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Pierre Roberts John

The University of Montana

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PHYSICAL FITNESS STATUS OF ELEMENTARY
SCHOOL PUPILS (GRADES 5-8) IN MISSOULA, MONTANA

by

PIERRE JOHN ROBERTS
B.A. Montana State University, 1948

Presented in partial fulfillment
of the requirements for the degree of
Master of Arts

MONTANA STATE UNIVERSITY

1959

Approved by:

Chairman, Board of Examiners

Dean, Graduate School

Date
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CHAPTER I

INTRODUCTION

"What is Physical Fitness?"¹ This was the question Dr. C. H. McCloy asked and then answered in an attempt to make clear the meaning of the above term. In his writing, Dr. McCloy emphasized that the term physical fitness has limitations, it is not total fitness. The important aspects of physical fitness are: inheritance of high grade vital organs and proper function of these organs, proper functioning of the neuro-muscular systems which require an adequate amount of strength and endurance; and flexibility.

Educators, Dr. McCloy included, have long been aware that fitness, and particularly physical fitness, is an increasing problem in this automation era.² Several states, New York, California and Minnesota among them, have developed and used physical fitness tests in their schools to gain knowledge of the possible strengths and weaknesses of


their physical education curriculums in general and physical fitness of their youth in particular.

Analysis of the data gathered by the administration of these tests, and other research in the area of physical fitness, prompted physical educators to advise the people of our nation of the implications involved if they permitted the lack of physical fitness to become a more serious problem. However, the general public evidently was unwilling to become concerned about the heavy price they were paying for the highest standard of living in the world.

Nevertheless, the findings of these physical educators were not wasted. These findings were confirmed by the study made by Hans Kraus, M.D., Associate Professor of Physical Medicine, New York University, and Bonnie Prudden, Director, Institute for Physical Fitness, White Plains, New York. Administration of the Kraus-Weber Tests of minimum muscular fitness showed that of 4365 American children tested, 57.9% between the ages of six and sixteen failed one or more of the six tests; of the 2870 European children tested, 8.7% failed. The findings of this study were brought to the

attention of President Eisenhower, and have been referred to as the "Report That Shocked the President."\(^4\)

This report, and the fact that approximately 35\% of our young men are rejected for military service because of lack of fitness,\(^5\) prompted the establishment of a National Council on Physical Fitness and the birth of "Operation Fitness - U.S.A.\(^6\), a national project aimed toward improving the physical fitness of our nation. Approved by our government, and under the sanction and direction of the American Association for Health, Physical Education, and Recreation, this project is a combined effort by government, business, industrial and educational leaders to do something on a national scale about our nation's lack of fitness.

Evaluation of youth physical fitness as part of this project emerged from the appointment of the Physical Fitness Research Committee.\(^7\) This committee, headed by Dr. Paul Hunsicker and composed of leaders in the field of physical


\(^6\)"Operation Fitness - U.S.A.\(^,"\) \textit{JOPHER} (January, 1959), p. 25.

education, developed a physical fitness test which "at last can be accepted nationally." Through the cooperation of hundreds of interested persons throughout the nation, national norms were devised through the testing and evaluation of the test scores of some 8500 pupils in our elementary, junior high, and high schools.

It is this test with which this study is concerned. Through its use, an investigation of the physical fitness status of Missoula's Elementary Public School pupils, Grades 5 through 8, could be made. By a statistical comparison, information may be gained which could aid in the direction of future planning concerning the physical education curriculum of Missoula's elementary schools.

I. PROBLEM

Purpose of this Study.—The purpose of this study is to evaluate the physical fitness status of the Missoula, Montana, Elementary Public School pupils, Grades 5 through 8, using the AAHPER Fitness Test.

Basic Assumptions.—It is assumed that the AAHPER Youth Fitness Test is a valid, reliable and objective means of measuring physical fitness.

It is further assumed that a thorough training of

8"Operation Fitness - U.S.A.," op. cit., p. 28.
the test administrators will assure the reliability, validity, and objectivity of the test results.

It is assumed also that of the two methods of classification presented, the most satisfactory means of homogeneous grouping of students to measure achievement can be accomplished by the use of the Neilson-Cozens Classification Index rather than by age alone.

II. DEFINITIONS OF TERMS USED

AAHPER.—Wherever used in this study, these initials refer to the American Association for Health, Physical Education, and Recreation.

Neilson-Cozens Classification Index.—The Neilson-Cozens Classification Index is a means of classifying pupils by using the factors of age, height, and weight.9

Physical Fitness.—A lack of clarity in defining the term was indicated by a sub-committee on Physical Medicine. They stated that:

A clear definition of the term physical fitness is elusive.—The purely physical feats are too varied to be determined by any one set of criteria.10

---


For the purpose of this study, we will consider that:

Physical fitness includes those qualities which will permit an individual to perform life activities involving speed, strength, agility, power, and endurance and to engage in various kinds of physical activity required of modern-day living, including sports and athletics, and to be able to maintain an optimum amount of fitness for the individual involved.\[1\]

III. LIMITATIONS OF THE STUDY

It is recognized that total fitness involves social, mental and emotional fitness in addition to physical fitness. This study will evaluate only the physical fitness status of boys and girls, Grades 5 through 8, in the Missoula Elementary Public Schools at the specific times of testing, April, 1959.

According to the test authorities, use of the aquatic portion of the test was optional and norms were not provided. Therefore, because of the above factors and inadequate facilities, this portion of the test will not be used.

It is recognized that previous training and experience will have an influence on the individual's physical fitness.

However, this is a study of status and is not concerned with previous experience.

IV. NEED FOR THE STUDY

In establishing the need for any study, it must be considered that the need for any research is governed by what has been done previously in that specific field of research and the potential contribution of any research to the locale, and/or the field of research.

There has not been a comprehensive study conducted to evaluate the physical fitness status of the Missoula Elementary Public School pupil, Grades 5 through 8, in recent years. Therefore, it is difficult to determine if the present program satisfies the objective of physical fitness. This evaluation is needed to determine if possible curriculum adjustments are necessary to improve the physical fitness status of Missoula students.

An evaluation of individual pupils may provide a desirable stimulus toward the objective of physical development for both pupil and teacher.

By recording scores achieved in this test on an accumulative score card, the yearly administration of this test will provide a means of evaluating an individual's improvement in each successive grade.

Finally, the nationwide survey of physical fitness using the AAHPER Youth Fitness test was a pilot study in
which 8500 pupils in 28 states were tested. Since Montana was not one of the states included in the survey, the testing of nearly 2000 pupils in Missoula could provide information which would substantiate the scores of the national study completed in 1958, or indicate a need to develop norms based upon the population tested.

V. HISTORY AND PREVIOUS RESEARCH

Physical Education and Fitness

Primitive man needed education physically to obtain food and to defend himself against his enemies. From that time on the status of physical education in general and physical fitness in particular has been conditioned by the religious, political, economic and social forces of society. The evident necessity for physical fitness in the military eras of the Greeks and Romans is affirmed in the fact that "they were the first to give physical education an important place," in education.

Rome fell and Christianity appeared. Early Christianity contributed little in the way of physical fitness as "The early Christians had little use for physical education".

\[\text{Ibid.}\]
\[\text{Ibid.}\]

\[\text{Ibid.}\]
exalting the spirit and soul in their educational programs, sometimes neglecting the body.

"The renaissance was a transition period between the middle ages and modern times." The study of Greek and Roman life during this period, scientific progress in the area of health, and the idea of education through play emphasized the need for physical education.

The effect of European programs on American physical education has been strong and the multiplied needs of a machine age society since the industrial revolution has given physical education a good deal of impetus.

Thus, physical fitness as an emphatic part of the physical education program has varied in its emphasis throughout history. American educators have been interested in fitness since the origin of the AAHPER in 1885. Efforts to promote physical fitness in this field have fluctuated with the times. "There usually was peak interest during war years and a usual drop-off following the cessation of hostilities." 

The present uncommon concern over fitness no doubt can be traced partially to the disquieting draftee rejection rate of the Korean War, and the work Kraus and his assoc-

\[^{15}\text{Ibid.}\]^{16}\text{Hunsicker, op. cit., p. 1.}\]^{17}\text{Ibid.}\]
iates did to revitalize interest in fitness. Furthermore, modern educational trends dictate curriculums based on the needs and interests of the individual pupil, pointed toward enjoying a successful adult life. Tomorrow's adult life will include more leisure time. Therefore, the indications of greater leisure time preclude the need for optimum physical fitness of each individual to enable him to fulfill his economic obligations, participate in leisure time activities, and meet emergencies.

Testing in Physical Education

Twenty-five years ago, in 1934, N. P. Neilson and Frederick W. Cozens stated that there were needs for scales in physical education to stimulate pupils, to interest pupils, to aid in finding pupils' strengths and weaknesses, to measure pupils' improvements in skills and to aid in further research and experimentation in the field of physical education.19

In 1949, The Research Section and Research Council of the Research Section of the AAHPER wrote, "One of the most essential criteria for the judgement of a recreational or school health and physical education program is its

18 Ibid.

19 N. P. Neilson and Frederick W. Cozens, Achievement Scales in Physical Education Activities (California, State Department of Education, 1934), p. 177.
effectiveness. This quality cannot be fully ascertained without intelligent use of appropriate tests and measures."\textsuperscript{20}

More recently, in 1958, committee members on the Moses Lake Project agreed that "a minimal testing program should include some type of organic evaluation such as a motor fitness or motor ability test and an orthopedic screening test."\textsuperscript{21}

This research has shown the need for a testing program as a means of partially evaluating the effectiveness of physical education in meeting its objectives. For example, the type of testing discussed does not measure the socialization aspects of physical education; nevertheless it is an important part of the students' total evaluation.

Physical Fitness Tests

Attempts to establish a physical fitness test with nation-wide acceptance was difficult, perhaps, because physical educators felt, as stated in the definition of physical fitness, that "A clear definition of the term physical fitness is elusive.--The purely physical feats


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are too varied to be determined by any one set of criteria."\(^{22}\)

However, President Eisenhower's concern after the Kraus-Weber test results brought the leaders in the field of physical education together to make a concerted effort to investigate the physical fitness status of our youth.\(^{23}\)

The AAHPER Youth Fitness test, which leaders in the field of physical education developed as a pilot study, can serve as the basis for a national evaluation of youth physical fitness. This evaluation tool, as an integral part of "Operation Fitness - U.S.A.," providing the data accumulated is properly used, may lead our youth into a greater degree of physical fitness than they have ever before attained.

VI. METHOD OF INVESTIGATION

The Normative Survey Method of Investigation was employed in evaluating the physical fitness status of the Missoula Elementary Public School pupils, Grades 5 through 8.

VII. ORGANIZATION OF REMAINDER OF THESIS

Chapter II will describe the AAHPER Youth Fitness test as a means of testing the fitness of the pupils of the

\(^{22}\)National Research Council of the Research Section, loc. cit.

\(^{23}\)Hunsicker, loc. cit.
Missoula Elementary Public Schools, Grades 5 through 8. Chapter III will describe: the methods used in training administrators of the test; materials used; and the administration of the test. Chapter IV will present an analysis of scores achieved by comparing the Missoula Elementary Public School pupils by grade locally and by classification nationally. The final chapter will contain the summary, conclusions, and recommendations of this study.
CHAPTER II

DESCRIPTION OF THE AAHPER YOUTH FITNESS TEST

All educational programs need a means of evaluating the present status or readiness of the pupil and a method to determine the progress of the individual. There also is a need to determine to what degree the desired goals have been reached, and to indicate the quality of instruction.

Methods of measurement, if they are to show results accurately, must fulfill the set of values or criteria which constitute a good test.

Any test must meet the primary criteria of validity, reliability and objectivity.¹ In addition, factors such as administrative ease, utility, time consumed, directions, and availability of norms are important items to consider in selection of a suitable test.² The factors of administrative ease and minimum equipment will necessarily receive strong consideration in this evaluation.


Scott\(^3\) summarizes the opinions of authorities on criteria by reporting that authors are agreed that:

the criteria to be applied include statistical measures supplemented by practical considerations and subjective opinion. Usually evidence in reliability and validity is presented. Objectivity, standardized directions, the type of scoring, ease of administration, economy of time and availability of norms are some of the practical considerations.

Since the primary purpose of the study is to test physical fitness, consideration must be given to the components of physical fitness that will be tested. Cureton, et al.\(^4\) state that:

three principle approaches for objective testing of physical fitness, (apart from diagnosis of disease) are:

1. Appraisal of physique
2. Appraisal of organic efficiency
3. Appraisal of motor fitness

The need for specialized training of test administrators in the areas of appraisal of physique and appraisal of organic efficiency plus required special equipment, necessitates elimination of these items when considering ease of administration, and minimum equipment. Therefore practical testing of physical fitness resolves itself into an evaluation of motor fitness, and the implied measurement


of "effective utilization of the organic equipment" which must be considered in any "whole method" evaluation such as a physical fitness test.

A review of available literature indicated that tests of physical fitness for boys and girls at the 5 to 8 grade level were few. In 1950, the National Research Council of the Research Section listed and evaluated 57 selected tests on knowledge and/or fitness. A more recent investigation by Hunsicker in 1957 considered 18 selected tests which could be easily administered and called for a minimum of equipment. Hunsicker's investigation revealed only three tests which could be applied to boys and girls at the 5 through 8 grade level. These were: The California Physical Fitness Pentathlon, the Kraus-Weber Test of Minimum Muscular Fitness, and the Larson Muscular Strength Test.

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6 Ibid.
In 1958 the recently organized National Council on Physical Fitness provided another test, developed by leaders in physical education, which could be added to the previous list; namely, the AAHPER Youth Fitness Test. This made four tests of physical fitness which could be used to evaluate the physical fitness status of the Missoula Elementary Public School pupils, Grades 5 through 8.

When the author judged the listed tests on the basis of availability of national norms, only one, the AAHPER Youth Fitness Test, provided these norms which could be used to evaluate the physical fitness status of a group on a national basis.

The AAHPER Youth Fitness Test, as used for this study, includes the following items:

1. Pull Up (Modified for Girls)
2. Sit Up
3. Shuttle Run
4. Standing Broad Jump
5. 50 Yard Dash
6. Softball Throw for Distance
7. 600 Yard Run-walk

In reference to the definition of physical fitness used in this study, a test battery which measures physical fitness should include items which test speed, strength, agility, power and endurance. The 50 Yard Dash measures speed; the Shuttle Run is a measure of agility and speed; power is
measured by the Standing Broad Jump and Softball Throw for distance; and the Pull Up and Sit Up measure strength; endurance is measured by the 600 Yard Run-walk.

Therefore, the AAHPER Youth Fitness test was evaluated as an adequate means of determining the physical fitness status of the Missoula Elementary Public School pupils, Grades 5 through 8, regardless of the lack of actual measurement in the areas of appraisal of physique and appraisal of organic efficiency because:

1. The test presumably meets established criteria of tests in general.

2. The test meets the reduced criteria of physical fitness tests in particular.

3. The items in the test battery were selected by established authorities in the field of physical education.

4. The nation-wide sample of pupils that were tested provided a useable basis for comparison of physical fitness status nationally.

5. The test battery measures components of physical fitness consistent with the definition of physical fitness in this study.
CHAPTER III

ADMINISTRATION OF THE TEST

Administration of the AAHPER Youth Fitness Test to 1937 pupils in Missoula's Elementary Public Schools necessitated a plan to train those who would be required to administer the test, to insure the objectivity, validity and reliability of the test scores.

Permission to administer the test to all physically qualified pupils, Grades 5 through 8, and to use the data acquired for a thesis study was secured from C. S. Porter, Superintendent of Schools.¹

Preparations to insure adequate training of the test administrators involved the following:

1. A thorough study of the Youth Fitness Test Manual and available literature pertaining to the test.

2. A viewing by the author of two films, showing administration of the test, which were narrated by Dr. Ruth White Fink of North Carolina University² and supervised by Dr. Paul Hunsicker, Chairman of the Youth Fitness Project which had developed the test.

¹Appendix A.
²Appendix B.
3. The following information and materials were mimeographed for use by test administrators:
   a. Instruction sheets containing the test items and information concerning the administration of these items.³
   b. Score sheets for recording name, age, height, weight, sex, grade, and raw score of each pupil.⁴
   c. Neilson-Cozens Classification Charts for determining the index for each pupil.⁵
   d. Permanent record cards for entry of raw scores and percentile scores.⁶

4. An administration of the test by the author to a pilot group to gain additional first-hand information of possible problems concerned with the administration of the test.

The first three steps were completed and the teachers of all physical education classes, Grades 5 through 8, were requested to attend a meeting for the purpose of instruction on and viewing of the administration of the test to a select group of students.

At this meeting, the responsibility for supervisory aid to the individual teachers during the administration of the test.

³Appendix C. ⁴Appendix C. ⁵Appendix E. ⁶Appendix F.
test and preparation of test materials was placed on those teachers involved in coaching duties in each school. Their experience and training made them qualified for this task. Each teacher-coach was presented a Youth Fitness Test Manual to enable him to further familiarize himself with the test and its administration.

A detailed explanation was then presented to the assembled group concerning the data necessary to complete the score sheets, use of the Neilson-Cozens Classification Charts, and the entry of raw scores. Information was also presented as to procedure in forwarding the completed score sheets, the inclusive dates for administration of the test, and achievement awards which would be presented to pupils who could qualify as being physically fit.

The test administrators then viewed a demonstration of the test by selected pupils of one of the schools. Included with the demonstration was a discussion of materials used in administering the test and notification that needed materials would be available at each school prior to the time of testing. These materials included a stop-watch, a chinning bar, two blocks of wood 2 in. x 2 in. x ½ in., a tape measure, and a softball.

After the test was administered to a pilot group at one of the schools to gain first-hand information of possible administrative problems which might be encountered by administrators of the test, the following observations were
1. Each school's gymnasium would be adequate to conduct the indoor items of the test, as they compared favorably to the gym utilized by the pilot class.

2. The outdoor facilities in each school were adequate as all other schools had larger play areas.

3. The author felt that students tended to do their best and were anxious to have their test scores interpreted.

In addition to the aforementioned steps, posters were made for each school, showing achievement awards possible if the student could attain the 50th percentile rank (Red Seal Award) or the 80th percentile rank (Gold Seal Award) on all seven of the test items. This concluded the preparatory work prior to administration of the test.

During the testing period, the author personally administered some of the test items in each school and re-checked scores submitted by spot checking students chosen at random on selected items. This was done in 80% of the schools to verify the objectivity in administration of the test.

At the end of the testing period, the data was tabulated by the author. This included:

1. The changing of raw scores to percentile scores.\(^7\)

\(^7\)Appendix G.
2. Determining the number of students at or above the 50th percentile in each test item.

3. Determining the average percentile for each pupil.

4. Determining a median percentile by sex and by grade for each classroom unit.

5. Determining a mean percentile for boys and girls in each classification.

6. Determining the percent of students in each school at the 50th percentile in all seven test items.

7. Determining the percent of students in each school at the 80th percentile in all seven test items.
CHAPTER IV

ANALYSIS OF RESULTS

The population of the Missoula Elementary Public Schools, Grades 5 through 8, at the time of testing, in the spring of 1959, was 2194. Of this population, 1937 pupils, or 88.3%, were tested.

In the various classifications, determined by the Neilson-Cozens Classification Index, the following characteristics are generally apparent for both boys and girls, although some variations within groups are predicted.

Pupils in Classes A and B tend to be small in body type, below the average age of the population tested, light in weight and of short height.

Those in Classes C, D, E, and F represent the average of the group tested. They would tend to be medium in body type, of average age for Grades 5 through 8, and of medium weight and height.

Pupils in Classes G and H represent large body types, above the average age, heavy in weight and tall in height. These two classes would probably contain the overweight type of pupil as well as those of increased physical maturity.

The norms in the AAHPER Youth Fitness Test Manual permitted two possible means of grouping students for comparison: one is by age and sex; the other is by using the factors of...
age, height, weight and sex. The latter system of grouping students is known as the Neilson-Cozens Classification Index. Because of the heterogenous quality of the pupils, the author felt that the most adequate method of assuring homogeneous grouping was to use the Neilson-Cozens Classification method.

The Missoula pupils were compared with the national test on the basis of mean percentile scores by classification, sex, and event. A composite score to indicate total fitness was not presented by the National Youth Fitness Test. Therefore, it was not possible to compare an individual's total fitness with national statistics, but only to indicate the fitness he had attained in individual test items within his own classification and sex group in respect to the population tested in the pilot study.

To obtain data that would allow comparisons between Missoula students by classification, school, sex and grade, mean percentiles were determined. By using the mean percentile scores, it was possible to establish a method of rating students: to enable comparison within their own groups, to permit evaluation of pupil progress by grade, to judge the effectiveness of the program in various schools, and to indicate possible curriculum revisions aimed at improving physical fitness.

The quality of individual performance was also evaluated by determining those students eligible for awards on
the basis of achieving the 50th and 80th percentile in all seven test items.

The above comparisons required the following data:

1. Classification of each pupil by the teacher and entry of classification, name, grade, sex and raw scores on the score sheet provided.

2. Changing the raw score to a percentile score.

3. Determination of:
   a. The mean percentile for each pupil.
   b. The per cent of students rating on or above the 50th percentile by classification and sex.
   c. The mean percentile scores by sex, classification and event.
   d. The mean percentile scores by school, grade and sex for each test item.
   e. The range of mean percentile scores in each test item by sex.
   f. The per cent of pupils in each school achieving the 50th and 80th percentiles on all seven test items.

In analyzing the scores achieved by the Missoula students, it was found that well over 50% of the students tested ranked at or above the 50th percentile. This tendency to score above the national median is shown by the following analysis of the data.

Figures 1 to 8 represent the per cent of students in
each classification who achieved the 50th percentile or above in the various test items.

Because of the classification system used, it is not possible to have a direct comparison between boys and girls, as each was rated on a separate scale. However, a visual comparison is possible if it is assumed that the same relative degree of achievement in fitness is attained between sexes in any of the classifications by achieving the same percentile score.

The analysis of that data presented in these figures indicates the test items in which the greatest and least achievement is attained.

In each figure it is possible to show the item or items in which the classification group rates high and low, the achievement by sex, and the spread in scores between sexes.

Analysis of Achievement

In Class A (Figure 1) the test item showing the greatest achievement for both boys and girls as a combined group was the 600 Yard Run-walk. The item showing the least achievement was the 50 Yard Run.

The boys indicated their highest achievement in the Shuttle Run (83%) and the lowest in the Pull Up item (60%). The girls had the greatest achievement in the 600 Yard Run-walk (89%) and the lowest in the 50 Yard Run (55%).
FIGURE I
PER CENT OF CLASS A STUDENTS ACHIEVING THE 50TH PERCENTILE BY TEST ITEMS

--- Boys --- --- Girls
By comparing the relative achievement by sex, the boys rated above the girls in 4 of the 7 test items. The greatest differences were observed in the Sit Up, Pull Up and Shuttle Run items, with the girls rating higher in the first two. The least difference appeared in the Standing Broad Jump, with the boys rating higher than the girls.

In Class B (Figure 2) the test items showing the greatest achievement for boys and girls as a whole was the 600 Yard Run-walk. The item showing the least achievement was the Softball Throw.

The boys indicated their highest achievement in the 600 Yard Run-walk (88%) and the lowest in the Softball Throw (60%).

The girls had the greatest achievement in the 600 Yard Run-walk (85%) and the lowest in the Sit Up (70%).

In comparing the relative achievement by sex, the girls rated above the boys in 5 of the 7 test items. The greatest difference was observed in the Softball Throw, with the girls rating higher than the boys. The least difference appeared in the Sit Up, with the boys rating higher than the girls.

In Class C (Figure 3) the test item showing the greatest achievement for boys and girls as a combined group was the 600 Yard Run-walk. The item showing the least achievement was the 50 Yard Run.

The boys indicated their highest achievement in the
FIGURE 2
PER CENT OF CLASS B STUDENTS ACHIEVING
THE 50TH PERCENTILE BY TEST ITEMS

___ Boys
--- Girls

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600 Yard Run-walk (81%) and the lowest in the 50 Yard Run (49%).

The girls had the greatest achievement in the Shuttle Run (83%) and the lowest in the 50 Yard Run (54%).

In comparing the relative achievement by sex, the girls rated above the boys in all seven test items. The greatest difference was observed in the Shuttle Run and the least difference was apparent in the 600 Yard Run-walk and in the Pull-Up.

In Class D (Figure 4) the test item showing the greatest achievement for boys and girls as a combined group was the 600 Yard Run-walk. The item showing the least achievement was the Softball Throw.

The boys indicated their highest achievement in the 600 Yard Run-walk (80%) and the lowest in the Pull-Up (62%), 50 Yard Run (61%) and Softball Throw (62%).

The girls had the greatest achievement in the Shuttle Run (88%) and the lowest in the Softball Throw (64%).

In comparing the relative achievement by sex, the girls rated above the boys in all seven test items. The greatest difference was observed in the Standing Broad Jump, and the least difference was apparent in the Softball Throw.

In Class E (Figure 5) the test item showing the greatest achievement for boys and girls as a combined group was the 600 Yard Run-walk. The item showing the least achievement was the Softball Throw.
FIGURE 3
PER CENT OF CLASS C STUDENTS ACHIEVING
THE 50TH PERCENTILE BY TEST ITEMS
--- Boys --- Girls
FIGURE 4

PER CENT OF CLASS D STUDENTS ACHIEVING

THE 50TH PERCENTILE BY TEST ITEMS

--- Boys  --- Girls

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ment was the Softball Throw.

The boys indicated their highest achievement in the Shuttle Run (75%) and the 600-Yard Run-walk (77%). The lowest achievement was observed in the Pull-Up (51%).

The girls had the greatest achievement in the 600-Yard Run-walk (89%) and the lowest in the Softball Throw (57%).

In comparing the relative achievement by sex, the girls rated above the boys in 6 out of 7 test items and both had the same rating in one item. The greatest difference was observed in the Pull-Up and the least difference was apparent in the Softball Throw.

In Class F (Figure 6) the test items showing the greatest achievement for boys and girls as a combined group were the Shuttle Run and the 600-Yard Run-walk. The items showing the least achievement were the Pull-Up and the 50 Yard Run.

The boys indicated their greatest achievement in the Shuttle Run (77%) and the 600-Yard Run-walk (77%). The lowest achievement was observed in the 50 Yard Run (49%).

The girls had the greatest achievement in the Shuttle-Run (85%) and 600 Yard Run-walk (87%). The lowest achievement was observed in the Softball Throw (51%).

In comparing the relative achievement by sex, the girls rated above the boys in 6 out of 7 test items. The greatest difference was observed in the 50 Yard Run and
FIGURE 5

PER CENT OF CLASS E STUDENTS ACHIEVING
THE 50TH PERCENTILE BY TEST ITEMS

--- Boys  ------- Girls
FIGURE 6

PER CENT OF CLASS F STUDENTS ACHIEVING

THE 50TH PERCENTILE BY TEST ITEMS

--- Boys         --- Girls

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the least difference was apparent in the Sit Up and Shuttle Run. Girls rated above the boys in all items except the Softball Throw.

In Class G (Figure 7) the test items showing the greatest achievement for boys and girls as a combined group was the 600-Yard Run-walk. The item showing the least achievement was the Pull Up.

The boys indicated their highest achievement in the 600-Yard Run-walk (86%) and the lowest in the Pull Up (54%).

The girls had the greatest achievement in the Sit Up (88%) and the 600-Yard Run-walk (87%). The lowest achievement was observed in the Softball Throw (72%).

In comparing the relative achievement by sex, the girls rated above the boys in 6 out of 7 test items. The greatest difference was observed in the Pull Up, the girls rating higher than the boys. The least difference was apparent in the 600-Yard Run-walk and Softball Throw, the girls rating higher in the first item.

In Class H (Figure 8) the test items showing the greatest achievement for boys and girls as a combined group was the 600-Yard Run-walk. The item showing the least achievement was the Softball Throw.

The boys indicated their highest achievement in the Sit Up (82%) and 600-Yard Run-walk (82%). The lowest achievement was observed in Pull Up (57%).

The girls had the greatest achievement in the Pull Up...
FIGURE 7
PER CENT OF CLASS G STUDENTS ACHIEVING
THE 50TH PERCENTILE BY TEST ITEMS
___ Boys  --- Girls
(81%) and the lowest achievement in the Softball Throw (43%).

In comparing the relative achievement by sex, the boys rated above the girls in 5 out of 7 test items. The greatest difference was observed in the Pull Up, girls rating higher, and Softball Throw, boys rating higher. The least difference was apparent in the Standing Broad Jump, with girls rating higher.

In summary, a tabulation of the frequency appearance of test items showing the greatest achievement for boys and girls as a combined group showed that the 600 Yard Run-Walk appeared 7 out of 8 times. In the test item showing the least achievement, the Softball Throw and 50 Yard Run each appeared 3 times out of 8. The Pull-Up appeared twice.

The item appearing the most frequently in highest achievement for boys was the 600 Yard Run-Walk (6 times). The Shuttle Run was indicated 3 times and the Sit Up once. The most frequent item showing lowest achievement was the Pull-Up (5 times). The 50 Yard Run was indicated 3 times and the Softball Throw once.

The item appearing the most frequently in highest achievement for girls was the 600 Yard Run-Walk (4 times). The Shuttle Run was indicated 3 times and the Sit Up and Pull Up once each. The most frequent item showing lowest achievement for girls was the Softball Throw (5 times). The 50 Yard Run was indicated 3 times.

In comparing the relative achievement by sex in all
FIGURE 8

PER CENT OF CLASS H STUDENTS ACHIEVING
THE 50TH PERCENTILE BY TEST ITEMS

___ Boys  - - - Girls
classifications, the girls rated above the boys in 41 out of the 56 comparisons (7 events and 8 classifications), one item rating the same for both. The test item appearing the most frequently indicating the greatest difference was the Pull-up, and the most frequent item indicating the least difference was the Softball Throw.

Analysis of Mean Percentile Scores

The analysis of the mean percentile scores of Missoula students provides a method of rating an individual's performance in relation to his own group and indicates the general status of group achievement in each classification by sex and event (Table I), or by school, grade, sex and event (Table II).

Using the above mentioned tables, it would be possible to determine what group and sex had the highest average (mean score) in any event. For example, if the boys' Class A mean percentile in a particular event was 40 and the boys' Class D mean percentile was 60, it would be possible to determine that Class D boys were more fit than Class A boys on that particular item according to the population tested in the pilot study. It would also be possible to determine that in this case the older, heavier, taller group had a higher degree of fitness.

Table I shows the mean percentile scores achieved by Missoula students by classification and event.
The combined mean percentile score for all classes tested, by events, indicate that girls score higher than boys in every event except the Softball Throw. When a comparison is made by classification, this is generally true, except in Class H. However, the low number of girls tested in Class H may have some implications concerning this variation.

The mean percentile scores of the total population show that the widest spread between means appears in the Pull Up and the least spread is observed in the Shuttle Run. The girls rated higher in both events.

An overview of Table I indicated that as Missoula students grew older, heavier, and taller, they tended to maintain their fitness level. A variation of this analysis was apparent in girls' Class H, but the low number tested may imply a question of reliability.

Table II provides a means of evaluating fitness achievement by schools, grade and sex for each event. Use of this table makes possible the following evaluating analysis:

1. An individual pupil can compare his score to the average within his own grade level to evaluate his own fitness by event, according to the Missoula population tested.

2. The classroom teacher is able to compare the mean score of her class with other equivalent grades to evaluate his or her physical education program.
TABLE I

<table>
<thead>
<tr>
<th>BOY</th>
<th>CLASSIFICATIONS IN EACH TEST ITEM</th>
<th>MEAN PERCENTILE SCORES ACHIEVED BY</th>
<th>TOTAL TESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>L</td>
<td>P</td>
</tr>
<tr>
<td>A</td>
<td>62</td>
<td>52</td>
<td>68</td>
</tr>
<tr>
<td>B</td>
<td>59</td>
<td>52</td>
<td>63</td>
</tr>
<tr>
<td>C</td>
<td>61</td>
<td>44</td>
<td>60</td>
</tr>
<tr>
<td>D</td>
<td>62</td>
<td>43</td>
<td>63</td>
</tr>
<tr>
<td>E</td>
<td>62</td>
<td>46</td>
<td>65</td>
</tr>
<tr>
<td>F</td>
<td>66</td>
<td>41</td>
<td>61</td>
</tr>
<tr>
<td>G</td>
<td>63</td>
<td>50</td>
<td>64</td>
</tr>
<tr>
<td>H</td>
<td>73</td>
<td>51</td>
<td>67</td>
</tr>
<tr>
<td>MEAN</td>
<td>64</td>
<td>47</td>
<td>64</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GIRL</th>
<th>CLASSIFICATIONS IN EACH TEST ITEM</th>
<th>MEAN PERCENTILE SCORES ACHIEVED BY</th>
<th>TOTAL TESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>77</td>
<td>80</td>
</tr>
<tr>
<td>B</td>
<td>67</td>
<td>77</td>
<td>66</td>
</tr>
<tr>
<td>C</td>
<td>63</td>
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<td>72</td>
</tr>
<tr>
<td>D</td>
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<td>70</td>
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</tr>
<tr>
<td>E</td>
<td>73</td>
<td>66</td>
<td>74</td>
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<tr>
<td>F</td>
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<td>G</td>
<td>79</td>
<td>76</td>
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</tr>
<tr>
<td>H</td>
<td>69</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td>MEAN</td>
<td>74</td>
<td>73</td>
<td>65</td>
</tr>
<tr>
<td>TOTAL TESTED</td>
<td>1937</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
generally and by events. This would indicate to
the teacher which areas need stress or are over­
emphasized in the Physical Education program with
regard to physical fitness.

3. The administrator of a school is able to judge
the effectiveness of the Physical Education pro­
gram in his school as compared to other schools
in the system. A means of evaluation is pro­
vided not only of the program but also the quality
of instruction.

4. The Supervisor of Physical Education may observe
and evaluate the general and specific weaknesses
and strength of each school program and the in­
struction. This would serve as a guide for in­
service training of teachers, improvement of
facilities and equipment, and curriculum revisions
in the area of physical fitness.

In evaluating the relative degree of fitness between
the 5th and 7th-8th grade levels in each school (Table II)
by event and including both sexes, fewer low mean percentile
scores were observed at the 7th-8th grade level. In 9
schools the maximum number of low mean percentile scores at
the 7-8 level was 4. In the remaining 3 schools, the Willard
School experienced lower scores in 6 events (4 in girls’
events), the Paxson School in 8 events (6 in boys’ events),
and the Roosevelt School in 9 events (6 in boys’ events).
<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>GRADE</th>
<th>MEAN PERCENTILE SCORES BY SCHOOLS, GRADE &amp; SEX FOR EACH TEST ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>SIT UP</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Central</td>
<td>6</td>
<td>39 63</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>66 55</td>
</tr>
<tr>
<td>Franklin</td>
<td>6</td>
<td>40 80</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>49 53</td>
</tr>
<tr>
<td>Hawthorne</td>
<td>6</td>
<td>71 81</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>66 89</td>
</tr>
<tr>
<td>Jefferson</td>
<td>6</td>
<td>89 90</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>85 87</td>
</tr>
<tr>
<td>Lewis &amp; Clark</td>
<td>6</td>
<td>51 56</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>56 67</td>
</tr>
<tr>
<td>Lowell</td>
<td>6</td>
<td>57 51</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>51 59</td>
</tr>
<tr>
<td>Paxson</td>
<td>6</td>
<td>85 86</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>77 93</td>
</tr>
<tr>
<td>Prescott</td>
<td>6</td>
<td>43 47</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>46 38</td>
</tr>
<tr>
<td>Roosevelt</td>
<td>6</td>
<td>50 66</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>62 72</td>
</tr>
<tr>
<td>Washington</td>
<td>6</td>
<td>72 63</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>71 65</td>
</tr>
<tr>
<td>Whittier</td>
<td>6</td>
<td>70 51</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>53 51</td>
</tr>
<tr>
<td>Willard</td>
<td>6</td>
<td>65 70</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>95 44</td>
</tr>
</tbody>
</table>

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To demonstrate the use of mean percentile scores to analyze achievement in events by schools and sex, the following examples are provided:

In the boys' Pull-up, the lowest mean percentile score for all boys (Table I), the Jefferson School boys indicated the greatest mean achievement and the least mean achievement was observed in the Washington School.

In the girls' Softball Throw, the lowest mean percentile score for all girls (Table I), the Whittier School girls indicated the greatest mean achievement and the least mean achievement was observed in the Lewis and Clark School.

The range of mean scores and median percentile scores by school, grade, and sex as indicated by Table II can be found in Appendixes H and I.

Analysis by Awards

A final comparison was made on the basis of per cent of pupils qualifying for awards by schools (Figure 9). Of the Missoula population tested, 29 per cent qualified for awards. Two schools were able to qualify a greater per cent of their students than the Missoula average. The Whittier School qualified 50% and the Paxson School qualified 45%. The Hawthorne, Jefferson, and Washington Schools each qualified 28%, and the remaining schools, which constitute 7/12 of the total number of schools, each qualified less than 28%.
The above per cents include those qualifying for the Gold Seal Award, achieving the 80th percentile score in all seven test items. By schools, the Gold Seal Award percentages were:

<table>
<thead>
<tr>
<th>School</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paxson</td>
<td>12.6%</td>
</tr>
<tr>
<td>Whittier</td>
<td>8.9%</td>
</tr>
<tr>
<td>Jefferson</td>
<td>7%</td>
</tr>
<tr>
<td>Central</td>
<td>4.7%</td>
</tr>
<tr>
<td>Hawthorne</td>
<td>4.4%</td>
</tr>
<tr>
<td>Prescott</td>
<td>3.8%</td>
</tr>
<tr>
<td>Washington</td>
<td>2.2%</td>
</tr>
<tr>
<td>Franklin</td>
<td>2%</td>
</tr>
<tr>
<td>Willard</td>
<td>1.8%</td>
</tr>
<tr>
<td>Lewis &amp; Clark</td>
<td>1.5%</td>
</tr>
<tr>
<td>Lowell</td>
<td>1.2%</td>
</tr>
<tr>
<td>Roosevelt</td>
<td>1.1%</td>
</tr>
</tbody>
</table>
FIGURE 9

PER CENT OF PUPILS QUALIFYING FOR AWARDS BY SCHOOLS
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary.—The purpose of this study was to determine the physical fitness status of Missoula Elementary Public School pupils, Grades 5 through 8.

The selection of the AAHPER Youth Fitness Test as the means of determining this status was based on administrative criteria; reliability, validity and objectivity of test scores; and the availability of national norms.

Data for this study was collected through administering the AAHPER Youth Fitness Test to 1937 pupils of the Missoula Elementary Public Schools, Grades 5 through 8, in 1959. A national and local comparison was made on the basis of achievement using percentile and mean percentile scores to indicate the relative degree of fitness between classifications, schools, grades and sexes. Another comparison was made on the basis of the per cent of students eligible for awards, by schools. A summary of the findings is presented as follows:

1. Over 50% of the Missoula boys and girls tested achieved the 50th percentile score in each individual test item.

2. The event showing the greatest achievement was the
same for both boys and girls (600 Yard Run-walk). The event showing the least achievement for boys was the Pull-Up. The event showing the least achievement for girls was the Softball Throw.

3. The event showing the greatest difference in mean percentile scores between boys and girls was the Pull-Up. The event showing the least difference between boys and girls was the Softball Throw.

4. Mean percentile scores were higher for girls than boys in each event with the exception of the Softball Throw.

5. An overview of the mean percentile scores between the 5th and 7th-8th grade level indicated that, in 9 schools, the older Missoula pupils tended to maintain or improve their relative degree of fitness. However, a lesser degree of fitness between the above levels was apparent in the Willard (girls), Paxson (boys), and Roosevelt (boys) schools.

6. In comparison to the average per cent of Missoula students qualifying for awards, only two schools (Whittier and Paxson) were able to qualify a larger per cent than the Missoula average.

Conclusions.--The following conclusions may be drawn from this study.

1. The Missoula Elementary School students with regard to physical fitness, by event, are superior to
those students tested in the pilot study.

2. Scores of both boys and girls of the Missoula Elementary Public Schools indicated the greatest achievement in the endurance event of the physical fitness test. The scores of Missoula boys indicating the least achievement were apparent in the event measuring shoulder-girdle and upper extremity strength. The scores of Missoula girls indicating the least achievement were observed in the event which measured their ability to throw hard and skillfully.

3. The great difference between boys and girls in the Pull Up event, and the observation of the author, indicate that objective administration of the girls' Pull Up is difficult. The low rating of both boys and girls in the Softball Throw indicates a lack of skill and power in this event.

4. The Missoula Elementary School girls have a higher relative degree of fitness than the Missoula boys and also rate higher than the girls tested in the pilot study.

5. A lower physical fitness status is indicated at the 7th-8th grade level than at the 5th grade level in the Willard (girls), Paxson (boys), and Roosevelt (boys) schools.
6. Twenty-nine per cent of the Missoula pupils tested qualified for awards. Since only two schools were able to qualify a larger per cent of their students, there is an indication of a need for a program which will develop each component of physical fitness, proportionately, in every individual.

**Recommendations.**—The following recommendations are made concerning the use of the AAHPER Youth Fitness Test and results of the study.

1. A further development of test scores used in the pilot study is recommended. A development of a composite score would facilitate ability grouping, enable a classification comparison, and aid in measuring normal progress.

2. An indication of the per cent of students involved in the pilot study who qualified for awards is recommended, to permit a national comparison on the basis of awards representing total physical fitness.

3. The AAHPER Youth Fitness Test should continue to be administered to Missoula pupils, Grades 5 through 8, at least once a year. To insure a valid and reliable comparison, this should be done at a time of the year corresponding to the time of this study. Yearly administration of the test at this time would permit a continuous evaluation.
of:

a. Strengths and weaknesses of the physical education program with regard to physical fitness.

b. The quality of instruction.

c. The needs of the schools with regard to in-service training of teachers, facilities, and equipment.

d. Individual pupil progress.

4. The wide range of girls' scores in the Pull Up and the large difference in relative achievement between boys and girls in the Missoula study of this event affect a recommendation of further research to determine objectivity in administration and the effect on reliable and valid scores in this item.

5. Research studies similar to this study should be conducted in the cities and towns of Montana and the nation to further validate the scores achieved in the pilot study and to determine the degree of fitness of Montana pupils with regard to other Montana pupils and the national norms.
A. BOOKS


B. PUBLICATIONS OF THE GOVERNMENT, LEARNED SOCIETIES
AND OTHER ORGANIZATIONS


C. PERIODICALS


To Whom it May Concern:

I hereby grant Pierre Roberts permission to administer the National Youth Fitness Test to all boys and girls of School District #1, Grades 5 through 8; and to use any or all data acquired through this testing as thesis material in obtaining a Masters Degree.

Sincerely,

(C. S. Porter)
Supt. of Schools
School District #1
Missoula, Montana
Mr. Pierre Roberts

I am sorry that I am so late in answering your letter of January 25, but I have been waiting since January for an answer to a letter regarding the matter which I had written to Dr. Carl Troester of the AAHPE&R Office in Washington. Just today I received a reply to that letter.

I do not feel that the kinescopes which we made of the Youth Fitness Tests are of especially good quality for general use, and since AAHPE&R had announced plans for commercial filming of the Tests, I had hoped that the latter might be available for your use by March. However, Dr. Troester writes that their project of filming has not been completed, and suggested that I continue to make my films available if possible.

Our two films are now out of the office -- as they are being used by the educational television station of St. Louis. I also have requests for sending them to two or three other stations. However, if they are returned in time I shall send them on to you for your use on March 21. There would be no charge for the use of the films, other than the postage charges.

Sincerely yours,

Mrs. Ruth White Fink, Director
Physical Education for Women
APPENDIX C

AAHPER YOUTH FITNESS TEST

Test Administration

The Youth Fitness Test battery consists of seven test items which are given in the gymnasium or outdoors according to the item. It is suggested that the pull-up (for boys), modified pull-up (for girls), sit-up, standing broad jump, and shuttle-run be given in one period; the 50-yard dash, softball throw for distance, and 600-yard run-walk in a second period.

The pupils should be given reasonable warm-up prior to the testing. A test should not be given to any pupil whose medical status is questionable.

I--Pull-up

Equipment.--A metal or wooden bar approximately 1\(\frac{3}{4}\) inches in diameter is preferred. A doorway gym bar can be used and, if no regular equipment is available, a piece of pipe or even the rungs of a ladder can also serve the purpose.

Description.--The bar should be high enough so that the pupil can hang with his arms and legs fully extended and his feet free of the floor. Use the overhand grasp. After assuming the hanging position, the pupil raises his body by his arms until his chin can be placed over the bar and then lowers his body to a full hang as in the starting position. The exercise is repeated as many times as possible.

Rules.--1. Allow one trial unless it is obvious that the pupil has not had a fair chance.

2. The body must not swing during the execution of the movement. The pull must in no way be a snap movement. If the pupil starts swinging, check this by holding your extended arm across the front of the thighs.

3. The knees must not be raised and kicking of the legs is not permitted.
Scoring.--Record the number of completed pull-ups to the nearest whole number.

**Modified Pull-up**

Equipment.--A metal or wooden bar approximately 1 1/2 inches in diameter is preferred. A doorway gym bar can be used and, if no regular equipment is available, a piece of pipe can also serve the purpose. In some instances, it is possible to use the aisle between bleacher seats and have the bleachers support the pipe at the desired height.

Description.--Adjust the height of the bar so it is approximately at nipple level. Use an overhand grasp. The pupil extends her legs under the bar and extends the arms fully. The arms should form an angle of 90 degrees with the body line, and the body line should form an angle of 45 degrees with the floor. The heels should be braced to prevent slipping; they can be resting on a mat or against an improvised rest, like the scorer's foot, to prevent slipping. From this position the pupil raises her body by her arms until the chest touches the bar, then lowers her body to a full hang. The exercise should be repeated.

Rules.--1. No resting is permitted.

2. No pull-up shall be counted in which the pupil fails to: keep the body straight, come to a full extension of the arms, or touch the chest to the bar.

3. The maximum number is 40.

Scoring.--Record the number of completed pull-ups to the nearest whole number, with a maximum of 40.

**II-Sit-up**

Equipment.--Mat or floor.

Description.--The pupil lies on his back, either on the floor or on a mat, with legs extended and feet about two feet apart. His hands are placed on the back of the neck with the fingers interlaced. Elbows are retracted. A partner holds the ankles down, the heels being in contact with the mat or floor at all times.

The pupil sits up, turning the trunk to the left and
touching the right elbow to the left knee, returns to starting position, then sits up turning the trunk to the right and touching the left elbow to the right knee. The exercise is repeated, alternating sides.

Rules.--1. The fingers must remain in contact behind the neck throughout the exercise.

2. The knees must be on the floor during the sit-up but may be slightly bent when touching elbow to knee.

3. The back should be rounded and the head and elbows brought forward when sitting up as a "curl" up.

4. When returning to starting position, elbows must be flat on the mat before sitting up again.

Scoring.--One point is given for each complete movement of touching elbow to knee. No score should be counted if the fingertips do not maintain contact behind the head, if knees are bent when the pupil lies on his back or when he begins to sit up, or if the pupil pushes up off the floor from an elbow. The maximum limit in terms of number of sit-ups shall be: 50 sit-ups for girls, 100 sit-ups for boys.

III--Shuttle Run

Equipment.--Two blocks of wood, 2 in. x 2 in. x 4 in., and stop-watch. Pupils should wear sneakers or run barefooted.

Description.--Two parallel lines are marked on the floor 30 feet apart. The width of a regulation volleyball court serves as a suitable area. Place the blocks of wood behind one of the lines as indicated. The pupil starts from behind the other line. On the signal "Ready? Go!" the pupil runs to the blocks, picks one up, runs back to the starting line and places the block behind the line; he then runs back and picks up the second block which he carries back across the starting line. If the scorer has two stop-watches or one with a split-second timer, it is preferable to have two people running at the same time. To eliminate the necessity of returning the blocks after each race, start the races alternately, first from behind one line and then from behind the other.

Rules.--Allow two trials with some rest between.

Scoring.--Record the better of the two trials to the nearest
tenth of a second.

IV--Standing Broad Jump

Equipment.--Mat, floor, or outdoor jumping pit, and tape measures.

Description.--Pupil stands as indicated in Figure 8, with
the feet several inches apart and the toes just behind the
take-off line. Preparatory to jumping, the pupil swings
the arms backward and bends the knees. The jump is
accomplished by simultaneously extending the knees and
swinging forward the arms.

Rules.--1. Allow three trials.
2. Measure from the take-off line to the heel or
other part of the body that touches the floor
nearest the take-off line.
3. When the test is given indoors, it is conveni­
ten to tape the tape measure to the floor at right­
angles to the take-off line and have the pupils jump
along the tape. The scorer stands to the side and
observes the mark to the nearest inch.

Scoring.--Record the best of the three trials in feet and
inches to the nearest inch.

V--50-Yard Dash

Equipment.--Two stop-watches or one with a split-second
timer.

Description.--It is preferable to administer this test to
two pupils at a time. Have both take positions behind the
starting line. The starter will use the commands "Are you
ready?" and "Go!" The latter will be accompanied by a
downward sweep of the starter's arm to give the timer a
visual signal.

Rules.--The score is the amount of time between the starter's
signal and the instant the pupil crosses the finish line.

Scoring.--Record in seconds to the nearest tenth of a second.
VI--Softball Throw for Distance

Equipment.--Softball (12-inch), small metal or wooden stakes, and tape measure.

Description.--A football field marked in conventional fashion (five-yard intervals), makes an ideal area for this test. If this is not available, it is suggested that lines be drawn parallel to the restraining line, five yards apart. The pupil throws the ball while remaining within two parallel lines, six feet apart. Mark the point of landing with one of the small stakes. If his second or third throw is farther, move the stake accordingly so that, after three throws, the stake is at the point of the pupil's best throw. It was found expedient to have the pupil jog out to his stake and stand there; and then, after five pupils have completed their throws, the measurements were taken. By having the pupil at his particular stake, there is little danger of recording the wrong score.

Rules.--1. Only an overhand throw may be used.

2. Three throws are allowed.

3. The distance recorded is the distance from the point of landing to the nearest point on the restraining line.

Scoring.--Record the best of the three trials to the nearest foot.

VII--600-Yard Run-walk

Equipment.--Track or area marked according to Figures 10-12 and stop-watch.

Description.--Pupil used a standing start. At the signal "Ready? Go!" the subject starts running the 600-yard distance. The running may be interspersed with walking. It is possible to have a dozen subjects run at one time by having the pupils pair off before the start of the event. Then each pupil listens for and remembers his partner's time as the latter crosses the finish. The timer merely calls out the times as the pupils cross the finish.

Rules.--Walking is permitted, but the object is to cover the distance in the shortest possible time.

Scoring.--Record in minutes and seconds.
APPENDIX D

YOUTH FITNESS ON CLASS COMPOSITE RECORD

SCHOOL __________________________ GRADE __________________________ DATE __________

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<th>RS - Raw Score</th>
<th>%ile - Percentile</th>
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# APPENDIX E

**YOUTH FITNESS RECORD**

**CLASSIFICATION INDEX FOR BOYS AND GIRLS**

**Grades 5, 6, 7, 8**

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<th>Exponent</th>
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<th>Weight (Lb.)</th>
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APPENDIX F

YOUTH FITNESS RECORD

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<td>Shuttle-run</td>
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<td>Stand. Brd. Jump</td>
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<td>50-yd. run</td>
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<td>Softball Throw</td>
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<td></td>
<td></td>
<td>600-yd. run</td>
<td>min. sec.</td>
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|     |      |       | Sit-up |           |      |          |
|     |      |       | Pull-up|           |      |          |
|     |      |       | Shuttle-run | min. sec. |      |          |
|     |      |       | Stand. Brd. Jump | ft. in. |      |          |
|     |      |       | 50-yd. run | sec. |      |          |
|     |      |       | Softball Throw | ft. |      |          |
|     |      |       | 600-yd. run | min. sec. |      |          |

**PHYSICAL FITNESS**

The physically fit person is the individual who is able to carry out his normal everyday tasks without undue fatigue and still have an ample reserve of energy to enjoy leisure and to meet emergencies.
APPENDIX G

THE UNIVERSITY OF MICHIGAN
ANN ARBOR
PHYSICAL EDUCATION FOR MEN

March 16, 1959.

Mr. Pierre Roberts
Director of Physical Education
School District #1
Missoula, Montana

Dear Mr. Roberts:

In a case where several percentile ranks are given for the same raw score, I would award the maximum percentile rank.

I would be interested in seeing results of your study. The test is being administered on a wide scale, and we should have literally volumes of data within the next year.

Good luck, and keep me posted.

Sincerely,

(signed)

Paul Hunsicker
Chairman, Department of Physical Education

PH:em
APPENDIX H

FIGURE 19

RANGE OF MEAN PERCENTILE SCORES OF POPULATION TESTED

69

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## APPENDIX I

### Median Percentile School Grade

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### COMPOSITE SCORE MEDIANs BY SCHOOL, GRADE & SEX

70

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