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THE PROGRESS MADE IN IMPROVING THE PHYSICAL FITNESS OF FRESHMEN IN SIX STATE TEACHERS COLLEGES OF MASSACHUSETTS FOR THE SCHOOL YEAR 1937-38

Submitted By

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the degree of Master of Education

1938

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Second Reader: **Edgar W. Everts, Associate Professor of Education**
Third Reader: **Franklin C. Roberts, Associate Professor of Education**

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CHAPTER I

INTRODUCTION

The writer shares with many people, both in and out of the profession, the observation that physical education does not occupy the fundamental place it should occupy in public school programs.

On the whole, a hopeful and friendly public has been generous in providing funds for the development of this method of education, but interested citizens will become increasingly critical of outcomes and demand justification of practices. It would be difficult to justify, on a basis of educational outcomes, much of the expenditure of time and money which bears the label of physical education.[1]

Considerable time might be spent in discussion of reasons for this state of affairs--the lack of agreement among the leaders in this field--failure to give heed to individual differences and needs of pupils--indefinite programs--failure to measure results--failure to treat activities as means rather than ends--failure to recognize and give first consideration to health conservation and the protection and development of sound bodies, as the prime aim of physical education.

Definite programs, with health as a prime contribution which physical education makes to the growing child, have been

[1] Rogers, Frederick Rand: Fundamental Administrative Measures in Physical Education, Newton, Massachusetts, The Pleiades Company, 1932. Appendix, pages 252, 253.

in operation for several years in other states and more recently have been established in an increasing number of cities and towns in Massachusetts. In such places[2] physical education is making remarkable progress in gaining the respect, not only of school authorities but of parents as well.

This emphasis on the development of physical power as the prime contribution of physical education to growth, need in no way detract from the degree to which moral, social, citizenship or character teaching is achieved nor from the carry-over values or recreational activities. It is rather a recognition of obvious and fundamental facts: that good health or abundant vitality is a prime human virtue; that health may be conserved most effectively by teachers through guidance of children's physical activities; that health conservation should be the prime aim of physical education.

Beyond the failure to recognize health as the prime aim of physical education, perhaps the greatest error has been failure to act on the fact that children differ greatly in physical status, and consequently in needs.

Many pupils are seriously underdeveloped and others dangerously over-developed, and physical educators should adapt their programs to individual pupils' needs with the object of increasing the strength of some, maintaining others

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[2] Rogers, Frederick Rand: An Admirable New England High School Physical Education Program, Newton, Massachusetts, The Pleiades Company, 1938.

in their present state, and reducing the strength of still others.

Proper physical fitness tests, in addition to thorough medical examinations are of greatest importance in determining individual needs and in measuring programs in physical education.

Tests in some Massachusetts communities have shown the median physical fitness of pupils to decline from grades 7 through 12 under physical activity programs which are apparently well organized but not directed at health conservation as a prime aim and not adapted to individual needs in that respect. Other tests in communities with programs organized under policies advanced here show that this decline is not necessary and that normal physical capacity and vitality can be maintained and even greatly increased.

It is the particular function of educators to be concerned with health conservation and development: that is, to assist in the correction of certain growth handicaps in pupils, to protect the weak from overstrain, further develop the average pupil and protect robust individuals from over-development.

In order to serve the needs of individual pupils, those needs must be discovered and met by measurement, classification of pupils and adaptation of activities to meet individual needs.

The Problem in Teacher Training Institutions

The problem of physical education in Teachers Colleges differs from that in other institutions. Health conservation,[3] the primary objective of physical education, is increasingly recognized as of vital importance to the teacher both personally and professionally. Who, more than the teacher, should stand as a model of physical fitness, as an inspiration and a guide to children? Who, more than the teacher, has need of a maximum capacity for activity with all that the term implies--of endurance and recuperative powers to meet the rigors of her profession?

This problem of health conservation through a program of rest and physical activity adapted to the individual's need, the solution of which demands the redirection of programs throughout a large part of this field as now constituted. In a Teachers College the added problem of teacher training in physical education is encountered. In addition to the maintenance of her own physical fitness, the teacher, especially in the elementary schools, has the added responsibility of qualifying herself for the health guidance of her pupils. Observations borne out by the study reported here point to great confusion in the field of Teacher College programs.

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[3] Lawton, Shailer Upton and Rogers, Frederick Rand: Educational Paths to Virtue: I, Newton, Massachusetts, The Pleiades Company, 1937.

The centering of attention upon activities, and skill in their performance as outcomes in themselves or as contributing to the attainment of other and vaguely stated aims rather than upon the outcome of activities in terms primarily of physical development, has hampered physical education in the performance of its chief function. This fact is to a large degree responsible for the reluctance of administrators to provide a full measure of time and facilities for the program of physical education. This data reinforces the condition of existing programs as mentioned in the beginning of this thesis.

First, the physical education program for the Teacher College student and her teacher training in physical education for the use in her profession were not handled as distinct problems. It was necessary for the physical education staff to handle both problems in a time allotment insufficient for the proper handling of either.

Second, for the most part physical education classes were held for freshmen and sophomores only. This was done in disregard of the fact that many juniors and seniors, when tested, were found to be low in general physical condition, and the further fact that many freshmen and sophomores participating in the undifferentiated compulsory activity programs were in excellent physical condition.

Third, no effort was made to have activities meet individual needs in terms of health. All pupils, regardless of physicall fitness and individual differences, unless excused

by a physician, were required to take the same type of work. It was later shown that there was a range of "Strength Index" from 700 to 3500 points in the same physical education period.

One could not conceive of a mathematics class composed of students with a mental range of I.Q. from 40 to 120 or varying in mathematical abilities from ignorance of fractions to knowledge of trigonometry. Yet this is the situation in practically all physical education classes in the nation unless they use physical fitness tests of some kind to aid in classifying students.[4]

In setting up a program directed primarily at individual health guidance and conservation of physical fitness, certain fundamental administrative measures are indicated. The introduction of some of these during the school year 1937-38 has provided the data for this study.

Purpose

The purpose of this study is

1. To determine the status of all the freshmen students in the State Teachers Colleges located at Bridgewater, Salem, Fitchburg, Lowell, Framingham and the first-year men at Hyannis.

2. To determine the extent to which progress was made in improving the physical fitness of these students near the close of the school year.

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[4] Opp. Citation, page 2.

3. To furnish a picture of conditions found which would be helpful both to administrators and to instructors in the future redirection of the health and physical education programs in the teacher training institutions of the Commonwealth.

Procedure

To further the first purpose, tests and retests were made in terms primarily of the health aim, and students were included in the redirected elements of the programs as well as those continuing under existing procedures. The data for the study were obtained in part from the records of the Teacher College physical directors and in part from tests conducted by the writer.

The initial tests were given at the various teacher training institutions during the months of October and early in November with the exception of Hyannis, which were not completed until December 1, 1937.

The second tests were completed at all the institutions concerned in this study by May 24, 1938.

All tests were made under the personal supervision of the writer except those at Hyannis. In all cases competent testers assisted, thus assuring reliable results. Instruments for the tests were calibrated and standard testing techniques explained in the following illustration.

The Commonwealth of Massachusetts

DEPARTMENT OF EDUCATION

The Commonwealth of Massachusetts

DEPARTMENT OF EDUCATION

PHYSICAL FITNESS INDEX USED IN SCHOOLS TO AID HEALTH PROMOTION

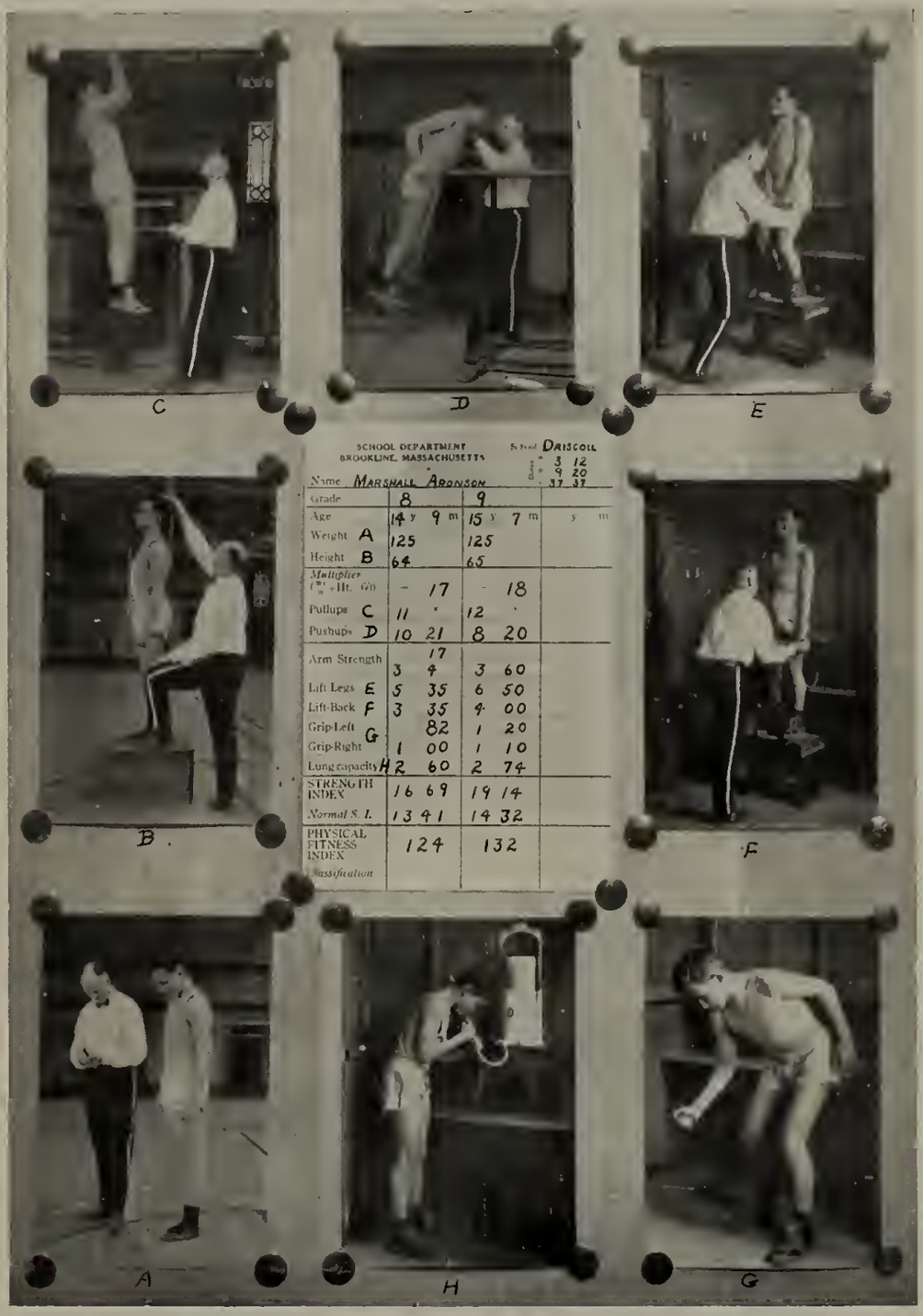
To make more complete and effective the health promotion and maintenance work carried on as a feature of the local school system, there is now used in the department of physical education a plan styled the physical fitness index. In order to acquaint parents with the purpose and operation of this, Director Thomas H. Hines gives the following information regarding it:

"The Physical Fitness Index is a measure of physical condition. It is calculated by dividing one's achieved strength index by a norm for one's sex, weight and age at the time of testing. The average individual less than 21 years old will have a P. F. I. of about 100. Others less than 21 years old will have P. F. I.'s varying from about 40 to 200. Older persons will decline in P. F. I. until at death their P. F. I.'s will be 000—as will also be their powers to perform physical acts.

"Individuals with indices above 100 will have greater physical and mental endurance and precision of movement than those with lower scores. That is, they will be able to keep going longer, more efficiently and at greater speeds, and recuperate faster from fatigue or illness. They will be able to do more work in a given time than others of the same sex, weight and age whose P. F. I.'s are lower.

"The lower the P. F. I. the greater the need for special exercise, diet and advice by physicians and physical educators. Low P. F. I.'s are the results of physical defects, improper food or eating habits, improper exercise, emotional disturbances, or other physical or mental strains or drains or injuries. Individuals with P. F. I's below 85 to 90 ought to engage in supervised remedial activities or rest daily until their indices are 100 or higher. Otherwise they are likely to decline steadily.

"Repeated P. F. I. tests are of inestimable value in determining whether one is gaining or losing in physical fitness and therefore whether one's corrective regime is adapted to one's needs. Many cases are on record of obscure defects and wrong habits, which escaped the attention of physicians and physical educators, being discovered through comparison of P. F. I. records. It is easily possible for individuals of almost any age to raise their P. F. I.'s from 40 to 100 percent with a proportionate increase in physical fitness, power for service and personal happiness."



Reprinted by courtesy of the Chronicle, Brookline, Massachusetts.

School administrators and physical educators desirous of looking further into the administrative procedures, activities and outcomes of the program discussed in the above article would find it worth while to visit the following communities:

BROOKLINE—Mr. Thomas R. Hines
QUINCY—Mr. James J. Carter
NEEDHAM—Mr. Philip H. Claxton
MELROSE-HIGH SCHOOL—Mr. Leonard W. Clark
BRAINTREE—Mr. Elsworth R. Thwing
BRIDGEWATER TEACHERS COLLEGE—Mr. Frederick Meier
HYANNIS TEACHERS COLLEGE—Mr. Frederick Meier
LEXINGTON—Mr. Edward E. Abell
ANDOVER—Mr. Donald D. Dunn
HAVERHILL-HIGH SCHOOL—Mr. Orren B. McKnight
HINGHAM—Mr. Harold R. Danford
MILTON-HIGH SCHOOL—Mr. A. H. Yeaton
POSSE PHYSICAL EDUCATION SCHOOL—Dr. Evelyn B. Lyle

RAYMOND H. GRAYSON
RALPH H. COLSON
Supervisors, Department of Education

4m—5-'38. No. 4035.

In addition to the tests of general physical fitness just described, the results of medical examinations were utilized in determining the physical status of students, thus making classifications as to particular needs more effective. It is interesting to note that the introduction of the physical fitness tests in many instances resulted in more thorough examinations of certain students. For example, students suspected of cardiac or respiratory difficultires, as well as those with wide inguinal rings, were subjected to a thorough medical examination before being permitted to take the P.F.I. tests. Indeed, one of the values of introducing the P.F.I. tests is the more frequent and thorough medical examination of students induced by testing programs.

CHAPTER II

GENERAL PHYSICAL CONDITION OF STATE TEACHER COLLEGE STUDENTS REVEALED THROUGH THE INTRODUCTION OF TESTING PROCEDURE

As a first step in directing the attention of instructors in various State Teachers Colleges considered in this study, it was decided to administer tests of physical fitness to all women and men students. Due to limitation of time, it was decided to concentrate on freshmen in order to do a more thorough job in following up individual cases. The results of the test for freshmen students in the teacher colleges located at Bridgewater, Framingham, Fitchburg, Lowell, Hyannis[5] and Salem have been arranged in the tables which follow.

Bridgewater

For the purpose of depicting the general physical condition of both women and men freshmen students at Bridgewater State Teachers College, Table I on the following page has been prepared.

Table I reveals that there were a total of 129 cases. The P.F.I. scores ranged from 41 to 141 with a median of 93. In other words, more than 50 per cent of the freshmen class at this institution were below normal in general physical fitness. It should be kept in mind that 100 is normal and a P.F.I. of

[5] Only data for the men students at the Hyannis Teachers College was available.

TABLE I

RESULT OF FIRST P.F.I. TEST OF FRESHMEN
AT BRIDGEWATER STATE TEACHERS COLLEGE

SCORE	NUMBER OF WOMEN	NUMBER OF MEN	TOTAL CASES
140-145	1	-	1
135-140	1	-	1
130-135	2	-	2
125-130	2	-	2
120-125	3	-	3
115-120	4	-	4
110-115	5	3	8
105-110	8	-	8
100-105	12	1	13
95-100	14	2	16
90-95	16	2	18
85-90	14	-	14
80-85	10	1	11
75-80	6	-	6
70-75	7	2	9
65-70	2	1	3
60-65	5	-	5
55-60	1	-	1
50-55	2	-	2
45-50	1	-	1
40-45	1	-	1
TOTALS	117	12	129
RANGE	41-141	68-114	41-141
MEDIAN	87	95	93

110 to 115 is a desirable goal for a student preparing to teach in the public schools.

Women Students. The data for women students reveals that the median P.F.I. was only 87. There were 31 girls with P.F.I. below 77. This group was made the subject of a special study. Ordinarily all women students with physical fitness index below 80 are given special attention. The lower dividing line in this case was chosen in the light of existing facilities and to train instructors to more thoroughly follow up individual cases. The program of adjustments made at Bridgewater to meet the individual health needs of students, as well as those made at the other colleges will be described in the chapter which follows.

In connection with the women's program at Bridgewater it is interesting to note the wide range in P.F.I. scores. The lowest score was 41 and the highest 141. In other words, the general physical fitness of the student with the highest score was more than three times that of the lowest. Previous to any differentiation of the general program of physical education to meet individual needs, the weaker student was required to participate in the same activity as that of a strong student. It is also to be noted that the median physical fitness of the women at this institution was very low, being only 87.

Men Students. Data were available for 12 of the 25 men students in the freshmen class. The score ranged from 68 to 114 with a median of 95. Those with P.F.I's of 85 or below were given special treatment. There were only 4, or one-third of the cases, which needed individual attention. It is of interest to note, however, only 4 cases had a P.F.I. of 100 or more.

Salem

For students at the Salem State Teachers College Table II on the following page was prepared.

Referring to Table II there were a total of 97 cases reported. The range of scores was from 58 to 132 and median for the freshmen class was 94 for women students. Considering the women separately from the men it was observed that 21 of the 82 cases or 24 per cent had a P.F.I. below 80. Ordinarily in the public secondary schools about 15 per cent of a given class will have scores this low. This is not to be interpreted as a criticism of the institution, but only shows what is probably happening in all institutions on the collegiate level where no special attention is being given to determine the physical status of pupils and programs modified accordingly. In other words, the further students progress through school the worse their general physical condition becomes.

The median physical fitness of this group was 93.

TABLE II

RESULT OF FIRST P.F.I. TEST OF FRESHMEN
AT SALEM STATE TEACHERS COLLEGE

SCORE	NUMBER OF WOMEN	NUMBER OF MEN	TOTAL CASES
130-135	1	1	2
125-130	-	-	-
120-125	2	2	4
115-120	7	-	7
110-115	5	1	6
105-110	3	2	5
100-105	9	2	11
95-100	7	3	10
90-95	12	3	15
85-90	9	-	9
80-85	6	-	6
75-80	5	1	6
70-75	8	-	8
65-70	3	-	3
60-65	3	-	3
55-60	2	-	2
TOTALS	82	15	97
RANGE	58-130	75-132	58-132
MEDIAN	93	102	94

Men Students. The median physical fitness for men was 102, the highest of any group in the state. In fact, there was only one case with a P.F.I. below 90.

Fitchburg

In the general environment of the two State Teacher Colleges previously discussed it is approximately the same. For the purpose of learning whether or not any significant differences might appear in the physical condition of the students attending a college located further inland, Table III was prepared. Looking at Table III the range of the physical fitness scores of the 57 cases was 49 to 108.

Women Students. There were only 27 in the freshmen class, this being the first of the State Teachers Colleges where the number of men exceeded that of the women. The scores of this group of women ranged from 49 to 158 with a median of 95, the second highest for any group in the state.

It is to be observed that there were only four students in this group who had a P.F.I. below 80.

Men Students. Of a total of 30 cases the scores ranged from 67 to 135, with a median of 101.

Lowell and Framingham

Since there were no men students at either Lowell or Framingham, the data concerning both schools has been grouped

TABLE III

RESULT OF FIRST P.F.I. TEST OF FRESHMEN
AT FITCHBURG STATE TEACHERS COLLEGE

SCORE	NUMBER OF WOMEN	NUMBER OF MEN	TOTAL CASES
155-160	1	-	1
150-155	-	-	-
145-150	-	-	-
140-145	-	-	-
135-140	1	2	3
130-135	1	-	1
125-130	1	-	1
120-125	-	1	1
115-120	1	2	3
110-115	-	7	7
105-110	2	2	4
100-105	1	4	5
95-100	6	4	10
90-95	3	3	6
85-90	3	-	3
80-85	3	2	5
75-80	3	-	3
70-75	-	2	2
65-70	-	1	1
60-65	-	-	-
55-60	-	-	-
50-55	-	-	-
45-50	1	-	1
TOTALS	27	30	57
RANGE	49-158	67-135	49-158
MEDIAN	95	101	94

in Table IV. Also it should be pointed out that about 90 per cent of the students at Lowell major in music education. Therefore, it was of interest to group these two schools to find out whether or not any significant differences might occur between the physical fitness of the students at Lowell and those at Framingham, because the women at the latter institution do not specialize in one particular branch of education.

A study of Table IV reveals that there were a total of 172 students reported. The range of scores for this group was the widest of any group reported--from 46 to 164. It is to be pointed out that the physical fitness was 103, the highest for any similar group in the state.

Lowell. The general physical condition at Lowell was very similar to that of other colleges previously discussed. The P.F.I. scores ranged from 46 to 139 with a median of 92.

Framingham. The range of P.F.I. scores of this institution was the highest of any group in the state ranging from 50 to 164.

Hyannis

No data were available for the women at Hyannis State Teachers College and it was only possible to test 12 men. Table V shows the situation for this group.

Referring to Table V, the median physical fitness of this group was 100. There were only two cases below 85.

TABLE IV

RESULT OF FIRST P.F.I. TEST OF FRESHMEN (WOMEN) AT LOWELL AND FRAMINGHAM STATE TEACHERS COLLEGES

SCORE	NUMBER LOWELL	NUMBER FRAMINGHAM	TOTAL CASES
160-165	-	2	2
155-160	-	-	-
150-155	-	-	-
145-150	-	-	-
140-145	-	1	1
135-140	3	-	3
130-135	-	1	1
125-130	2	4	6
120-125	-	10	10
115-120	4	3	7
110-115	6	15	21
105-110	2	1	3
100-105	7	15	22
95-100	6	8	14
90-95	3	14	17
85-90	4	5	9
80-85	10	10	20
75-80	4	2	6
70-75	4	6	10
65-70	3	3	6
60-65	2	4	6
55-60	1	2	3
50-55	1	3	4
45-50	1	-	1
TOTALS	63	109	172
RANGE	46-139	50-164	46-164
MEDIAN	92	103	96

TABLE V

RESULT OF FIRST P.F.I. TEST OF FRESHMEN (MEN) AT HYANNIS STATE TEACHERS COLLEGE

SCORE	NUMBER
140-145	2
135-140	-
130-135	-
125-130	-
120-125	-
115-120	1
110-115	2
105-110	1
100-105	-
95-100	3
90-95	1
85-90	-
80-85	2
TOTAL	12
RANGE	84-143
MEDIAN	100

All Freshmen Students

For the purpose of depicting the total picture of the general physical fitness of both the men and women students in the colleges studied Table VI was prepared.

In Table VI it is observed that there were a total of 467 cases reported. The median P.F.I. for all freshmen was 95.

Women Students. The median physical fitness for 398 cases was 94. Of this total 82 or 22 per cent had a P.F.I. below 100. This is indeed a sad commentary on the physical fitness of the students being sent from our secondary schools to the state teacher training institutions of the Commonwealth.

The data clearly indicate the magnitude of the job which faces the instructor in the Teachers Colleges of the State in their efforts to raise a general physical fitness of the young women who are candidates for entrance into the teaching profession.

Men Students. Of a total of 69 cases the median physical fitness for men was 100. While this was higher than that for women it is considerably lower for high school seniors throughout the country where these tests have been conducted. Since the data reveal that nearly 50 per cent of the men in the State Teachers Colleges have a P.F.I. below 100 there is definite need for instructors to concentrate on the individual needs of this group.

TABLE VI

RESULT OF FIRST P.F.I. TEST FOR ALL FRESHMEN STUDENTS IN THE TEACHER COLLEGES OF BRIDGEWATER, FITCHBURG, FRAMINGHAM, HYANNIS, LOWELL AND SALEM (MASSACHUSETTS)

SCORE	NUMBER OF WOMEN	NUMBER OF MEN	TOTAL CASES
160-165	2	-	2
155-160	1	-	1
150-155	-	-	-
145-150	2	-	2
140-145	-	2	2
135-140	5	2	7
130-135	5	1	6
125-130	9	-	9
120-125	15	3	18
115-120	19	3	22
110-115	31	13	44
105-110	16	5	21
100-105	44	7	51
95-100	41	12	53
90-95	48	9	57
85-90	35	-	35
80-85	39	5	44
75-80	20	1	21
70-75	25	4	29
65-70	11	2	13
60-65	14	-	14
55-60	6	-	6
50-55	6	-	6
45-50	3	-	3
40-45	1	-	1
TOTALS	398	69	467
RANGE	41-164	67-143	41-164
MEDIAN	94	100	95

CHAPTER III

MODIFICATION OF PROGRAMS BASED ON TESTING PROCEDURES

The general physical condition of the students in the six State Teachers Colleges was revealed in the preceding chapter. With this data as a basis, steps were taken to modify the existing program of health and physical education in these institutions. The new program was introduced by means of successive conferences with the presidents and the instructors of the various teachers colleges.

It is most desirable to classify students for physical education in accordance with their needs as indicated by medical, physical fitness and other proper tests. This ideal arrangement in the various loci of the study could not be effected. In fact, it would be well to keep in mind that this analysis of existing conditions relative to the physical condition of the students was for the purpose of demonstrating an existing weakness and of pointing the way to its correction. Indeed, the modifications made were the best adjustments that could be effected under the conditions determined by the facilities and the teacher staff and constituted an initial effort to show what might be done under more favorable circumstances.

With the thought expressed above in mind, and the fact that the most significant results could be obtained by attack-

ing the most glaring weakness of the established programs, an effort was made to concentrate attention on those students of greater need as expressed by the tests in terms of health development. Following the conferences referred to above, the procedures outlined below were followed by the instructors in the State Teachers Colleges immediately after the tests were given. A further result of the conferences was to set up a suggested procedure for administrative adjustments in the program to the end, that the way to a more progressive program would be definitely outlined.

Procedures Followed By Instructor After Initial Tests

1. The P.F.I. scores were calculated and cards arranged in order from the lowest to the highest, keeping in mind that in P.F I. 100 is normal and P.F.I. 115 and 120 is more nearly an ideal objective. A low group was established by starting with the lowest score and working up towards the ideal until a point was reached which would include as many students as could possibly be given special attention in the particular school. In some instances the low group was composed of pupils of P.F.I's below 100 and in other institutions the line was of necessity drawn at P.F.I. 70.

2. A study was made involving scrutiny of the P.F.I. record, the medical examination report, in some instances other significant records and consultation with the individual students. This study was an effort to determine the cause of the

pupil's low condition so that it might be administered to, specifically through modification of activities, rest program, diet and other factors. The individual cases often involved resort to further consultation with the school or family physician or nurse. In many instances it was impossible by the indicated activity program carried on under the direct personal supervision of the physical instructor and was accomplished to some degree informally and voluntarily by the student. In other instances, spare or study periods coincided with existing physical education classes and students were able to get needed additional activity periods under instruction.

3. Frequent visits and correspondence was necessary to encourage instructors in the pursuit of the desired goal (a redirected program) in view of the difficulties under which they were working and in view of the fact that with one or two exceptions they were not overly familiar with the philosophy and program involved. It is to be mentioned that most of the teachers in the past have not been trained definitely to follow up the individual health needs of the pupils.

4. Activity adjustments based on discovered needs ranged all the way from hospitalization to physical education class-time rest periods, to five-day per week activity programs including such activities as formal body mechanics, exercises, tennis, rope jumping, hiking and bicycling.

Suggested Administrative Adjustments for Future Guidance in Administering the Program of Health and Physical Education in the Teachers Colleges of Massachusetts

I. Physical Education

A. Conservation of students' physical fitness. Program adapted to individual needs. Students required to attend according to need, regardless of class (freshmen, sophomore, junior, senior) until physical fitness is normal. No credit.

Classification on results of
- Medical Examination
- Physical Fitness Test
- Silhouettograph
- Skill Tests
- Social Considerations

Lowest ¼ - divided into 4, 5 or 6 groups for daily physical examination.

Next ¼ - divided into 2 or 3 groups for supervised recreation twice a week.

Remaining ½ on self-directed activities under supervision. (Results of retests here are a check on whether or not good activity habits were formed). Retest and re-assignment at least annually for all and semi-annually for lowest ¼.

B. A year's course, twice a week, half practice and half theory. Preparing teachers to direct playground, gymnasium and corrective activities under direction of

supervisors. (2, 3 or 4 credits).

II. Health Teaching

A year's course to prepare teachers to teach health habits and information to school children.

A. Methods and materials to teach health information to older children. (2 credits)

B. Methods and materials to teach health habits to younger children. (2 credits)

III. Course of Study

Development of printed Course of Study in Physical Education and Health, to be developed during the next year on basis of reports and suggestions of Teacher College Physical Education Teachers.

CHAPTER IV

ANALYSIS OF INDIVIDUAL CASES LOW IN PHYSICAL FITNESS

As a result of the modification of the program referred to in Chapter III which entailed considerable work on the part of several of the instructors, significant gains were achieved by many individuals found to be low as a result of the first test. Unfortunately, only one instructor, Miss Lois E. Decker, Supervisor of Physical Education for Women at Bridgewater, gave a detailed report relative to the follow-up procedure utilized in improving the physical fitness of her students. Her data are summarized below.

Studies of Low P.F.I. Cases at Bridgewater[6]

No.	P.F.I. Scores Nov. 1937	May 1938	Change	Apparent Cause	Procedure Recommended	Comment
1.	76	74	Loss 2	Lack of exercise. No interest. Psychological maladjustment.	Guidance in mental hygiene. Additional activity of own choice.	Half-hearted cooperation. Problem not solved.
2.	74	80	Gain 6	Rapid heart, lack of exercise.	Regular moderate exercise.	Good cooperation

[6] Data furnished through the courtesy of Lois E. Decker, Supervisor of Physical Education, Bridgewater State Teachers College.

No.	P.F.I. Scores Nov. 1937	May 1938	Change	Apparent Cause	Procedure	Comment
3.	73	92	Gain 19	Overweight	Diet, rest exercise	Good cooperation
4.	72	76	Gain 4	Lack of physical activity except during summer. Sedentary interests.	Additional activity	Needs further study
5.	72	88	Gain 16	Dysm - lack of physical activitactivity ivity	Additional	
6.	72	84	Gain 12	Inadequate rest	Regular sleep	
7.	71	78	Gain 7	Inadequate exercise. Music and club work greater interest.	Additional activity Dancing, hiking, conditioning.	
8.	70	87	Gain 17	Inadequate exercise	Regular program.	
9.	69	71	Gain 2	Sedentary, intellectual interests.	Conditioning classes, added recreational activity.	Very faithful effort to improve. Very high scholarship.
10.	69	(Mens. P.)		Lack of exercise	Increased activity. Corrected vision. Conditioning additional sports.	
11.	68	79	Gain 11	Nervous, poor vision. Lack of exercise.		

No.	P.F.I. Scores Nov. 1937	May 1938	Change	Apparent Cause	Procedure Recommended	Comment
12.	68	73	Gain 5	Congenital heart defect, erratic exercise habits.	Regular moderate exercise. Balanced with rest.	Needs further guidance.
13.	67	ab. (115)	Gain 48	No previous physical education.	Regular program.	
14.	67	78	Gain 11	Faulty diet and constipation	Improved diet.	
15.	67	ab.		Lack of exercise. Poor eating habits.	Improved diet. Conditioning class.	Needs further study.
16.	66	83	Gain 17	Dysm - Vision defect, overactive.	Regular rest Reduced activities. Corrected vision.	Under doctor's care for treatment of stiff neck. To have tonsils removed this summer.
17.	66	69	Gain 3	Overweight. Poor diet, lack of activity.	Improved diet, increased activity.	Needs further study.
18.	65	Left college				
19.	64	absent		Inadequate exercise	Conditioning class	
20.	63	70	Gain 7	History of chronic appendicitis since childhood. Recent operation.	Gradual increase of activity	

No.	P.F.I. Scores Nov. 1937	May 1938	Change	Apparent Cause	Procedure Recommended	Comment
21.	63	86	Gain 2	None	Regular program	
22.	61	72	Gain 11	Overweight, lack of exercise.	Further medical examination.	Under the doctor's care, lost 5 pounds. Very cooperative.
23.	60	62	Gain 2	Lack of exercise	Conditioning class	Needs further study.
24.	59	59	None	Hypothyroid Basal metabolism - 24.	Continue under doctor's care. Rest, mild exercise.	Still under doctor's care. Condition poor Needs further study.
25.	54	58	Gain 4	Marked overweight	Further medical examination. Guided reducing.	Doctor does not advise Basal Metabolism yet - has lost 9 pounds only.
26.	48	70	Gain 22	Overweight, starchy diet, sedentary interests.	Conditioning class 2 per week. Hiking.	
27.	51	M.P.		Marked overweight.	Further medical examination. Guided reducing.	Doctor does not advise basal metabolism. Slight loss of weight.
28.	41	51	Gain 10	Inactivity due to back condition.	Increased moderate and specialized activity under doctor's care.	Will probably continue to improve as back strengthens.

No.	P.F.I. Scores Nov. May 1937-1938	Change	Apparent Cause	Procedure Recommended	Comment
29.	67		Heart condition. Under doctor's care.	Gradual increase in regular exercise.	
30.	91		No test first time because of recent appendectomy.	Gradual increase in exercise.	
31.			Heart condition.	Gradual increase in exercise under doctor's care.	Under doctor's care, who is omitting test until next year.

Summary of Follow-Up Procedure

All students were notified of scores;and their significance was discussed. In most cases the usual activity program was continued. In freshmen low group - (31 - about 20 per cent of class) special conferences were held at intervals during the year. Partially adjusted programs were carried on, on a voluntary basis.

15 took additional activity conditioning exercises

3 took additional rest and minimum of activity

12 made no great change in program.

After the second test, conferences were held with most of those who showed a change of more than 5 points to discover the probable reasons for loss or gain and to recommend procedures for the summer.

Results of Low Group Studies

29 (score of 76 and below.) 2 unfit to take complete test. Giving a total of 31 low ones.

	21	gained
	1	lost (2 points)
	1	remained the same
	4	missed second test
	2	omitted first test
	1	omitted both tests
	1	left college
Total	31	

Of entire group - total tested first time 117. On second test 3 remained the same.

	27	changed less than 5 points
	57	gained more than 5 points
	2	incomplete tests
	10	lost more than 5 points
	16	missed the second test
	2	left college
Total	117	

Summary of Follow-up Procedures for Freshmen Women at Salem and Fitchburg State Teachers Colleges

As previously noted, no detailed reports of the progress of individual cases were available from the other five Teachers Colleges concerned in this study. It is to be understood, however, that definite efforts were made to follow through the cases of pupils low in physical fitness. Following are examples of progress made improving physical fitness in certain cases.

Study of two cases at Salem.

No.	P.F.I. Scores Nov. 1937	May 1938	Change	Apparent Cause	Procedure Recommended	Comment
1.	59	83	Gain 24	Lack of exercise.	Change of diet. Broader physical education program.	Need of more recreational development.
2.	71	83	Gain 27	Needs a special program	Additional activity	Good cooperation.

Study of two cases at Fitchburg.

1.	79	88	Gain 9	Lack of play	Body mechanics. Special exercise class	Very faithful
2.	84	95	Gain 11	Interested in program. Happy.	Regulated activity. Also strict diet.	Needs special guidance

Summary of Follow-up Procedures for Freshmen Men at Bridgewater, Fitchburg and Hyannis

The preceding sections of this chapter have dealt with analysis of individual cases for women students. In this section we are interested in the work done by the instructors to improve the cases low in physical fitness among the men at Bridgewater, Fitchburg and Hyannis.

Study of two cases at Bridgewater.

No.	P.F.I. Scores Nov. 1937	May 1938	Change	Apparent Cause	Procedure Recommended	Comment
1.	73	92	Gain 31	Increased weight 5 lbs. Also activity.	Increased exercise.	
2.	83	5-103	Gain 19	Weight increased 2 lbs. Hiking.	Heavy exercise.	

Study of two cases at Fitchburg.

1.	74	101	Gain 27	Enjoyed physical education. More activity.	Rope jumping.	Squeezed small rubber ball, too gain grip strength.
2.	120	150	Gain 30	Loss of 2 lbs. worked out often in gymnasium.	Hand grip, and jump rope exercises.	

Study of two cases at Hyannis.

No.	P.F.I. Scores Nov. 1937	May 1938	Change	Apparent Cause	Procedure Recommended	Comment
1.	83	110	Gain 27	Competed in athletics for first time.	A good deal of walking.	Enjoyed class work.
2.	84	98	Gain 14	Loss of 9 lbs. helped this lad. Much more activity.	Gymnasium work and intra-murals	A lad well liked.

CHAPTER V

EVIDENCE OF PROGRESS AS SHOWN BY COMPARISON OF FIRST AND SECOND PHYSICAL FITNESS TESTS

In Chapter IV efforts made to improve the physical condition of students low in physical fitness were discussed. It is the purpose in this Chapter to furnish a general picture of the progress made by all students in the six State Teachers Colleges. A number of tables were prepared to reveal the extent of progress made during the school years 1937 and 1938 at each institution.

Bridgewater

Women. Table VII gives comparisons between first and second tests for freshmen (women).

By observing Table VII it is noted that the median P.F.I. for women freshmen students at Bridgewater was 87 compared with 98 on the second test. The range of scores on the first test was from 41 to 141 compared with 51 to 155 on the second test. It is clear that a definite effort has been made to meet more adequately the individual health needs of the students in this institution.

Men. In order to find out what changes were brought about in the general physical condition of the freshmen men, Table VIII has been constructed.

TABLE VII

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR WOMEN IN THE FRESHMEN CLASS AT BRIDGEWATER STATE TEACHERS COLLEGE

SCORE	FIRST TEST	SECOND TEST
155-160	-	1
150-155	-	-
145-150	-	1
140-145	1	1
135-140	1	1
130-135	2	1
125-130	2	3
120-125	3	3
115-120	4	3
110-115	5	5
105-110	8	12
100-105	12	11
95-100	14	13
90-95	16	15
85-90	14	8
80-85	10	7
75-80	6	7
70-75	7	3
65-70	2	2
60-65	5	-
55-60	1	1
50-55	2	1
45-50	1	-
40-45	1	-
TOTALS	117	99
RANGE	41-141	51-155
MEDIAN	87	98

TABLE VIII

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR MEN IN THE FRESHMEN CLASS AT BRIDGEWATER STATE TEACHERS COLLEGE

SCORE	FIRST TEST	SECOND TEST
125-130	-	1
120-125	-	1
115-120	-	2
110-115	3	-
105-110	1	3
100-105	2	2
95-100	2	1
90-95	-	1
85-90	1	-
80-85	-	-
75-80	2	1
70-75	1	-
TOTALS	12	12
RANGE	68-114	75-129
MEDIAN	95	107

The median physical fitness on the first test was 95 compared with 105 on the second test. Further study of Table VIII shows that there were five students with a P.F.I. below 85 on the first test whereas on the second test there was only one student in this group who had failed to show a gain.

Salem

Women. A comparison of the physical fitness status of the freshmen women on the second test compared with the first test is illustrated in Table IX.

Table IX shows that the median on the first test for women was 93. On the second test the median had been raised to only 96. Failure to obtain better results in this situation was due, no doubt, to the fact that the instructor in charge was only able to concentrate individual attention on a limited number of the girls found to be low on the first test.

Men. For the purpose of comparing the general physical fitness of the men students on the first test with that on the second, Table X was prepared.

A study of Table X revealed that a very material increase was made in the physical fitness of the freshmen men at Salem. The median physical fitness on the first test was 102 and was raised to 114 by the end of the year. It is of interest to note that on the second test only two students had a P.F.I. below 100. This shows that the Salem director, Lawrence Lawry, must have been unusually hard-working and effective.

TABLE IX

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR WOMEN IN THE FRESHMEN CLASS AT SALEM STATE TEACHERS COLLEGE

SCORE	FIRST TEST	SECOND TEST
155-160	-	-
150-155	-	-
145-150	-	-
140-145	-	1
135-140	-	-
130-135	1	3
125-130	-	-
120-125	2	2
115-120	7	6
110-115	5	6
105-110	3	4
100-105	9	10
95-100	7	14
90-95	12	11
85-90	9	9
80-85	6	9
75-80	5	4
70-75	8	5
65-70	3	5
60-65	3	1
55-60	2	-
50-55	-	-
TOTALS	82	96
RANGE	58-130	64-144
MEDIAN	93	96

TABLE X

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR MEN IN THE FRESHMEN CLASS AT SALEM STATE TEACHERS COLLEGE

SCORE	FIRST TEST	SECOND TEST
135-140	-	1
130-135	1	1
125-130	-	1
120-125	2	1
115-120	-	3
110-115	1	4
105-110	2	1
100-105	2	1
95-100	3	1
90-95	3	-
85-90	-	1
80-85	-	-
75-80	1	-
TOTALS	15	15
RANGE	75-132	88-140
MEDIAN	102	114

Fitchburg

Women. A comparison between the scores on the first and second tests for freshmen women are found in Table XI.

The range of scores on the first test was from 49 to 158 and the range on the second test was from 40 to 160. The median score on the first test was 95 compared with 106 on the second test. Further, it was observed that there were 19 students with a P.F.I. below 100 on the first test, whereas on the second test there were only 10 in this group. It is significant to note that two students on the second test dropped below their scores on the first. These facts demonstrate the necessity for continued follow-up procedures in order to insure the protection of students who fail to respond in the initial stages of the program.

Men. In oder to determine what progress has been made in the improvement of the physical fitness of the men students, Table XII has been prepared.

It was observed in studying Table XII that the range of scores on the first test was from 67 to 135 and on the second test from 70 to 155, and that the median on the first test was 101 with an increase of 11 P.F.I. points to 112 on the second. There were 12 students with a P.F.I. below 100 on the first test and this had been reduced to 7 on the second.

TABLE XI

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR WOMEN IN THE FRESHMEN CLASS AT FITCHBURG STATE TEACHERS COLLEGE

SCORE	FIRST TEST	SECOND TEST
155-160	1	1
150-155	-	-
145-150	-	-
140-145	-	-
135-140	1	1
130-135	1	1
125-130	1	-
120-125	-	1
115-120	1	2
110-115	-	1
105-110	2	5
100-105	1	1
95-100	6	3
90-95	3	1
85-90	3	1
80-85	3	1
75-80	3	1
70-75	-	1
65-70	-	-
60-65	-	-
55-60	-	-
50-55	-	-
45-50	1	-
40-45	-	1
TOTALS	27	22
RANGE	49-158	40-160
MEDIAN	95	106

TABLE XII

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR MEN IN THE FRESHMEN CLASS AT FITCHBURG STATE TEACHERS COLLEGE

SCORE	FIRST TEST	SECOND TEST
150-155	-	1
145-150	-	-
140-145	-	-
135-140	2	1
130-135	-	2
125-130	-	3
120-125	1	1
115-120	2	4
110-115	7	5
105-110	2	3
100-105	4	3
95-100	4	2
90-95	3	2
85-90	-	1
80-85	2	1
75-80	-	-
70-75	2	1
65-70	1	-
TOTALS	30	30
RANGE	67-135	70-150
MEDIAN	101	112

Lowell

A comparison of the physical fitness of the freshmen women on the first test with that on the second test is shown in Table XIII.

Reference to Table XIII shows that the median physical fitness on the first test was 92 and on the second test no significant gain was made. From this is is clear that conditions prevented students from improving their general physical fitness.

Framingham

Table XIV gives a comparison of the status of the freshmen women at Framingham on the first test with that of the second.

A study of Table XIV reveals that the median physical fitness on the first test was 103. As previously pointed out, this was the high for any similar group in the state. On the second test, however, the median physical fitness at Framingham had dropped to 86. In other words, the general physical fitness of this group was very definitely on the decline and indicates that immediate steps should be taken to provide differentiated programs for those low in physical fitness. It is further observed in studying Table XIV that a large number who scored high on the first test had dropped considerably on the second test. Since the Framingham results reveal that

TABLE XIII

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR WOMEN IN THE FRESHMEN CLASS AT LOWELL STATE TEACHERS COLLEGE

SCORE	FIRST TEST	SECOND TEST
145-150	-	1
140-145	-	1
135-140	3	1
130-135	-	-
125-130	2	1
120-125	-	3
115-120	4	4
110-115	6	2
105-110	2	6
100-105	7	4
95-100	6	6
90-95	3	5
85-90	4	6
80-85	10	5
75-80	4	5
70-75	4	4
65-70	3	2
60-65	2	1
55-60	1	2
50-55	1	-
45-50	1	-
TOTALS	63	59
RANGE	46-139	58-147
MEDIAN	92	94

TABLE XIV

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR WOMEN IN THE FRESHMEN CLASS AT FRAMINGHAM STATE TEACHERS COLLEGE

SCORE	FIRST TEST	SECOND TEST
170-175	-	1
165-170	-	-
160-165	2	-
155-160	-	-
150-155	-	-
145-150	-	-
140-145	1	1
135-140	-	-
130-135	1	2
125-130	4	3
120-125	10	2
115-120	15	2
110-115	1	5
105-110	15	9
100-105	8	8
95-100	14	10
90-95	5	9
85-90	10	5
80-85	2	15
75-80	6	14
70-75	3	12
65-70	4	2
60-65	2	6
55-60	3	2
50-55	-	3
TOTALS	109	109
RANGE	50-164	50-175
MEDIAN	103	86

freshmen are positively declining in physical fitness, it is necessary to their future personal as well as professional welfare that conditions be radically changed.

Hyannis

A comparison of the general physical fitness of the men revealed on the first test with that of the second is reported in Table XV.

The median physical fitness on the first test was 100 compared with 110 on the second. This represents a 10 per cent gain and is the ninimum which may be expected in a group where definite efforts are made to meet the individual health needs of students.

Comparison of Results of First and Second P.F.I. Tests for All Women

The comparison between the scores on the first and second tests for all women students in the state is illustrated in Table XVI.

Table XVI shows that the first test was administered to a total of 398 students and 385 were available for the second te test. The median for all of the women on the test was 94 compared with 95 on the second. In other words, taken as a whole there was only a slight gain made in the general fitness of all the women students at the five State Teachers Colleges for whom data were available.

TABLE XV

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR MEN IN THE FRESHMEN CLASS AT HYANNIS STATE TEACHERS COLLEGE

SCORE	FIRST TEST	SECOND TEST
145-150	-	2
140-145	2	-
135-140	-	-
130-135	-	1
125-130	-	-
120-125	-	1
115-120	1	2
110-115	2	-
105-110	1	3
100-105	-	1
95-100	3	-
90-95	1	1
85-90	-	-
80-85	2	1
TOTALS	12	12
RANGE	84-143	80-150
MEDIAN	100	110

TABLE XVI

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR ALL WOMEN IN THE FRESHMEN CLASSES AT BRIDGEWATER, SALEM, FITCHBURG, LOWELL AND FRAMINGHAM

SCORE	FIRST TEST	SECOND TEST
170-175	-	1
165-170	-	-
160-165	2	-
155-160	1	2
150-155	-	-
145-150	2	2
140-145	-	4
135-140	5	3
130-135	5	7
125-130	9	7
120-125	15	11
115-120	19	17
110-115	31	18
105-110	16	36
100-105	44	34
95-100	41	46
90-95	48	41
85-90	35	29
80-85	39	37
75-80	20	31
70-75	25	25
65-70	11	11
60-65	14	8
55-60	6	5
50-55	6	4
45-50	3	-
40-45	1	1
TOTALS	398	385
RANGE	41-164	40-175
MEDIAN	94	95

Although appreciable gains in physical condition were noted for the women at Bridgewater and Fitchburg as reported in Table XII and Table X the reason for the lack of a substantial gain for the women as a whole is to be found in the serious decline of the general physical condition of the students at Framingham.

Again, a study of Table XVI reveals that 84 students, or 21 per cent of the entire group had P.F.I's of 80 or below on the first test, while on the second test 22 per cent were in this category. The facts just mentioned indicate the need for further follow-up work for students low in physical fitness.

Comparison of Results of First and Second P.F.I. Tests for All Men

Comparative scores of the first and second tests administered to all the men in the Teachers Colleges located at Bridgewater, Salem, Fitchburg and Hyannis are to be found in Table XVII.

Table XVII reveals that there were a total of 69 men tested on each occasion. The median physical fitness score on the first test was 100 and on the second test this was raised to 109. This shows that serious and successful effort were made to improve the physical fitness of the men students. A study of the data for those with a P.F.I. below 85 shows the extent of progress quite clearly. Of this group the number of students with Physical Fitness Indices below 85 on the first test

TABLE XVII

A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND P.F.I. TESTS FOR ALL MEN IN THE FRESHMEN CLASSES AT BRIDGEWATER, SALEM, FITCHBURG AND HYANNIS

SCORE	FIRST TEST	SECOND TEST
150-155	-	1
145-150	-	2
140-145	2	-
135-140	2	1
130-135	1	3
125-130	-	4
120-125	3	6
115-120	3	8
110-115	13	8
105-110	5	12
100-105	7	7
95-100	12	5
90-95	9	4
85-90	-	3
80-85	5	2
75-80	1	2
70-75	4	-
65-70	2	1
TOTALS	69	69
RANGE	67-143	67-150
MEDIAN	100	109

numbered 12 or 17 per cent of the total. On the second test, however, there were only five students so classified, or only 7 per cent of the total.

Concerning the progress made by the men, it is to be said that the number of students enrolled at each institution was small and therefore gave instructors better opportunity to follow through the cases of those low in physical fitness.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

The introduction, in part, of the specific program discussed in Chapter III has produced certain definite results. First, the records of the students on the initial test and the general low level of physical fitness of the students was a revelation to instructors and administrators. The test results showing so many deficient in physical powers placed a challenge before the instructor and opened an avenue to a field of service and a possible source of satisfaction unexplored by them up to that time. More specifically, the test revealed that:

1. An appallingly large number of students preparing to teach were considerably below normal in physical fitness.
2. Without proper health guidance and activity programs adjusted to their particular needs, most of these students continuing the habits of living largely responsible for their low condition would continue to decline in physical powers.
3. With proper activity programs, coordinated health guidance and the service of all available health affecting agencies, most of these low students could be greatly improved.

It was hoped that the introduction of the program which had as its basis a better provision for the individual health needs of the students in the teacher training institutions would result in a material improvement in their general physical condition. It was realized, of course, that certain difficulties such as those mentioned in Chapter I on pages 2 and 3 would be encountered. Indeed, it is a considerable accomplishment to improve the physical fitness of a student low on the scale even 10 per cent involving, as it does, the task of changing habits of physical activities, diet and rest and sometimes even requiring a detailed medical follow-up.

From the data set forth particularly in Chapter V, it is clear that in several of the institutions a serious attempt was made to improve the physical condition of pupils and to maintain the level of physical fitness of those higher on the scale. The accomplishments to date may be summarized as follows:

1. Important progress was made in improving the physical fitness of the women students at Bridgewater, Fitchburg and Salem State Teachers Colleges.
2. A very significant gain was made in the improvement of the physical condition of the men at all of the State Teachers Colleges studied.
3. From the selected cases mentioned in Chapter IV, certain individuals were helped very materially along the road of better health and this evidence should

serve to awaken administrators to the shortcomings of previous practices in physical education and to the real potentialities of a redirected program.

As noted in Chapter IV, the students at Lowell and Salem failed to improve to any great extent, and those at Framingham deteriorated to a serious extent. In all instances, if certain adjustments were made and if the whole school would cooperate in terms of health as a prime objective, the general level of physical fitness could be greatly improved.

Since the new program has only been under way for one year, it is not to be expected that all of the instructors would grasp its full significance. Further, administrative difficulties such as inability to provide individual programs for certain students due to lack of time or the pressure of other curricular subjects has been a factor militating against best results. Whatever the reason for lack of progress in improving the health of students in certain of the institutions and of making more effective progress in all of them, it is the responsibility of those who are administering these institutions to see that further steps are taken to raise the general level of the health of the students.

Recommendations

Before making specific recommendations, it is well to remind administrators, and particularly the instructors, that one of their prime responsibilities is the development and

conservation of the health of their charges. Following are specific recommendations for the further improvement of the physical education program in the teacher training institutions of the Commonwealth.

1. Instructors should exercise the utmost care in analyzing the cases of pupils low in physical fitness. Every effort should be made to find "the cause of the cause" of low P.F.I's.
2. A more vigorous attempt should be made to classify students as to need for physical development and to modify programs accordingly.
3. More time should be devoted to individual students low in physical fitness and to those high in physical fitness the physical activity program may well be curtailed.
4. Administrators may well give more attention and support to their instructors in their efforts to more effectively meet the individual health needs of the students. Steps which will help in this direction are:
    a. More thorough and efficient general medical examinations should be given.
    b. Adequate time allotments for students urgently in need of individual health guidance should be provided.

c. All members of the school faculty should be induced to cooperate in helping to solve the health problems of the individual being given special attention through the school department. This may mean in some instances a modification of the school study program temporarily.

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APPENDIX

The detailed Physical Fitness Index records for the cases of the men at Bridgewater, Fitchburg and Hyannis are included for the benefit of those who may be interested in a detailed study of the same. They are arranged in order on the pages which follow.

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF EDUCATION

Name #1 Bridgewater S.T.C.

	Date		
m	10	2	3
d	18	28	24
y	37	38	38

Grade I						
Age	18 y	2 m	18 y	5 m	18 y	8 m
Weight	148½	—	154	—	156¾	—
Height	68	—	68	—	68½	—
$(\frac{Wt.}{10} + Ht.-60)$ Multiplier	—	23	—	24	—	24
Pullups	7	X	11	X	12	X
Pushups	4	11	10	21	12	24
Arm Strength						96
	2	53	5	05	4	8
Lift-Legs	3	74	5	94	5	32
Lift-Back	3	30	3	96	4	40
Grip-Left		75		80		90
Grip-Right		95		95	1	00
Lung capacity	3	05	3	00	3	20
STRENGTH INDEX	14 32		19 70		20 58	
Normal S.I.	19 74		21 21		21 82	
PHYSICAL FITNESS INDEX	73		92		92	
Classification						

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF EDUCATION

Name #2 Bridgewater S.T.C.

	Date		
m	10	2	5
d	18	28	24
y	37	38	38

Grade I						
Age	20 y	9 m	21 y	0 m	21 y	3 m
Weight	152	—	154	—	155	—
Height	70 1/4	—	70 1/4	—	71	—
$(\frac{Wt.}{10} + Ht. - 60)$ Multiplier	—	25	—	26	—	27
Pullups	10	X	9	X	9	X
Pushups	6	16	7	16	9	18
Arm Strength			1	56	2	16
	4	00	2	6	2	7
Lift-Legs	5	06	8	38	8	10
Lift-Back	4	18	4	84	4	62
Grip-Left	1	00	1	10	1	15
Grip-Right	1	08	1	20	1	42
Lung capacity	2	70	2	80	2	70
STRENGTH INDEX	1802		2248		2285	
Normal S.I.	2155		2172		2216	
PHYSICAL FITNESS INDEX	83.5		103		103	
Classification						

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF EDUCATION
Name #1 Fitchburg S.T.C.

	Date	
m	11	5
d	9	11
y	37	38

Grade I						
Age	18 y	11½ m	19 y	5½ m	y	m
Weight	142	—	145	—		—
Height	70½	—	71	—		—
(Wt. ÷ Ht.-60) / 10 Multiplier	—	25	—	24	—	
Pullups	1	X	3	X		X
Pushups	2	3	2	5		
Arm Strength						
		75	1	20		
Lift-Legs	8	60	13	00		
Lift-Back	3	70	4	25		
Grip-Left		43		96		
Grip-Right		47	1	00		
Lung capacity	2	20	2	70		
STRENGTH INDEX	16	15	23	11		
Normal S.I.	21	72	22	76		
PHYSICAL FITNESS INDEX	74		101			
Classification						

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF EDUCATION

Name #2 Fitchburg S.T.C.

	Date	
m	11	5
d	9	11
y	32	28

Grade I						
Age	22 y	3 m	22 y	9 m	y	m
Weight	138	—	136	—		—
Height	66¼	—	66½	—		—
$(\frac{Wt.}{10} + Ht.-60)$ Multiplier	—	20	—	20	—	
Pullups	7	X	9	X		X
Pushups	9	16	7	16		
Arm Strength	3	20	3	20		
Lift-Legs	11	50	17	40		
Lift-Back	6	15	5	50		
Grip-Left		90	1	04		
Grip-Right	1	00	1	20		
Lung capacity	3	02	3	20		
STRENGTH INDEX	2577		3154			
Normal S.I.	2137		2103			
PHYSICAL FITNESS INDEX	120		150			
Classification						

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF EDUCATION

Name #1 HYANNIS S.T.C.

	Date		
m	11	1	6
d	18	27	2
y	37	38	38

Grade I						
Age	21 y	0 m	21 y	2 m	21 y	5 m
Weight	162½	—	160	—	163½	—
Height	67	—	67	—	67	—
$(\frac{Wt.}{10} + Ht. - 60)$ Multiplier	—	23	—	20	—	23
Pullups	9	X	12	X	14	X
Pushups	12	21	17	29	20	34
Arm Strength	4	89	6	67	7	82
Lift-Legs	5	50	5	50	6	38
Lift-Back	4	08	4	18	5	10
Grip-Left	1	30	1	45	1	44
Grip-Right	1	05	1	10	1	16
Lung capacity	2	90	2	80	2	65
STRENGTH INDEX	19 72		21 70		24 55	
Normal S.I.	23 61		23 61		24 02	
PHYSICAL FITNESS INDEX	83		91		110	
Classification						

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF EDUCATION
Name #2 HYANNIS S.T.C.

	Date		
m	12	2	6
d	1	3	2
y	37	38	38

Grade I						
Age	18 y	10 m	19 y	1 m	19 y	5 m
Weight	194	—	185	—	185	—
Height	71	—	71	—	71	—
$(\frac{Wt.}{10} + Ht.-60)$ Multiplier	—	30	—	30	—	30
Pullups	9	X	7	X	9	X
Pushups	10	19	11	18	13	22
Arm Strength						
	5	78	5	10	6	16
Lift-Legs	8	36	7	26	9	95
Lift-Back	5	06	5	06	5	20
Grip-Left	1	30	1	40	1	40
Grip-Right	1	42	1	52	1	51
Lung capacity	2	80	2	80	2	80
STRENGTH INDEX	2472		2314		2712	
Normal S.I.	2917		2758		2775	
PHYSICAL FITNESS INDEX	84		83		98	
Classification						