinois, is generally accepted as a frame of reference for this study. His ideas are presented, in brief, in the following paragraphs.

Physical fitness is a part of one's total fitness. It does not include the aspects of social, emotional, and mental fitness. Social fitness deals with adaptability to the group and to particular friends. Emotional fitness is concerned with feelings. The power of thought is dealt with in mental fitness. Physical fitness can be thought of as the ability to handle the body well and the capacity to work hard over a long period of time without diminished efficiency.<sup>2</sup> More specifically, physical fitness can be thought of as the degree of strength, balance, flexibility, power, agility, and endurance which an individual possesses.<sup>3</sup>

The following definitions of the characteristics of physical fitness are taken from Cureton's book, Physical Fitness Appraisal and Guidance:<sup>4</sup>

---

<sup>1</sup>John F. Bovard, Frederick W. Cozens, and E. Patricia Hagman, Tests and Measurements in Physical Education (Philadelphia, 1949), p. 167.

<sup>2</sup>T. K. Cureton, Physical Fitness Appraisal and Guidance (St. Louis, 1947), p. 18.

<sup>3</sup>T. K. Cureton, Physical Fitness of Champion Athletes (Urbana, Illinois, 1951), p. 4.

<sup>4</sup>Cureton, Physical Fitness Appraisal and Guidance, p. 18.

Strength --- emphasizes the capacity of the body, or the hands or legs to exert great force. Strength in its ultimate analysis is a complex human quality involving will power, the number of muscle fibers that can be brought into the act, the efficiency of the levers involved -- all to develop coordinated effort against the particular resistance.

Balance --- emphasizes mental control and poise, the kinesthetic sense of position, and the various anatomical and physiological capacities which regulate acts of balance.

Flexibility --- emphasizes the capacity of the body to move easily to the full range of joint flexion and extension without undue restrictions in the joints or tissues.

Power --- emphasizes the capacity to release great explosive effort to execute fast or sudden efforts which move the entire body with maximum effort.

Agility --- emphasizes the capacity for fast reaction in controlled movement where accuracy is also a feature. The ability to handle the body quickly and precisely, not necessarily with maximum force or power.

Endurance --- emphasizes capacity for continuous exertion with partial recovery during the exercise.

## CHAPTER II

### REVIEW OF LITERATURE

Testing and appraisal of physical status has been a major interest of physical educators since the beginning of organized physical education in the United States. In 1880, Dr. Dudley A. Sargent began a systematic study of Harvard students as a basis for determining physical standards for American college men. This effort resulted in what Sargent called the Intercollegiate Strength Test,<sup>1</sup> consisting of lung capacity and strength of back, legs, grip, and arms.<sup>2</sup> Since the efforts of Sargent, there have been many studies directed toward the measurement of muscular strength and physical fitness.

In the early 1940's, motor fitness tests for college men, high school boys and girls, and elementary school children were developed at Indiana University. The test items included pull-ups, push-ups, vertical jumps, standing broad jump, and the squat thrust for twenty seconds.<sup>3</sup>

In 1947, Cureton recognized and confirmed by factor analysis six components of motor fitness -- balance, flexibility, agility, strength, power, and endurance.<sup>4</sup> At the University of Illinois, under the direction

---

<sup>1</sup>D. A. Sargent, "Intercollegiate Strength Test," American Physical Education Review, II (December, 1897), p. 216.

<sup>2</sup>T. E. Blesh and C. R. Meyers, Measurement in Physical Education (New York, 1962), p. 188.

<sup>3</sup>Ibid., p. 219.

<sup>4</sup>Ibid., p. 221.

of Cureton, two test batteries were developed: one of fourteen items, requiring some apparatus and facilities for running the mile, and the second of eighteen items, requiring no apparatus. The fourteen item Motor Fitness Screen Test included foot and toe balance, squat stand, trunk extension flexibility, trunk flexion, sitting, extension press-ups, man lift and let down, leg lifts and sit-ups, medicine ball put, Illinois Agility Run, skin the cat, bar or fence vault, chinning, standing broad jump, and mile run.<sup>5</sup>

Probably the most controversial test in physical education and yet the most provocative and influential test in terms of the significance of its findings for physical education and the American mode of living<sup>6</sup> has been the Kraus-Weber test of Minimum Muscular Fitness, 1954.<sup>7</sup> Dr. Hans Kraus spent some eighteen years developing these tests as a result of his interest in the relation between low back disorders and poor muscular fitness. Six items were selected which represented the most valid test of a large battery administered in clinical experiences. These tests were designed to indicate a level of strength and flexibility for certain key muscle groups below which the functioning of the body seemed to be impaired. Basically, the tests were graded on a pass or fail basis, but the authors provided a means of scoring partial movements. The six tests were:

- Test 1: Abdominal Plus Psoas Muscle Strength
- Test 2: Abdominal Muscle Strength Minus Psoas
- Test 3: Psoas and Lower Abdominal Muscle Strength

---

<sup>5</sup>T. K. Cureton, Physical Fitness Workbook (St. Louis, 1947), pp. 13-14.

<sup>6</sup>Blesh and Meyers, p. 188.

<sup>7</sup>Hans Kraus and Ruth P. Hirschland, "Minimum Muscular Fitness in School Children," Research Quarterly XXV: 2 (May, 1954), p. 178.

- Test 4: Upper Back Muscle Strength
- Test 5: Lower Back Muscle Strength
- Test 6: Back and Hamstring Muscle Strength

Kraus and Hirschland administered these tests to 4,458 American school children and compared the results with 3,156 European children. It was found that 57.9 per cent of the American children failed the test and only 8.7 per cent of the European children failed.<sup>8</sup>

In 1957, selected members of the Research Council of the AAHPER devised the AAHPER Youth Fitness Test as a means of surveying the fitness of American youth. A battery of seven tests was developed. During the 1957-1958 school year, 8,500 school children in grades five through twelve in twenty-eight states were tested with the fitness test battery.<sup>9</sup> After completing the testing a manual was prepared describing the test and its administration, as well as giving norms for different age levels. The manual is known as the AAHPER Youth Fitness Test Manual.<sup>10</sup> The test items included in the manual were: (1) pull-ups; (2) sit-ups; (3) 40-yard shuttle run; (4) standing broad jump; (5) 50-yard dash; (6) softball throw for distance; and (7) 600-yard run-walk. Three aquatic tests, two on pass or fail basis and one time event, were included in the manual, but no norms were available for them.<sup>11</sup>

The New York State Education Department, in 1958, published a test designed to provide schools with a convenient instrument for periodic evaluation of status and progress in physical fitness of boys and girls

---

<sup>8</sup>Blesh and Meyers, p. 206.

<sup>9</sup>Ibid., pp. 217-218.

<sup>10</sup>AAHPER Youth Fitness Test Manual (Washington, D.C., 1958), 55 pp.

<sup>11</sup>Ibid., pp. 4-13.

in grades four through twelve. Seven basic components of total physical fitness were measured by the New York State Physical Fitness Test.<sup>12</sup> The components and test items included were:

Posture --- Posture Rating Chart  
 Accuracy --- The Target Throw  
 Strength --- Pull Ups  
 Agility --- Sidestep Test  
 Speed --- The 50-yard Dash  
 Balance --- The Squat Stand  
 Endurance --- The Treadmill

The New York State Physical Fitness Test booklet was intended to serve as a manual for teachers and contained test directions, record forms, and norm tables derived from administering the test to 12,626 pupils in twenty-six school districts throughout the state of New York.<sup>13</sup>

D. M. Hall, working at the University of Illinois and in close connection with the state 4-H leaders, has studied health and fitness standings of Illinois 4-H youths for some twenty-one years.<sup>14</sup> Hall's analysis shows that health consists of four parts --- growth, organic fitness, motor fitness, and body protection. Hall has set up a battery of tests consisting of two endurance tests, two flexibility tests, two speed tests, and three strength tests. The tests have been standardized by sex, age, and by size and weight index.<sup>15</sup>

Dr. Bruno Balke has recently developed a walking treadmill test of

---

<sup>12</sup>The New York State Physical Fitness Test: For Boys and Girls Grades 4-12 (Albany, New York, 1958).

<sup>13</sup>Blesh and Meyers, p. 219.

<sup>14</sup>D. M. Hall, Keeping Fit Handbook for Leaders (Urbana, Illinois, 1962), Forward.

<sup>15</sup>D. M. Hall, "What is a Good Physical Fitness Program?", The Physical Educator XVIII: 3 (October, 1961), p. 94.

work capacity. This test measured the maximal oxygen intake attainable by the subject while working aerobically. The maximum oxygen intake attainable is described by Balke as the most adequate criterion of work capacity. Dr. Balke has standardized the treadmill test and correlated it with the oxygen requirements estimated for average velocities achieved in best effort runs over various distances. There was a high correlation between distances covered in runs of twelve to twenty minutes duration and the more objective treadmill test. Based on these findings, a field test for the assessment of physical fitness was established which employed a fifteen-minute endurance run. Balke concluded that the run gave a valid objective rating of physical fitness.<sup>16</sup>

Two unpublished field studies were carried out at Oklahoma State University in 1963 dealing with endurance run tests. Using eighty-eight boys and eighty girls in the seventh and eighth grades of Cushing, Oklahoma, Junior High School, Glenn correlated scores of the 600-yard run-walk test and the fifteen-minute endurance run test to determine whether the 600-yard run-walk test was a valid test for endurance.<sup>17</sup> Glenn found a definite relationship between the two runs but the correlation was not high enough to validate the 600-yard run-walk as an endurance test.

Newman carried out a study to establish norms for the fifteen-minute endurance run for Kay County, Oklahoma, 4-H Club members.<sup>18</sup> The run test

---

<sup>16</sup> Bruno Balke, A Simple Field Test for the Assessment of Fitness (Oklahoma City, 1963), p. 8.

<sup>17</sup> Dorothy J. Glenn, "A Study of the Validity of the 600-Yard Run-Walk Test as an Endurance Test" (unpub. field study, Oklahoma State University, 1963), p. 1.

<sup>18</sup> Eva Newman, "An Establishment of Local Norms for the Fifteen-Minute Endurance Run for Kay County 4-H Club Boys and Girls Ages 96-227 Months" (unpub. field study, Oklahoma State University, 1963), p. 1.

was given to forty-six boys, thirty-three girls, age eight to fifteen and forty-one boys and forty girls age sixteen to eighteen. The older boys ran further with a mean of 2,744 yards. Next came the older girls with a mean of 2,063 yards. The younger boys' mean was 2,051 yards and the younger girls' was 2,010 yards.

Brown<sup>19</sup> tested 104 boys from Emerson seventh grade at Enid, Oklahoma, on the fifteen-minute endurance run and compared his findings with those of Glenn and Newman. The boys from Cushing had the greatest mean in distance covered with 1.7 miles. The 104 Emerson boys, age eleven to fourteen, tested by Brown, had a mean of 1.64 miles, and the Kay County 4-H Club boys' mean was 1.6 miles.

In a study by Ray,<sup>20</sup> trunk flexibility measurements were taken from a group of boys and girls attending a 4-H Club summer camp near Ponca City, Oklahoma, and compared to Cureton's Multiple Rating Scale of trunk flexibility. Ray's measurements were taken from eighty-eight boys and seventy-four girls, age nine to sixteen. The flexibility means taken from the 4-H groups were quite different from the means presented in Cureton's Multiple Rating Scale. The 4-H Club members were found to be more flexible. This difference is very probably due to the age difference of the groups. Cureton's subjects ages ranged from eighteen to twenty-four years and the 4-H boys' from eleven to eighteen years. It is known that flexibility is generally reduced with age. There may have been a slight

---

<sup>19</sup>William S. Brown, "A Comparison of Kay County 4-H Members, Cushing Seventh and Eighth Grade and Emerson (Enid) Seventh Grade Endurance Run" (unpub. field study, Oklahoma State University, 1964), p. 8.

<sup>20</sup>Howard Ray, "Measuring the Trunk Flexibility of Oklahoma 4-H Club Members" (unpub. field study, Oklahoma State University, 1963), p. 19.

difference due to the point of measurement. Cureton's measurements were made from the floor to the ear lobe of the subject. Ray's measurements were taken from the floor to the chin.

Hetrick<sup>21</sup> compared standing broad jump means of 162 4-H boys and girls to the national means as set up by the AAHPER Research Council. The results showed that the means of the group studied fell consistently short of the national means. The reason for this difference may have been because the subjects studied by Hetrick were given only one trial and the national averages are based on the best of three trials. It was also possible that Hetrick's subjects lacked the proper skill and timing of the arm swing and the jump.

In summary, the procedures employed in the measurement of physical fitness have undergone continual change in this country. Most of the earlier tests were based on measurement of strength, such as the number of sit-ups, chins, or push-ups one could do in a given time. Since Cureton's recognition of the various components of physical fitness, the testing of physical fitness has become more sophisticated. Recent laboratory testing procedures have involved elaborate and expensive equipment which requires much time and highly trained personnel to measure the physical fitness level of even a very small group. This type of laboratory testing is not applicable nor practical for mass testing of large groups by limited personnel and in limited time. In his very recent work with the fifteen-minute endurance run, Dr. Balke has developed a simple field test of physical fitness which is highly correlated with more elaborate

---

<sup>21</sup>Charles Hetrick, "How Do the Scores of The Standing Broad Jump of 4-H Boys and Girls Compare to the National Average?" (unpub. field study, Oklahoma State University, 1963), p. 19.

laboratory testing procedures.

There is still much to be done in the area of physical fitness measurement. There is a great need for valid and reliable physical fitness tests with adequate standards which can be administered efficiently to large groups.

## CHAPTER III

### PROCEDURE

In general, selection of test items used in this study was made on the basis of measurement of the components of physical fitness as described by Cureton. More specifically, the fifteen-minute endurance run was included at the recommendation of Dr. Balke. The other tests were suggested or designed by Dr. A. B. Harrison, Associate Professor of Health, Physical Education, and Recreation at Oklahoma State University with several criteria in mind: ease and rapid measurement for large groups in a station-to-station testing situation, meaningfulness to the subjects being tested, and validity in measuring physical fitness. The forty-yard swim was included because it was the opinion of the director of this study that swimming is an important skill which every child should possess and that this skill could be associated with the individual's fitness level. For each test, a three-point scoring scale was arbitrarily set up so the individuals would have some idea of their rating on each test item.

The following test items were included, along with instructions and scoring procedures.

#### Rope Climb

The rope climb was used as a test for strength. The subject was asked to climb as high as he could up a twenty-two foot rope, two inches in diameter. He was instructed to use his hands and feet while climbing.

He started from a standing position and was given one trial.

For scoring purposes, the rope was marked at the nine, fifteen, and twenty foot height. If the subject did not climb nine feet, his score was zero. If he climbed as high as nine feet but less than fifteen feet, his score was one. If he climbed as high as fifteen feet but less than twenty-two feet, his score was two. If he climbed to the top or twenty-two feet, his score was three.

The rope was further divided into one-foot intervals so that a more accurate measurement could be obtained for establishing standards. The subject had to climb to a mark before he was given credit for that height. For example, if a subject climbed ten feet and nine inches, his recorded height was ten feet.

#### Balance Beam Walk

When testing balance, the subject was instructed to step onto a balance beam at one end and walk, heel to toe, as far down it as he could without stepping off. The balance beam was fifteen feet long, two inches wide, and eight inches high. If he did not complete at least three steps on the balance beam, he was given another trial.

The balance beam was marked off into three equal lengths. If the subject did not walk one-third of the beam's length, his score was zero. If he walked one-third but less than two-thirds, his score was one. If he walked two-thirds but did not make the full length, his score was two. If he walked the entire length of the balance beam, his score was three.

The balance beam was further divided into one-foot lengths so that a more accurate measurement could be obtained for establishing standards. A drawing of the balance beam used in this test is included in Appendix B.

### Flexibility Test

Trunk extension and trunk flexion were used to measure flexibility. To measure trunk extension, the subject assumed a prone position with his hands in the small of his back. He was instructed to raise his chin as far from the floor as possible without jerking. The subject's legs were held down by a partner who placed his hands on the thigh of the subject just below the glutei muscles. Pressure was applied here to keep the subject's hips from raising off the floor. The partner assumed a kneeling position over the subject's heels to hold the subject's feet down.

A sliding caliper was used to measure the distance to which the subject could raise his chin from the floor. The measurements were recorded in inches to the nearest one-fourth inch. If the subject could not raise his chin as high as fourteen inches, his score was zero. If he raised as high as fourteen inches but less than seventeen inches, his score was one-half. If he raised as high as seventeen inches but did not reach twenty inches, his score was one. If he raised his chin twenty inches or more, his score was one and one-half.

To measure trunk flexion, the subject assumed a sitting position on the floor with his legs extended and spread eighteen inches apart at the ankles. His hands were held behind his head. He was then instructed to bend forward, without jerking, and move his forehead as close to the floor as possible. The subject's legs were kept straight by the aid of his partner who knelt at the feet of the subject and pressed down on the subject's knees.

The distance from the subject's forehead to the floor was measured in inches to the nearest one-fourth inch. If the subject's forehead did not get within fifteen inches off the floor, his score was zero. If the

measurement was fifteen inches or less, but not as low as twelve inches, his score was one-half. If the measurement was twelve inches or less, but not as low as six inches, his score was one. If the measurement was six inches or less, his score was one and one-half.

A drawing of the sliding caliper used to measure flexibility is included in appendix B. The test of flexibility used in this study is similar to that described by Dr. Cureton in his Physical Fitness Workbook.<sup>1</sup>

#### Swimming Test

Each subject was timed individually on a forty-yard swim. The subject was allowed to use any stroke he wished. He started standing in shallow water. The command "get-set---go" was used for starting each subject. On the command "get-set", the subject could grab the scum rail with his hand and place his feet against the end of the pool and prepare for a push-off on the command, "go." Each subject was given time to get into this position. The subject was not given any instruction as to the type of stroke to use or to the type of turn to use at the opposite end of the twenty-yard pool; but, he was told to touch the opposite end. When the command "go" was given, a stop watch was started. The watch was stopped when the subject returned and touched the starting end of the pool. The time was recorded in seconds to the nearest tenth of a second.

If the subject could not swim, if he could not swim the full forty yards, or if his time was more than fifty seconds, he received a score

---

<sup>1</sup>T. K. Cureton, Physical Fitness Workbook (St. Louis, 1947), pp. 20-21.

of zero. If his time was fifty seconds or under, but not as low as forty seconds, his score was one. If his time was forty seconds or under, but not as low as thirty-two seconds, his score was two. If his time was thirty-two seconds or less, his score was three.

#### Standing Broad Jump

For this test, a mat four feet by twelve feet was marked off into one-inch lines, parallel to the starting line. The subject stepped onto the mat and stood, toeing the starting line with both feet. He was instructed to jump off both feet as far forward as possible. He was encouraged to swing his arms. If he fell back after jumping, he was given another trial.

The distance jumped, from the starting line to the back of the subject's heels, was measured in inches to the nearest inch. If the subject jumped less than forty-eight inches, his score was zero. If he jumped as far as forty-eight inches but less than sixty inches, his score was one. If he jumped as far as sixty inches but less than seventy-two inches, his score was two. If he jumped seventy-two inches or more, his score was three.

#### Speed and Agility Run

The subject took his position behind a starting line. He was given the command, "get-set---go." He then ran twenty yards, picked up a block of wood (two inches square) and returned to the starting line as fast as possible. After returning to and touching the ground beyond the starting line, he dropped the block he had picked up and returned back over the same course to retrieve a second block. Upon returning to the starting

line the second time, he ran on past that line.

When the command "go" was given, a stop watch was started. When the subject passed over the starting line with the second block, the watch was stopped. The time was recorded in seconds to the nearest tenth of a second.

If the subject's time was more than twenty seconds, his score was zero. If his time was as fast as twenty seconds but slower than eighteen seconds, his score was one. If his time was as fast as eighteen seconds but slower than sixteen seconds, his score was two. If his time was sixteen seconds or less, his score was three.

#### Fifteen-Minute Endurance Run

For the endurance run, a rectangular one-half mile course was staked out on a grass field. The course was marked off into eighty-eight ten-yard intervals. The subjects were started in groups of thirty to fifty and told to go as far as they could in fifteen minutes. They were told to set a pace which they thought they could continue. It was stressed that they should not start out too fast. If they developed a bad side-ache, they could slow down and walk it off.

At the finish of each lap, the subjects were given the remaining time left to run. The number of laps completed was recorded by checkers at the starting line. Each subject had a large number pinned on the front of his shorts to prevent any mixup in the number of laps completed in case of some of the subjects were lapped by others.

After the subjects had been going fifteen minutes, a whistle was blown and all the subjects stopped where they were. The distance they had covered was recorded on their number.

If the subject ran less than one mile, his score was zero. If he ran as far as one mile but less than one and one-half mile, his score was one. If he ran as far as one and one-half miles, but less than two miles, his score was two. If he ran two miles or more, his score was three.

A sample of the score card used by each of the subjects will be included in appendix C. See appendix D for subjects instructions.

#### General Procedure for Administering Test Battery

The station-to-station testing method was used to administer the tests described above. Each of the tests, except the fifteen-minute endurance run, was given a station number. Station one was the rope climb. One tester was used to test two subjects at one time. Station two was the balance beam walk. Two testers were used to test two subjects at one time. Station three was the flexibility test. Four testers were needed at this station, two to measure and two to record. The subjects were tested two at one time. Station four was the forty-yard swim. Five testers were used with four subjects being tested at one time. Four testers were used to start the subject, time, and record the time. A fifth person was used as a checker at the opposite end of the pool. Station five was the speed and agility run. Two testers were used to test two subjects at one time. Station six was the standing broad jump. The subjects were tested two at one time by two different testers.

All of the testers reported to the testing area two hours before the testing was to begin. They were each assigned to a station and instructed individually as to how to administer their assigned test and how to score the subjects. Each tester practiced his procedure on the other testers.

This allowed him sufficient practice at his station and also acquainted the testers with what was being done at the other stations.

The subjects had been previously instructed to bring swim suit, tennis shoes, shorts, T-shirts or blouse, a towel and a doctors permit saying they may participate in a testing program of this type. The subjects first reported to an information table where they were given a score card (see Appendix C) and a sheet of instructions. Each subject recorded his name, age, height, weight, and home town on the score card. Pencils were provided at the table for this purpose. The score cards were each numbered in the upper right corner with a number ranging from one to six. This number indicated which of the six stations the subject was to report for the first test. For example, if a subject was given a score card with a number four on it, that subject reported to station four (or the swimming pool). After completing the swimming test, he then reported to station five, six, one, two and three in that order. After completing each of the six tests, the subject reported to the fifteen-minute run area. When the testers finished at their stations they also reported to the run area to help record the distance ran by each subject. The distance beyond the starting line was recorded on the score card which the participants were wearing pinned to their trunks or shirts. The individual's total distance ran was found by adding this distance to the number of laps which he had completed. The score cards were then collected by the testers and the subjects were released.

This procedure provided easy administration of this test battery to as many as one-hundred participants in a two-hour period. It was felt that as many as two-hundred could have been accommodated, if necessary, in approximately two and one-half hours.

### Analysis of Data

After a brief examination of the results, the subjects were divided into three groups. The boys were divided into two different age groups because of the difference in performances between the older and younger boys. The boys who were fifteen and older were put in one group and those below fifteen made up the younger group. All the girls were placed into the same group because there was very little difference between the results of the younger and older girls. Means and standard deviations were calculated for each group on all the test items except the rope climb and the balance beam walk. Tables of T-scores and standard scores were set up for all the test items except the rope climb and the balance beam walk.

The following rating scales were devised for the interpretation of the individual's overall physical fitness score.

#### Older Boys:

21			Superior
19½	---	20½	Excellent
18½	---	19	Above Average
16½	---	18	Average
14	---	16	Below Average
12	---	13½	Poor
10	---	11½	Very Poor

#### Younger Boys:

20	---	21	Superior
18½	---	19½	Excellent
16½	---	18	Above Average
14½	---	16	Average
12½	---	14	Below Average
10½	---	12	Poor
8	---	10	Very Poor

## Girls:

18	---	21	Superior
16	---	17½	Excellent
13½	---	15½	Above Average
10½	---	13	Average
7½	---	10	Below Average
4½	---	7	Poor
2	---	4	Very Poor

The physical fitness scores of the fifteen best swimmers among all boys were compared with the scores of the fifteen boys who were non-swimmers to test the relationship between the physical fitness level (as measured by these tests) and swimming ability. The scores did not include the swimming score. The means and standard deviations were calculated for the two groups. A t-ratio was calculated to determine significance of difference between the means of the two groups.

The fifteen non-swimmers were also compared to the fifteen poorest swimmers with respect to their physical fitness scores.

The relationship between the swimming speed and the physical fitness level was further tested by correlating the swimming times with the physical fitness scores (minus swim score) of the 111 boys (swimmers) used in this study.

Other comparisons made in this study were:

1. The standing broad jump results of the two groups of Oklahoma 4-H boys were compared with results of the University of Illinois men, Hetrick's results, and the standards presented by the AAHPER Research Council.
2. The trunk extension results of the Oklahoma 4-H boys were compared to the University of Illinois men's results.

3. The trunk flexibility results of the Oklahoma 4-H boys were compared to the results of the University of Illinois men.
4. The fifteen-minute endurance run results of the Oklahoma 4-H boys were compared to the Cushing seventh and eighth grade results, results of Emerson seventh grade of Enid, and Kay County 4-H boy's results.

## CHAPTER IV

### RESULTS

T-scores and standard scores for trunk extension, trunk flexion, forty-yard swim, speed and agility run, standing broad jump, fifteen minute endurance run, and physical fitness scores for each of the three groups are presented in Tables I, II, and III. The mean, standard deviation, and the number of subjects for each of the test items are included at the bottom of the tables.

Table IV shows the results of the rope climb. In the rope climb it was possible for a subject to get a perfect score or climb to the top of the rope. This did not result in a continuous distribution of the scores. For this reason, no attempt was made to compute T-scores or standard scores on this test.

TABLE I  
STANDARDS FOR BOYS FIFTEEN AND OLDER

Rating	Standard Score	T Score	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standard Broad Jump in Inches	15 Minute Endurance Run in Yards	Score
Superior	100	80	26.50	1.75	19.5	12.6	109	4770	24.5
	95	77	25.50	2.50	21.6	12.9	107	4620	23.5
	90	74	24.75	3.50	23.6	13.3	104	4470	23.0
Good	85	71	23.75	4.50	25.6	13.6	101	4320	22.0
	80	68	22.75	5.25	27.6	14.0	98	4170	21.5
	75	65	22.00	6.25	29.7	14.3	95	4020	21.0
Above Average	70	62	21.00	7.00	31.7	14.7	92	3870	20.0
	65	59	20.00	8.00	33.7	15.0	89	3720	19.5
	60	56	19.25	9.00	35.7	15.4	86	3570	18.5
	55	53	18.25	9.75	33.7	15.7	83	3420	18.0
Average	50	50	17.25	10.75	35.7	16.1	80	3270	17.5
Below Average	45	47	16.50	11.75	37.8	16.4	78	3120	16.5
	40	44	15.50	12.50	39.8	16.8	75	2970	16.0
	35	41	14.50	13.50	41.8	17.1	72	2820	15.5
	30	38	13.50	14.50	43.8	17.5	69	2670	14.5
Poor	25	35	12.75	15.25	45.9	17.8	66	2520	14.0
	20	32	11.75	16.25	47.9	18.2	63	2370	13.0
	15	29	11.00	17.00	49.9	18.5	60	2220	12.5
Very Poor	10	26	10.00	18.00	51.9	18.9	57	2070	12.0
	5	23	9.00	19.00	54.0	19.2	54	1920	11.0
	0	20	8.00	19.75	56.0	19.6	51	1770	10.5
Mean			17.30	10.74	35.75	16.08	80.46	3271	17.35
Sigma			3.08	3.02	5.75	1.16	9.65	500.15	2.32
Number of Subjects			54	53	50	54	54	54	49

TABLE II  
STANDARDS FOR BOYS BELOW AGE FIFTEEN

Rating	Standard Score	T Score	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standard Broad Jump in Inches	15 Minute Endurance Run in Yards	Score
Superior	100	80	24.00	.75	61.5	14.0	98	4286	21.5
	95	77	23.25	1.75	59.5	14.3	95	4162	21.0
	90	74	22.50	2.75	57.4	14.6	93	4038	20.0
Good	85	71	21.50	3.50	55.3	14.9	90	3914	19.5
	80	68	20.75	4.50	53.3	15.2	88	3790	19.0
	75	65	20.00	5.50	51.3	15.5	85	3660	18.5
Above Average	70	62	19.25	6.50	49.1	15.8	82	3540	18.0
	65	59	18.50	7.50	47.1	16.1	78	3418	17.0
	60	56	17.50	8.25	45.0	16.5	77	3294	16.5
	55	53	16.50	9.25	42.9	16.8	75	3170	15.5
<b>Average</b>	50	50	16.00	10.25	41.00	17.1	72	3046	15
Below Average	45	47	15.25	11.25	38.8	17.4	70	2922	14.5
	40	44	14.50	12.00	36.7	17.7	67	2798	13.5
	35	41	13.75	13.00	34.7	18.0	64	2674	13.0
	30	38	12.75	14.00	32.6	18.3	62	2550	12.5
Poor	25	35	12.00	15.00	30.5	18.6	59	2426	12.0
	20	32	11.25	15.75	28.5	18.9	57	2302	11.0
	15	29	10.50	16.75	26.4	19.2	54	2178	10.5
Very Poor	10	26	9.75	17.75	24.3	19.5	52	2054	10
	5	23	9.00	18.75	22.3	19.9	49	1930	9.5
	0	20	8.00	19.75	20.2	20.2	46	1806	8.5
Mean			16.04	10.21	40.88	17.08	72.17	3046	15
Sigma			2.64	3.14	6.89	1.03	8.60	414.45	2.13
Number of Subject			77	77	64	76	76	75	61

TABLE III  
STANDARDS FOR GIRLS

Rating	Standard Score	T Score	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standard Broad Jump in Inches	15 Minute Endurance Run in Yards	Score
Superior	100	80	27.75	2.00	23.5	14.0	88	3385	20.0
	95	77	26.75	2.75	25.8	14.4	86	3280	19.0
	90	74	25.75	3.50	28.0	14.9	83	3180	18.5
Good	85	71	24.75	4.25	30.3	15.3	80	3075	17.5
	80	68	23.75	5.00	32.5	15.7	78	2970	16.5
	75	65	22.75	5.75	34.8	16.1	75	2865	15.5
Above Average	70	62	21.75	6.50	37.0	16.5	72	2760	15.0
	65	59	20.75	7.25	39.3	16.9	69	2660	14.0
	60	56	19.75	8.04	41.5	17.3	67	2555	13.0
	55	53	18.75	8.75	43.7	17.7	64	2450	12.0
Average	50	50	17.75	9.50	46.0	18.1	62	2345	11.5
Below Average	45	47	16.75	10.25	48.0	18.5	59	2240	10.5
	40	44	15.75	11.00	50.5	18.9	56	2140	9.5
	35	41	14.75	11.75	52.7	19.3	54	2035	8.5
	30	38	13.75	11.5	55.0	19.7	51	1930	8.0
Poor	25	35	12.75	13.25	57.2	20.2	48	1825	7.0
	20	32	11.75	14.00	59.5	20.6	46	1720	6.0
	15	29	10.75	15.00	61.7	21.0	43	1620	5.0
Very Poor	10	26	9.75	15.75	64.0	21.4	40	1515	4.5
	5	23	8.75	16.50	66.2	21.8	38	1410	3.5
	0	20	7.75	17.25	68.5	22.2	35	1305	2.5
Mean			17.75	9.56	46	18.12	61.59	2396	11.34
Sigma			3.31	2.54	7.49	1.36	8.88	347.16	2.90
Number of Subjects			68	68	35	66	68	67	37

TABLE IV  
RESULTS OF ROPE CLIMB (IN FEET)

Group	Number of Subjects	No. Climbed to Top	Standard Deviation	Mean	Could Not Start Up Rope
Boys - 15 and Older	50	47	2.42	21.25	0
Boys - be- low 15 yrs.	75	50	3.71	19.69	0
Girls	65	6	Not Calculated	Not Calculated	24
Total	190	103			

Ninety-four per cent of the older boys climbed to the top of the rope. This indicated a high level of arm and shoulder strength among this group. Sixty-six per cent of the younger boys and only nine per cent of the girls climbed to the top. Thirty-seven per cent of the girls could not start up the rope. Part of their problem was that they could not grip the rope tightly enough to hold their own weight and their arms were not strong enough to pull their body up. This indicated a particular weakness of the girls in their hands and arms. There are no standards with which these results can be compared, however, it is believed by the author that the older boys would be above average in arm strength and that the girls lack the desirable hand, arm, and shoulder strength for good fitness.

Table V shows the results of the balance beam walk.

As in the rope climb, no attempt was made to produce standards for the balance beam walk because here again it was possible for a subject to get a perfect score and there was not a continuous distribution of the

scores. Ninety per cent of the subjects walked the full length of the balance beam.

TABLE V  
RESULTS OF THE BALANCE BEAM WALK (IN FEET)

Group	Number of Subjects	Number Walked Total Length	Standard Deviation	Mean
Boys - 15 and Older	54	53	.809	11.77
Boys - below 15 yrs.	77	71	1.98	11.45
Girls	68	56	2.77	10.79
Total	199	180		

As measured by this test, the older boys possessed the highest degree of balance. Although this test did not provide a continuous distribution of the scores, it is believed that it was a reliable test of balance. A better spread of scores would have resulted if a more difficult test had been used. A recommended test would be to have the subject walk heel and toe down the beam, turn around, walk half way back, kneel down, stand, and then return to the starting end. As measured by the test used, the subjects rated high in balance ability.

Table VI shows the results of the trunk extension test.

The girls scored best on the trunk extension test. This was expected because girls are generally more flexible than boys. It was also expected that the younger boys would be more flexible than the older boys, however, this was not the case. The older boys scored better on the trunk

extension than the younger boys. This may have been due to stronger lower back muscles possessed by the older boys.

The two groups of boys were compared with the standards for the University of Illinois freshman men students. The Oklahoma 4-H boys possessed a higher level of flexibility. This comparison is shown in Graph 1.

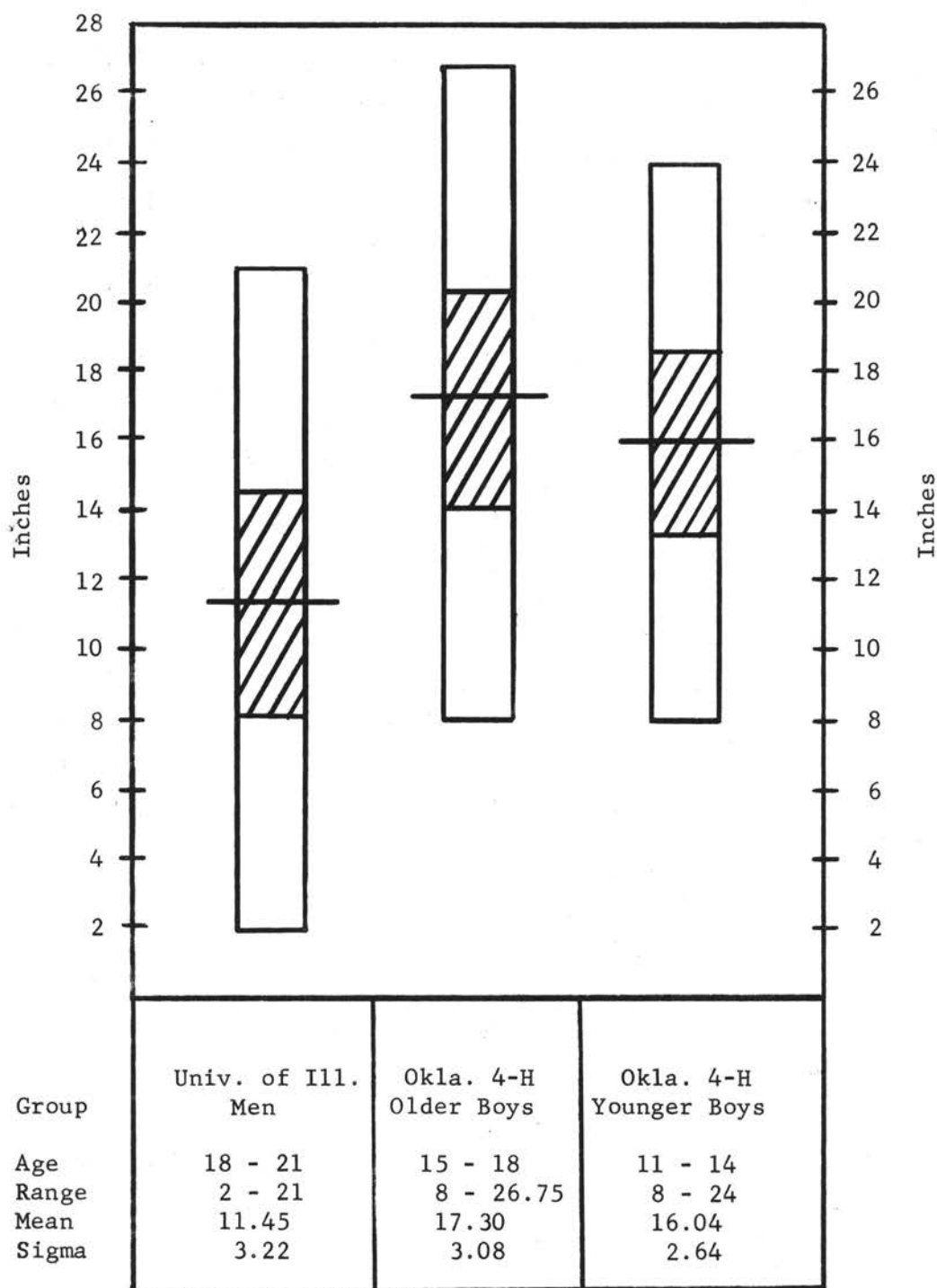
TABLE VI  
RESULTS OF TRUNK EXTENSION (IN INCHES)

Group	Number of Subjects	Best	Poorest	Standard Deviation	Mean
Boys - 15 and Older	54	24.50	10.75	3.08	17.30
Boys - be- low 15 yrs.	77	21.25	6.00	2.64	16.04
Girls	68	26.75	9.75	3.31	17.75
Total	199				

Table VII shows the results of the trunk flexion test. The girls scored best on this test and the younger boys scored better than the older boys. When compared to the University of Illinois freshman men (Graph 2) the 4-H boys were found to be more flexible.

GRAPH I

## COMPARISON OF TRUNK EXTENSION SCORES



GRAPH 2

## COMPARISON OF TRUNK FLEXION SCORES

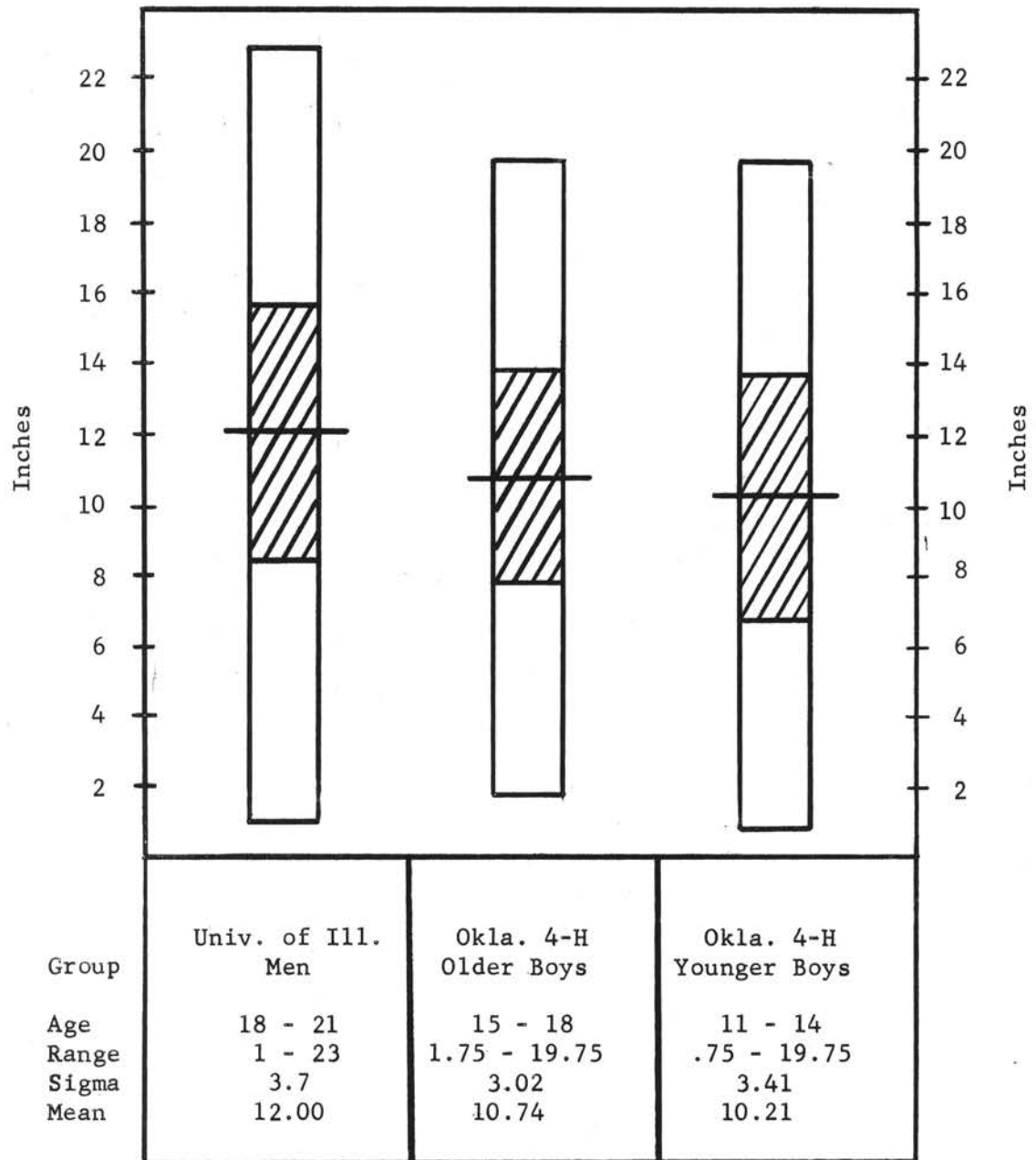


TABLE VII  
RESULTS OF TRUNK FLEXION (IN INCHES)

Group	Number of Subjects	Best	Poorest	Standard Deviation	Mean
Boys - 15 and Older	53	4.25	17.25	3.02	10.74
Boys - be- low 15 yrs.	77	4.00	18.75	3.14	10.21
Girls	68	5.5	16.25	2.54	9.56
Total	198				

TABLE VIII  
RESULTS OF THE FORTY YARD SWIM (IN SECONDS)

Group	Best Time	Standard Deviation	Mean	Number of Swimmers	Number of Non-Swimmers
Boys - 15 and Older	26.7	6.75	35.75	50	4
Boys - be- low 15 yrs.	30.4	6.89	40.88	65	12
Girls	35.8	7.49	46.00	40	28
Total				155	44

Table VIII shows the results of the forty-yard swim. It is the authors opinion that these subjects were below average in swimming ability. Twenty-two per cent of the subjects were non-swimmers. The greatest number of non-swimmers per group was among the girls with forty-eight per cent of the girls being non-swimmers. This lack of swimming

skill is probably due to a lack of swimming facilities in the rural areas from which most of these subjects came.

A comparison was made of the physical fitness scores made by the fifteen best swimmers among the boys and the fifteen boys who were non-swimmers. The fifteen best swimmers had a mean physical fitness score of 15.4, not including their swimming score. The fifteen boys who were non-swimmers had a mean physical fitness score of 13.17. The t-ratio for the difference of these means was 2.74. This is significant at the five per cent level. This indicates that the fifteen best swimmers, among the boys, were more physically fit than the boys who were non-swimmers. A comparison between the fifteen non-swimmers and the fifteen poorest swimmers showed the means of physical fitness scores to differ only .03. The fifteen poorest swimmers mean physical fitness score was 13.20.

Using the physical fitness scores and the swimming times of all the 111 boy swimmers, a correlation was computed to determine the relationship between swimming ability and physical fitness scores. The scores did not include the swimming score. The correlation was found to be  $-.329$  which indicates that the lower the swimming time, the higher the level of physical fitness. With this many subjects, this relationship is significant at the one per cent level of confidence.<sup>1</sup> This gives further justification for including a swim test as part of a physical fitness test battery.

---

<sup>1</sup>George W. Snedecor, Statistical Methods (Ames, Iowa, 1957). p. 174.

TABLE IX  
RESULTS OF SPEED AND AGILITY RUN (IN SECONDS)

Group	Number of Subjects	Best Time	Poorest Time	Standard Deviation	Mean
Boys - 15 and Older	54	13.6	18.7	1.16	16.08
Boys - be- low 15 yrs.	76	15.0	20.0	1.03	17.08
Girls	66	16.2	22.8	1.36	18.12
Total	196				

Table IX shows the results of the speed and agility run.

The older boys as a group had the fastest times in the speed and agility run. The younger boys followed and the girls had the slowest times.

To compare the eighty yard speed and agility run used in this test to the AAHPER forty-yard shuttle run, several subjects were given both of the tests and the difference between the individuals times on each test was found. The difference was then added to the national standards for the forty-yard shuttle run and compared to the results of the Oklahoma 4-H boys and girls speed and agility run averages. The younger boys had the same average as the national standards after the correction had been made. The older boys and the girls were above the national average.

TABLE X  
RESULTS OF THE STANDING BROAD JUMP (IN INCHES)

Group	Number of Subjects	Best Jump	Poorest Jump	Standard Deviation	Mean
Boys - 15 and Older	54	102	62	9.65	80.46
Boys - be- low 15 yrs.	76	94	52	8.60	72.17
Girls	68	86	39	8.88	61.95
Total	198				

Table X shows the results of the standing broad jump.

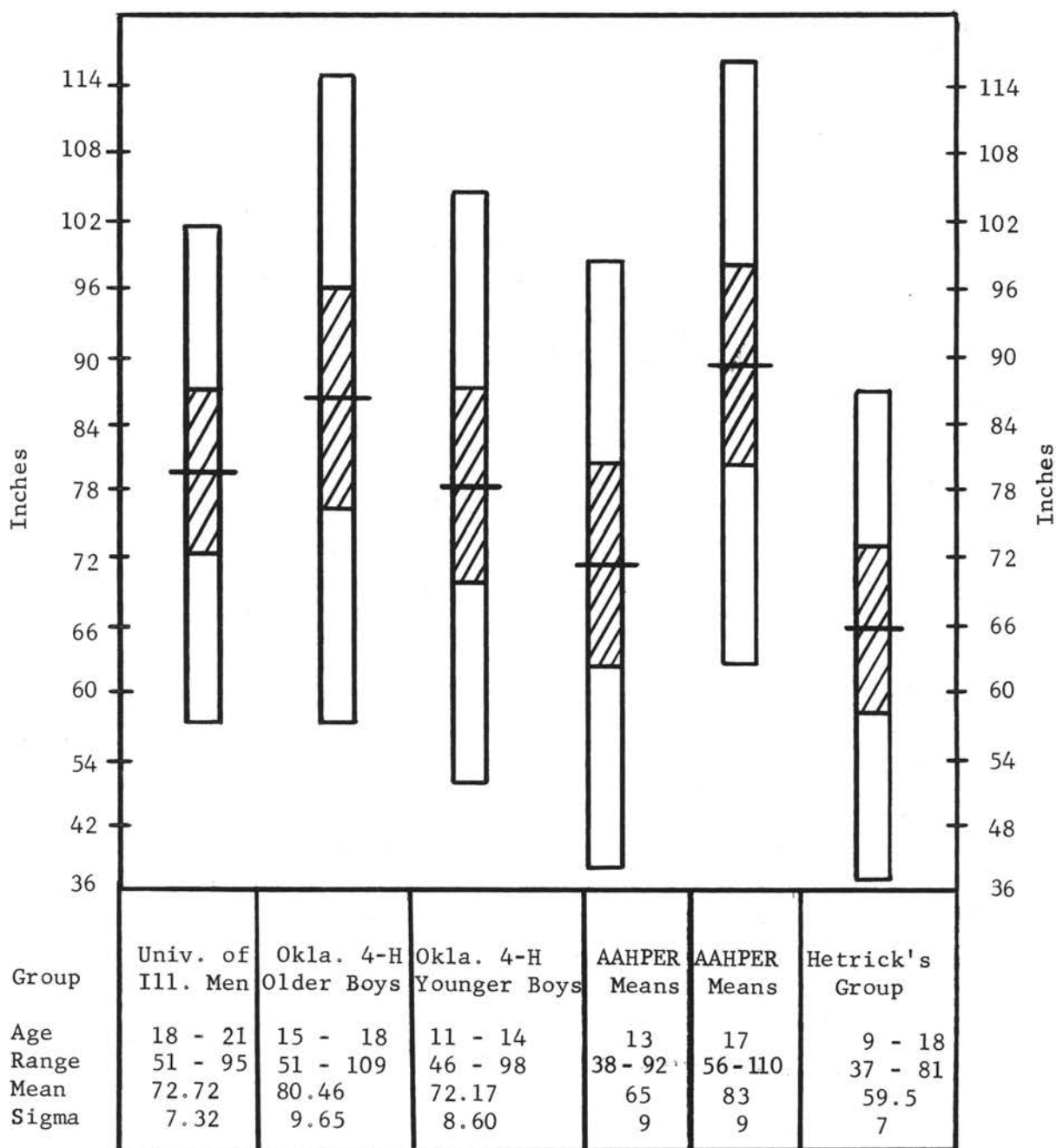
The group with the best standing broad jump score was the older boys with a mean distance of 80.46 inches. The group boys mean was 72.17 inches and the girls was 61.95. When compared to the AAHPER means for seventeen year old boys, the older 4-H boys were two and one-half inches short of the national standards. However, the older 4-H boys mean age was not seventeen so this group compared very closely to the national averages. The younger group of 4-H boys was compared to the AAHPER averages for thirteen year old boys and their mean distance was seven inches farther than the national averages. Both groups of boys scored higher than the subjects studied by Hetrick.<sup>2</sup> The older boys had a greater mean distance jumped than the mean of the University of Illinois freshmen men. The boys' broad jump ability was slightly higher than the national averages. See Graph 3 for comparisons.

---

<sup>2</sup>Hetrick, p. 19.

GRAPH 3

## COMPARISON OF STANDING BROAD JUMP SCORES



The girls standing broad jump mean was slightly higher than the national averages for seventeen year old girls. This indicates that the group of 4-H girls are considerably above the national average for a similar age group.

TABLE XI  
RESULTS OF THE FIFTEEN-MINUTE ENDURANCE RUN (IN YARDS)

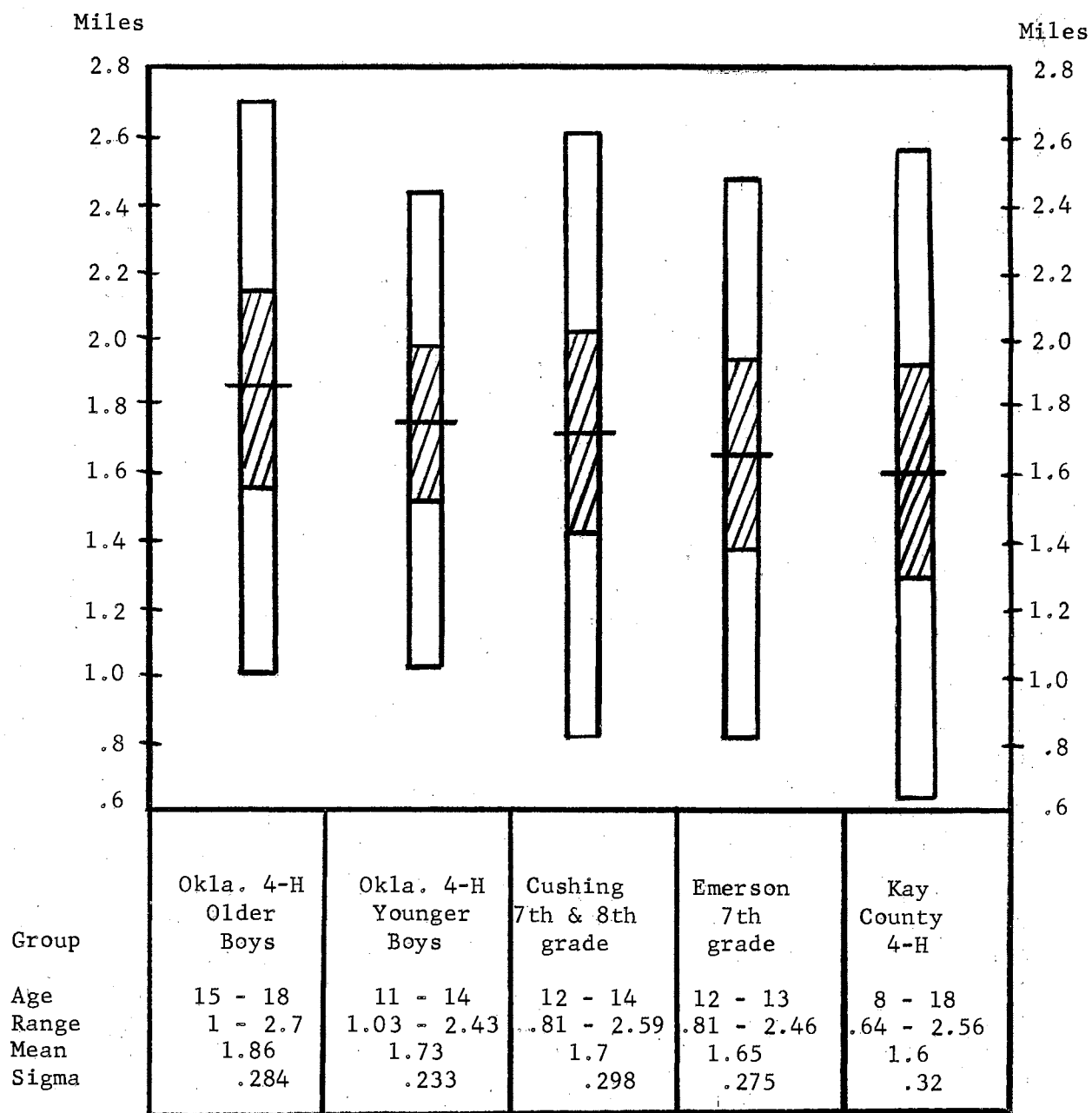
Group	Number of Subjects	Longest Run	Shortest Run	Standard Deviation	Mean
Boys - 15 and Older	54	4030	1860	500.15	3271
Boys - be- low 15 yrs.	75	3970	1785	414.43	3046
Girls	67	3005	1330	347.16	2346
Total	196				

Table XI shows the results of the fifteen-minute endurance run.

As a group the older boys had the best performance in the fifteen minute endurance run and the girls had the poorest performance. The younger boys mean distance ran was only 225 yards less than the older boys mean. The girls mean was seven hundred yards shorter than the younger boys mean. When compared to Cushing seventh and eight grade, Emerson seventh grade of Enid, and the Kay County 4-H Club boys, both groups of 4-H boys in this study were found to be superior in the endurance run. The average velocity per minute was 199.4 meters for the older boys and 185.7 meters for the younger boys. When compared to Balke's

GRAPH 4

## COMPARISON OF FIFTEEN MINUTE ENDURANCE RUN SCORES



rating for velocities in meters per minute,<sup>3</sup> the older boys rated very good and the younger boys rated good. With respect to number of subjects that finished the fifteen-minute endurance run, this was an exceptional group. Only two of the 198 subjects who started the run stopped before fifteen minutes were up, although many did walk at some time during the run. See Graph 4 for comparisons.

TABLE XII  
PHYSICAL FITNESS SCORES

Group	Number of Subjects	Best Score	Poorest Score	Standard Deviation	Mean
Boys - 15 and Older	49	20	7	2.32	17.35
Boys - be- low 15 yrs.	61	19	10.5	2.13	15
Girls	37	17.5	6	2.90	11.34
Total	141				

Table XII shows the results of the subject's overall physical fitness scores as determined by adding the scores of the seven individual test items. When calculating this table, a subject's score was not included if he did not take all the test items.

<sup>3</sup>Balke, p. 8.

TABLE XIII  
OVERALL PHYSICAL FITNESS STANDARDS

Classification	Boys 15 years and over	Boys under 15 years	Girls
Superior	21	20 - 21	18 - 21
Excellent	$19\frac{1}{2}$ - $20\frac{1}{2}$	$18\frac{1}{2}$ - $19\frac{1}{2}$	16 - $17\frac{1}{2}$
Above Average	$18\frac{1}{2}$ - 19	$16\frac{1}{2}$ - 18	$13\frac{1}{2}$ - $15\frac{1}{2}$
Average	$16\frac{1}{2}$ - 18	$14\frac{1}{2}$ - 16	$10\frac{1}{2}$ - 13
Below Average	14 - 16	$12\frac{1}{2}$ - 14	$7\frac{1}{2}$ - 10
Poor	12 - $13\frac{1}{2}$	$10\frac{1}{2}$ - 12	$4\frac{1}{2}$ - 7
Very Poor	10 - $11\frac{1}{2}$	8 - 10	2 - 4

The standards of overall physical fitness scores presented in Table XIII were based on the performance of the 199 4-H members tested at the 1963 Round-up. There were a total of 21 possible points on the entire test if the participant made maximum scores on each test item. It is recommended that these standards be used for future testing with this test battery.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

This study was undertaken to administer a battery of tests which would assess the physical fitness level of Oklahoma 4-H Club members and provide standard scores for this group on the tests used. A subproblem was to compare the scores of the Oklahoma 4-H Club youths with those of other groups on selected fitness items.

One hundred and ninety-nine Oklahoma 4-H Club boys and girls were tested on a battery of seven physical fitness tests. The test items included a rope climb test for strength, balance beam walk for balance, trunk extension and trunk flexion as a measure of flexibility, forty yard swim test, speed and agility run test, standing broad jump test for leg power, and a fifteen minute endurance run test. For the establishment of standards, the subjects were divided into three groups: older boys - age fifteen and older; younger boys - age below fifteen; and girls. Standards were established for each of the three groups

Based on the results of the seven test items and the comparisons of these results with the results of similar studies, it was considered that:

1. As compared to the national averages established by the AAHPER and results of other studies, the overall physical fitness level of the Oklahoma 4-H boys and girls appeared to be adequate. There were some strengths and weaknesses evident in the various groups on certain test items.

2. This group showed particular strengths in endurance, flexibility, speed and agility, and weakness in swimming.

3. The boys were above average and the girls below average in strength.

4. The boys and girls rated high in balance ability.

5. All three groups were above average in flexibility.

6. The subjects were, as a group, below average in swimming ability with twenty-two per cent of the entire group and forty-eight per cent of the girls being non-swimmers.

7. The boys and girls were above average in speed and agility.

8. The girls and younger boys were above the national average and the older boys slightly below the national average in the standing broad jump.

9. The boy and girls were above the average of all other groups to which they were compared on the fifteen minute endurance run.

### Recommendations

1. Future studies with the purpose of establishing standards should involve more subjects if possible.

2. Rather than testing subjects who volunteered, more accurate standards would be established if entire groups (i.e., a school population) were tested. A representative group such as this would be more likely to include the entire range of possibilities of a normal distribution.

3. It is recommended that the strength test be revised to include a rope climb to be timed.

4. It is recommended that the balance test be revised and made more difficult so that a more continuous range of scores would result. A recommendation would be to have the subject walk heel and toe down the beam, turn around, walk half way back, kneel down, stand, and return to the starting end.

### SELECTED BIBLIOGRAPHY

1. AAHPER Youth Fitness Test Manual. Washington, D.C.: American Association for Health, Physical Education and Recreation, 1958.
2. Balke, Bruno. A Simple Field Test For The Assessment of Physical Fitness. St. Louis: The C. V. Mosly Company, 1947.
3. Blesh, T. E. and Meyers, C. R., Measurement in Physical Education. New York: The Ronald Press Company, 1962.
4. Bovard, John F., Cozens, Frederick W. and Hagman, Patricia. Tests and Measurements in Physical Education. Philadelphia: W. B. Sanders Company, 1949.
5. Brown, William S. "A Comparison of Kay County 4-H Members, Cushing Seventh and Eighth Grade, and Emerson (Enid) Seventh Grade Endurance Run." Unpublished Field Study, Oklahoma State University, 1964.
6. Cureton, Thomas K. Physical Fitness Appraisal and Guidance. St. Louis: The C. V. Mosly Company, 1947.
7. \_\_\_\_\_. Physical Fitness of Champion Athletes. Urbana, Illinois: University of Illinois Press, 1951.
8. \_\_\_\_\_. Physical Fitness Workbook. St. Louis: The C. V. Mosly Company, 1947.
9. Glenn, Dorothy J. "A Study of the Validity of the 600-Yard Run-Walk Test as an Endurance Test." Unpublished Field Study, Oklahoma State University, 1963.
10. Hall, D. M. Keeping Fit Handbook For Leaders. Urbana, Illinois: Extension Service in Agriculture and Home Economics - University of Illinois, 1962.
11. \_\_\_\_\_. "What is a Good Physical Fitness Program?" The Physical Educator, XVIII (October, 1961), 94.
12. Hetrick, Charles. "How Do The Scores of The Stnading Broad Jump of 4-H Boys and Girls Compare to The National Average?" Unpublished Field Study, Oklahoma State University, 1963.

13. Kraus, Hans and Hirschland, Ruth P. "Minimum Muscular Fitness in School Children." Research Quarterly, XXV (May, 1954), p. 178.
14. Newman, Eva. "An Establishment of Local Norms for The Fifteen-Minute Endurance Run for Kay County 4-H Club Boys and Girls Ages 96-227 Months." Unpublished Field Study, Oklahoma State University, 1963.
15. Ray, Howard. "Measuring the Trunk Flexibility of Oklahoma 4-H Club Members." Unpublished Field Study, Oklahoma State University, 1963.
16. Sargent, D. A. "Intercollegiate Strength Test." American Physical Education Review, II (December, 1897), 216.
17. Snedecor, George W. Statistical Methods. Ames, Iowa: The Iowa State College Press, 1947.
18. The New York State Physical Fitness Test: For Boys and Girls Grades 4-12. Albany, New York: State Education Department, 1958.

# APPENDIX A

## Raw Data

### Older Boys

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
TJ	186	123	66	22	12	14.25	10.25	31.6	15.3	78	4030	19.5
JK	203	130	60	22	12	19.75	6.75	34.1	16.4	90	3340	17.5
JQ	201	140	66	22	12	14	8.75	33.5	15.8	86	3470	17.5
KG	180	110	67	22	12	16	14	37.8	17.5	74	3410	16
JN	187		65	22	12	18	8.5	33.9	15.8	73	2770	19
JH	183	160	70	22	6	17.75	15	30.3	17.5	73	3110	13.5
RH	192			22	12	21.5	11.75	58.8	16.2	88	3160	15.5
DC	186	106	62	22	12	12.75	11.25	49.5	17	70	3350	14.5
LI	205	145	70	16	12	12.5	13.5	43.9	17	62	2375	13
JB	180	135	69	22	12	19.75	13	28.1	16.5	77	3655	15.5
JB	189	218	62	22	12	17.5	13	39.1	16.2	81	2720	16.5
NV	182	115	69	22	12	15.5	13.5	31.2	16.5	68	3535	17
LK	189	110	67	22	12	17.5	12	38.7	15.6	72	3620	19
DP	194	143	69	22	12	17.25	15	37.5	15.8	88	3565	18
SF	216	150	69	22	12	15.5	12.5	37.9	16	92	3440	17.5
JM	191	95	62	22	12	16.25	13	37.4	16	78	3760	18
DW	190	145	71	22	12	11.5	12	34	15.6	74	3220	17
CK	180		67		12	16.5	15.75	35.6	15.6	70	3745	15.5

Raw Data  
Older Boys (Continued)

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
JB	189	130	66	22	12	19.25	9.75	28.2	16.3	73	3715	19
JV		122	64	22	12	13	12.5		17.7	75	3080	13.5
JW	183	120	67	22	12	16	4.75	38.6	16.4	78	3665	19
JS	180	101	62	8	12	14.25	13.75		18.7	53	1920	7
CT	187	128	66	22	12	21	7	34	15.5	93	3160	19
DR	182	149	70	22	12	19.25	11.25	30.2	15.5	79	1860	18
DZ	214	133	71	22	12	16.25	11.25	28.4	15.8	89	2950	19
CP	195	140	71	22	12	11.75	14.25		15.5	84	2710	14.5
ME	201	110	63	22	12	18.5	9	33	17.5	78	2920	17
WR	192	142	67	22	12	20.5	11.25	34.5	17.4	82	3470	17.5
MR	196	127	65	22	12	12.5	10	30.3	15.5	91	3770	19
JS	216	155	70	22	12	17	8	35	16.4	82	3010	17.5
HW	196	157	77	22	12	19.25	11.25	33.5	18	75	3190	17
DS	182	134	68	15	12	16	17.25	39.8	16.2	72	2710	14.5
JK	204	194	72	22	12	20	10.25	43.5	15.9	85	2850	17.5
KF	181	130	63	22	12	20.5	4.5	60.3	16.2	82	3140	16
AE	182	103	60	22	12	17.5	9.75	41.4	17.8	64	19.25	14
JD	197	135	69	22	12	19.75	12.5	38	15.9	76	3390	17.5

Raw Data  
Older Boys (Continued)

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
TH	220	140	68	22	12	15.25	6.5	35	15	97	3570	19
HM	204	150	75	17	12	19.25		30	13.6	76	2440	17.5
FF	197	137	68	22	12	13.75	7.25	31.6	15.5	96	3870	20
RS	193	147	70	22	12	21.5	11.25	26.7	15.2	87	3500	19.5
JM	210	167	72	22	12	24.5	10.5	28	15	85	3505	19.5
WJ	189	125	65	22	12	17.75	9.5	31	15.5	87	3615	20
PB	204	150	68	22	12	20	2.75	39.5	15.5	95	3570	20
JW	202	157	68	22	12	18.25	10.5	30	15	88	3550	20
RP	206	128	67	22	12	19	8.5	31.6	15.1	90	3775	20
RC	188	130	68	22	12	17.75	12.5	31.1	14.9	88	3785	19.5
KA	190	97	66	19	12	16.5	9.75	31.8	17.5	64	3910	16.5
DB	214	135	66	22	12	23.5	10.5	39.2	15.3	84	3480	18.5
PG	180	137	68	17	12	19	11.25	40.1	15.8	79	3265	16
RM	185	109	61	22	12	15.75	8	39	16.8	72	3260	17
LM	194	140	69	22	12	10.75	14.5	32	15	88	3615	15.5
DC	188	125	67	22	12	15.25	13.5	30.9	16.3	87	3735	18
RD	213	150	70	22	12	19	10.5	38.5	15.4	102	3480	18
RH	198	150	67	22	12	21.5	4.25		16.5	75	3020	10

Raw Data  
Younger Boys

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
GH	174	130		12	12	13	4.5	35	17.5	78	2635	13.5
SB	174	130	69	22	12	18.75	6.75	40.2	16.6	66	3500	15.5
JD	166	133	66	18	12	18.5	12.5	35	16	81	3350	17
VB	172	128	63	22	12	18	10.25	31	17	76	3400	17.5
RH	161	142	67	22	12	18.5	9	29.8	16.2	85	2810	18
RJ	164	115	67	22	7	16	9.75	37.1	16.9	78	3570	15.5
JW	163	96	60	22	12	14	9.25	34.1	17.1	59	3030	12.5
DH	176	120	70	22	12	9	17.75	56	17	80	3023	11
DH	164	85	70	22	12	11.5	8	48.7	17.4	79	2655	15.5
DP	164	88	61	11	12	15.25	10.25	41.2	17.8	60	3730	11.5
EN	164	110	62	22	12	16.5	9	41.2	19.5	72	3030	14.5
TK	177	148	69	22	12	13.75	19		16.5	94	3110	14.5
JE	169	145	69	22	12	19.5	14	41.5	16.8	68	3230	14.5
CE	162	116	62	13	12	16.25	8.5	43	19.2	57	3360	10.5
DC	186	106	62	22	12	12.75	11.25	49.5	17	70	3350	14.5
LL	174	132	67	22	12	19.5	15	45	16.4	66	2760	14.5
PM	168	110	65	13	12	18.75	10	46.1	17.8	71	2685	13
RP	168	115	63	22	12	18.25	7.75	43	16.5	76	3730	16.5

Raw Data  
Younger Boys (Continued)

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
TA	165	101	63	22	12	13.75	12		17.6	66	3410	13.5
JH	156	100	62	22	12	17.75	9.5	38.4	17.2	65	2380	15
DV	168	98	62	22	12	15.5	7.5		17.5	70	3180	14
TC	175	138		22	12	18.5	18.75	38.6	17.8	72	2490	15
CB	168	117	61	22	12	17.25	14.5		17.5	63	2865	13.5
DH	174	150	69	22	12	15.25	11	36	15.9	92	2840	17.5
JL	164	98	60	22	12	19.5	10	46.4	15.1	81	3275	17
TB	166	123	72	22	3	15.5	14	34.3	16.8	78	3070	13
GG	172	115	68	22	12	15.5	15.75	44.8	17	76	3120	15
BM	165	150	68	19	12	18	10	36	18.3	72	2950	14
PG	165	125	66	22	12	21.25	7.25	35	16.6	80	3795	19
AE	164	112	62		12	16.25	11	53	20	54	2520	8
RG	174	120	67	10	12	6.25	10.75		17.1	62	2500	10
CD	144	123	60		12	15.75	5.75	43	18.7	77		10
AL	161	107	64	15	12	13	7.75	52.1	17.2	65	2760	12.5
GH	171	90	61	22	12	15.25	4.5	46	17.6	73	2800	16
RM	167	115	63	22	12	14.5	6.75	39.9	17	76	2810	16
WL	144	86	58	22	12	11.75	7.25		18	72	2410	13

Raw Data  
Younger Boys (Continued)

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
TP	174	87	59	22	12	12.75	8.25	39.5	17.2	61	3450	15
MS	168	138	66	16	12	18	14.5	41.7	16	77	3230	15.5
HD	172	110	65	22	12	15.5	9.25	46.5	17.1	72	3170	15.5
BP	172	125	64	10	12	16	10.5	45.9	18.8	54	2765	10.5
MW	171	97	61	22	12	15.75	6.5	33	17.8	72	2780	17
TJ	164	118	62	15	12	14	11.25	41.7	17.5	67	3390	13.5
RH	167	145	69	22	12	15.25	7.75	43	15.1	80	3070	16.5
JH	176	133	65	22	12	20	15.5		15.6	80	2465	15
ML	174	84	59	22	12	16.5	11.75	61	17.8	60	3330	13.5
LD	161	115	63	16	4	16	9	40	17.9	77	3025	12.5
LL	164	139	65	16	12	17.5	8.75	39.8	16.6	66	2150	14
SK	174	144	69	13	12	16.25	11.25	57	17.6	52	3450	11
TH	163	115	63	19	12	18.25	8.25	51.5	17.8	5.5	2515	11
RC	156	123	68	22	12	16.75	14.75	46.8	16.3	70	2850	14.5
SC	167	140	68	22	12	17.5	3.25	34.5	17	84	3020	17.5
DD	161	68	55	22	12	15.25	8	41.8	16.3	68	3260	15
CW	162	144	71	19	12	17.5	8.25	36.7	16.2	70	2400	16
MM	176	165	72	18	3	20.5	9.25	38	16	66	3340	13.5

Raw Data  
Younger Boys (Continued)

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
JS	156	140	67	22	12	15	12.75	41.6	16.6	84	3105	15.5
GO	156	119	63	16	12	14.25	8.25	39.4	18	60	1785	12.5
DR	161	111	61	18	12	14.5	9.5				3110	8.5
DF	167	134	69	22	12	14.75	11	48.1	16	70	3055	15.5
PL	168	125	68	15	12	14.75	9.75	3.82	16.4	76	3230	15.5
TD	159	135	68	21	12	16	13.75	32.5	15.2	74	3110	15
EA	173	110	66	22	12	15.25	10	48.1	16.4	74	3320	15.5
DL	162	125	65	22	12	19.75	10.25	31	15	92	3260	19
WE	164	110	66	22	12	17	7.25		18.1	71	3235	13.5
JH	175	110	66	22	12	20.75	10.50	30.4	15.2	83	3570	20.5
TM	176	115	61	17	12	13.25	11		17.5	60	3970	13
DH	168	115	68	22	9	14	11.75	29.9	16.5	72	3440	16.5
DD	161	170	72	13	4	17.25	11.75	35	16.3	80	2705	13
KH	165	116	62	10	12	17.25	8	36.5	19.8	70	2370	12
FB	166	85	61	22	12	12.25	13.5	43.4	17.4	68	3180	13.5
SF	144	83	65	22	12	13.75	12	47	19	65	3145	13.5
RL	170	145	69	22	12	18	13	31.2	17	80	3285	17.5
HM	179	122	66	22	12	14.5	11	36.3	16.8	80	2890	16.5

Raw Data

Younger Boys (Continued)

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
FJ	173	120	66	22	12	14	7.25	37	17.1	70	3875	13
RT	162	125	65	14	12	16	11		18.4	67	2585	9.5
CG	173	106	64	22	12	15.5	4	37	16.4	80	3530	18
JN	172	138	72	22	12	20	7.25		15.8	89	2960	17
GM	172	126	69	22	12	20	9.5	36	16.6	79	2960	17.5

Raw Data

Girls

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
PH	184	118	61	22	12	20.75	9	38	16.5	75	2420	17.5
JP	181	119	66	22	12	19.25	10	45.4	16.5	67	2775	15
LS	191	121	67	0	12	22.75	12.25	48	17.6	68	2310	11
CB	210	124	66	0	8	11.25	10.75			62	1895	6
PP	196	130	65	0	12	18.75	6.5			62	2130	8.5
LP	189	115	66	0	12	22	5.5	47.6	17.8	59	2450	11
WW	188	148	67	0	12	20.5	12.75	41.1	18.3	62	1915	10.5
SP	185	124	65	0	12	20.5	7	49.2	17.1	59		10
JS	193	158	64	0	12	14.5	13.75	45.5	20	52	1330	6
NC	219	124	67	0	12	26.75	6.75		18	64	1895	10
PF	184	110	66	0	12	15.5	9.75		19.3	50	2060	7.5
SM	182	123	65	0	10	18.75	13.25	45.4	22.8	39	2115	5.5
GM	191	107	61	8	12	13.5	6.5	56.2	19	42	2460	7
JW	198	125	64	0	12	12	8.25		18.6	59	1925	7
BS	173	145	66	0	12	10.75	10.25	53	18	66	2345	10.5
KB	192	97	63	0	12	13.75	12.50		20	50	1945	6
CB	190	125	67	0	12	20.50	11.25		17.1	72	2855	12.5
UG	185	115	62	0	12	18.25	6.75	37	17.5	69	3005	13.5

Raw Data  
Girls (Continued)

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
SJ	191	140	66	10	12	18.25	11.75	40.8	17.5	66	2995	13
HY	204	115	66	9	5	16.25	12	5.95	19	64	2995	9
MS	199	110	66	11	12	13.25	9.25		20.1	69	2846	9.5
AM	180	120	67	11	12	14.75	8		18.4	66	2650	11
CR	194	125	67	10	12	15.75	8.25	38.1	16.3	73	2715	14.5
JB	192	120	63	20	12	23.5	9.25	29.7	16.2	77	2685	17.5
BD	212	88	64	9	12	14.5	8		17.5	58	2205	10
BG	198	119	66	9	12	19.5	12		18.5	56	2600	9
DS	205	112	62	14	5	22	8		17.2	64	2600	10
KK	211	114	63	9	12	16.25	9.75	49.2	19.1	52	2285	9.5
CF	198	130	68	9	12	12	8.25	65.6	18	54	1860	9.5
MR	192	121	65	9	12	15.5	10.25	59.4	17.8	59	2160	9.5
RM	201	123	65	10	12	13.75	10		17.2	52	1915	9
JP	187	120	63	9	12	23.5	9.5	46.7	17.2	57	2495	11.5
SH	192	123	64	11	12	21.5	12	67.1	18.8	61	2245	11.5
PM	212	138	66	9	12	21	8.75	38	18	64	2130	14.5
KK	181	127		13	12	21	6.5	36.5	16.7	86	2380	15
SG	183	112	66	9	12	15	12.5	40	17	66	2180	11.5

Raw Data  
Girls (Continued)

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
SS	191	105	62	9	12	16.5	13	36	18.4	66	2205	11
CL	196	106	62	11	12	18.5	7.5	51	17.9	64	2950	12.5
CG	184	85	61	11	5	15.5	11		18.2	66	2210	6
LS	164	100	62	22	12	16	11.25		17.4	68	2305	12
RN	156	95	61	22	3	15.5	8.75	44	17.5	80	2320	11.5
SG	164	92	69	22	12	15.25	8		17.1	69	2665	14
LV	177	117	64	22	12	18.25	6.75	46.1	17.5	75	2775	16.5
CC	172	130	60	0	12	22.50	8		17.8	52	2280	12
JK	165	123	63	0	7	15	10.75		17.5	56	2100	6.5
JH	156	131	63	0	12	15.75	10	83.6	20.9	53	1895	6.5
KT	166			0	3	20.5	11		18.5	53	2155	5.5
JW	176	125	67	0	12	17.5	9.25	49	18	57	2340	10
LR	164	130	67	0	7	20	12.75		18.8	62	2350	7
LM	161	124	62	0	3	15	11.5		20.5	58	2470	3.5
SC	176	114	68	0	3	9.75	16.25		19	49	2190	3
MG	173	140	67	0	12	13.5	13	60	19.9	52	2595	7
PJ	156	113	67		12	20.5	6	52	17	69	2385	11
WS	177	105	63		12	19	13		18.5	45	2705	8.5

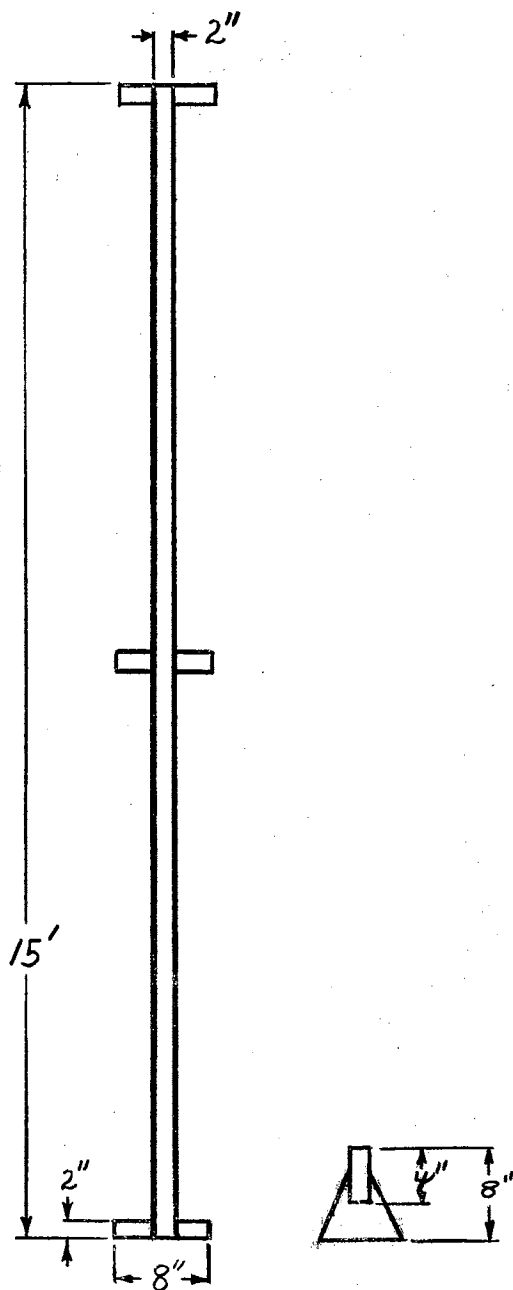
Raw Data  
Girls (Continued)

Subject	Age in Months	Weight in Pounds	Height in Inches	Rope Climb in Feet	Balance Walk in Feet	Trunk Extension in Inches	Trunk Flexion in Inches	Forty Yard Swim in Seconds	Speed and Agility Run in Seconds	Standing Broad Jump in Inches	Endurance Run in Yards	Score
JK	165	105	64	14	12	17.25	6.5		17	63	2650	12.5
DH	177	135	68	19	12	17.5	13.25		17.5	68	2705	12
DV	162	103	60	15	12	20.5	5.50	92.9	17.5	66	2650	13
FB	164	95		9	12	17.5	7.25	58.2	19	63	2290	10.5
NM	162	95	60	9	12	17.25	8.25		18	54	2130	10
CA	167	85	60	12	12	18.75	10.25	53	17.9	60	1935	11
PS	175	100	62	12	12	16.25	6.75	46	21.5	57	2140	9
RH	165	109	64	20	12	19	5.75	44.3	17	63	2290	12.5
JT	163	113	64	9	12	19.5	7.75	35.8	21	54	2265	10.5
SR	173	107	61	13	12	19.25	12	50.6	16.6	76	1540	11
PM	161	108	65	13	12	19.25	4.75	41.1	16.8	76	2495	13
MG	173	103	64	15	12	19.5	8		16.6	66	2340	12.5
CC	156	100	63	14	12	20	13.5	59	17.4	68	2145	11
JR	174	107	62	0	3	20.75	6.25		17.1	64	2940	9

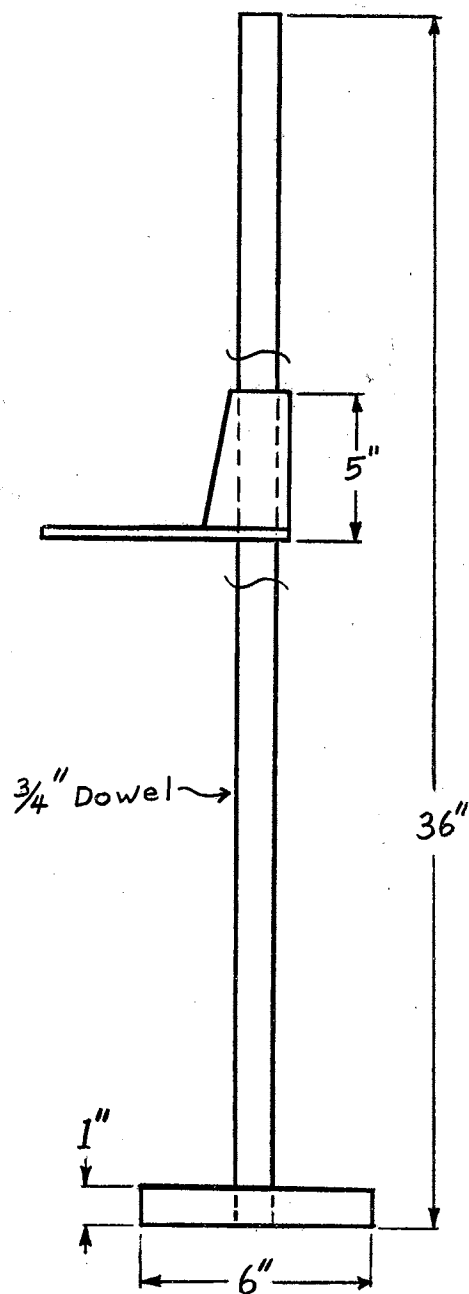
## APPENDIX B

Balance Beam

Cost \$3.55

Sliding Caliper  
used in measuring  
flexibility

Cost \$.95



## APPENDIX C

## SCORE CARD

Name _____		
Age _____	Wt. _____	Ht. _____
Sex _____ Home Town _____		

EVENT	PERFORMANCE	SCORE
Rope Climb	_____ ft.	0 1 2 3
Balance Walk	_____ ft.	0 1 2 3
Flexibility		
Trunk Extension	_____ in.	0 $\frac{1}{2}$ 1 $1\frac{1}{2}$
Trunk Flexion	_____ in.	0 $\frac{1}{2}$ 1 $1\frac{1}{2}$
Swimming Test	_____ sec.	0 1 2 3
Speed & Agility	_____ sec.	0 1 2 3
Standing Broad Jump	_____ in.	0 1 2 3
Endurance Run	___ laps ___ yds.	0 1 2 3

Endurance Run Track

## APPENDIX D

## 4-H Fitness Clinic, Instruction

This clinic program will consist of a series of seven physical fitness tests, by means of which we hope to assess your present physical fitness level. On arriving at this clinic you will receive this instruction sheet and a score card. In the upper right hand corner of the score card you will find a number (from 1 to 6) indicating your first station. Report directly to this station and be prepared to participate in the first test. At this first station fill in the information blanks on your score card with your name, age, ht, wt, etc. Give your score card to the recorder at each testing station. As soon as you have finished the test and your score has been recorded, take your score card with you and proceed to the next station. Report to stations in order of their numbers, 1 through 6 (from 6 go to 1) until you have finished all of the first six tests. Then report to the endurance run station which is located just across the street North from the football stadium. You will need to go around either end of the stadium to reach this station. Stations 1, 2, and 3 will be upstairs in the Old Gym, station 4 will be in the pool, stations 5 and 6 will be located on the lawn across the street South from the Old Gym.

Most of the test procedures will be self-explanatory, however, brief instructions will be given at each testing station. Following are a few instructions regarding some of the stations:

A. Rope Climb - You may climb the rope with hands only or you may use your feet and legs to pull yourself up. Do not slide down the rope as you may get rope burns on the hands.

B. Flexibility - You will need to warm up before doing this event

by doing some bending and stretching while you are waiting.

C. Swimming - If you cannot swim in deep water, skip this station and go to Number 5. If you are not sure of your swimming ability go to the pool, take one of the outside lanes and tell the person timing that you may need help. This test will consist of a forty-yard swim, or two lengths of the pool using any stroke or combination of strokes that you desire. Dressing Rooms, Girls will enter their dressing room from the outside Southeast door of the Old Gym. Boys will enter their dressing room from the central corridor on the ground floor of the Old Gym. Everyone take a soap shower before entering the pool. Take your score card into the pool with you and hand it to one of the timers at the North end of the pool. On finishing your swim, dry your hands, pick up your score card, go the dressing room, get back into your gym clothes and proceed to Station 5.

D. Endurance Run - The purpose of this test is to see how much distance you can cover in fifteen minutes. It is a test of your endurance ability or your ability to keep working over an extended period of time. This is not to be a fast race like a 100 yard or a 440 yard run. Do not start out at a fast pace but try to establish a nice easy running pace that you feel you will be able to keep up for fifteen minutes. If you need to slow up or walk during the fifteen minutes of course you may, but try to keep running if you can. If, during the last few minutes of the run you still have lots of energy left then speed up the pace to get as far as you can. At the end of the fifteen minute time period a gun will be fired. When you hear the gun, stop running and stand, sit or walk around in the immediate area until one of the recorders comes along to record your score. After your run score has been recorded you will be

through with the testing program and may return to your room for a shower and to change clothes.

Your Fitness Scores - Of course, you will be interested in knowing how you rate on the various tests and your overall rating. On your score card at each station the recorder will circle a number (0,1,2, or 3). These circled numbers will give you an indication of how well you did on that event. 0 and 1 are poor, 2 is average, and 3 is above average. If you want to keep track of your total points for the test then add your total after your endurance run score has been recorded, you can check your overall rating according to the following scale: 19-21 excellent, 15-18 average, 12-14 below average, 8-11 poor. More specific standards for each event and for the overall rating will be worked out after all of the test scores have been compiled and these standards will be made available to you through your 4-H leaders.

## VITA

Warren Ray Graham

Candidate for the Degree of

Master of Science

Thesis: A STUDY OF PHYSICAL FITNESS OF OKLAHOMA 4-H CLUB MEMBERS

Major Field: Health, Physical Education, and Recreation

### Biographical:

Personal Data: Born near Wayne, Oklahoma, July 10, 1939, the son of James Lee and Mary Evelyn Graham.

Education: Attended elementary, junior and senior high school in the Tulsa Public Schools, Tulsa, Oklahoma; graduated from Will Rogers High School in 1958; received the Bachelor of Science degree from Oklahoma State University, with a major in Health, Physical Education, and Recreation, in May, 1963.

Professional Experience: Graduate Assistant, Department of Health, Physical Education, and Recreation, Oklahoma State University from January, 1963 to June, 1964. Member of the American Association for Health, Physical Education, and Recreation; member of Phi Kappa Phi.