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# The prediction of rope climbing ability from chinning strength

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BOSTON UNIVERSITY  
SCHOOL OF EDUCATION

Thesis

THE PREDICTION OF ROPE CLIMBING ABILITY  
FROM CHINNING STRENGTH

Submitted by

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(B.S. in Ed., Boston University, 1941)

In partial fulfillment of the  
requirements for the degree of Master of  
Education

1950

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## CHAPTER I

### INTRODUCTION AND PURPOSE

#### A. INTRODUCTION

In 1945, the writer took over training of candidates for Civil Service positions. These men were prospective firemen and policemen for towns and cities in Massachusetts. The phase of training for which the writer was directly responsible, was the physical conditioning of these men to meet the requirements for the Strength Test. The event that was most troublesome for most of the candidates was the rope climbing. This was due to poor development and conditioning of the arm and shoulder muscles. To add to this problem the men had a limited training schedule because of the full program for which Young Men's Christian Associations are famous. In the course of the training of these individuals a suggestion of chinning on a horizontal bar to supplement their training when the rope was not available was made. It was following this suggestion that the writer noticed a close similarity between the pull-ups and the rope climb. It was his observation that for every pull-up that was done, these men could climb one foot on the rope.

For those men who lived in outlying communities and had little or no time for gym training at regularly scheduled classes, it was suggested that these individuals train for the rope climb by practicing chinning on an improvised chinning bar. This suggestion was greatly received and helped many men to train and to pass this event without attending regular classes.

#### B. PURPOSE

The purpose of this study is: 1, to determine the relationship which exists between chinning and rope climbing; and, 2, to predict rope climbing ability from the number of pull-ups the subject can perform.

#### C. SCOPE

The scope of this investigation is limited to a study of adult males who are preparing for Civil Service positions as firemen and policemen in the cities and towns of Massachusetts. Hence, this study is limited to men in the age range twenty-one to thirty-five, as specified by the Civil Service requirements.

#### D. JUSTIFICATION

The ability to climb a twenty-two foot rope is one of the requirements for a Civil Service appointment as a fireman or policeman. Since many men preparing for this particular test do not have facilities for practicing this test, it would seem desirable that the men practice a similar activity with equipment readily available to all. Most men can have at their disposal a chinning bar, which will permit the training of the same muscle groups as are used in the rope climb. Hence, there is a need for a scale which can accurately predict how far a man can climb on the rope by the number of pull-ups he can do.

Inasmuch as there are between six and ten thousand men applying each year for these positions, an expressed feeling has been presented by physical directors that a prediction chart would aid greatly the motivation for the training of these men. Not only would it aid physical directors, but also a chart of this kind, if scientifically established, would meet the needs of men in suburban areas where actual training facilities are not available.

## CHAPTER II

## SURVEY OF THE LITERATURE

Since the Civil Service Examination for Firemen and Policemen in Massachusetts is essentially a strength test, the writer wishes to point his survey of the literature in that direction.

Charles H. McCloy<sup>1</sup> states that arm strength correlated in the neighborhood of .90 with total strength.

Frederick W. Cozens<sup>2</sup>, working with college men, has set up scales for physical fitness using nine classifications based on strength. In this study he has considered height as well as weight in setting up his classification scales. Just as McCloy has considered arm strength for total fitness, Cozens has employed arm strength as part of his classification scales. Thomas Cureton<sup>3</sup>, has outlined in the Illinois Motor Fitness Screen Test, fourteen strength and motor ability tests. There is no height or weight factor considered in this study. Included as one of the strength tests is pull-ups which he has classified according to the individual's ability.

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1. Charles H. McCloy, Tests and Measurements in Health and Physical Education (F. S. Crofts & Co., New York, 1944) p 128

2. Frederick W. Cozens, Achievement Scales in Physical Education Activities for College Men (Lea and Febiger: Philadelphia, 1936) pp 27

3. Thomas K Cureton, Physical Fitness Workbook (Stipes Publishing Company: Champaign, Illinois, 1944) Chap. 3

We find that here he has classified an individual that can pull up fourteen times as "average fit", and one that does eighteen pull-ups as "superior fit". The Civil Service Examination might be compared similarly with his finding, as a man must climb fourteen feet on the rope to receive a passing grade.<sup>4</sup>

Back in the days of D. A. Sargent<sup>5</sup>, in his work with speed and endurance, pull-ups were of major importance. However, in this work the pull-ups included only part of the body weight. During that period considerable emphasis was placed on speed and endurance. The rating, in part, was based upon the number of minutes the individual was able to keep going on the exercises.

F. W. Cozens, working with M. H. Trieb and N. P. Neilson<sup>6</sup>, has set up forty-five different achievement tests for boys in Secondary Schools. A description of pull-ups is described and administered similar to those outlined in his work with college men, with the exception that here he has used six classifications, using age, height, and weight instead of nine as outlined in his work with college men. These six classifications are set up from an exponent value which was formed by combining age, height, and weight factors. On rope climbing, as outlined here, the individual uses the hands and feet to obtain a mark on the rope. This climb is based on time, whereas the Civil Service examination does not include the feet and

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4. Civil Service Strength Examination, Appendix

5. Dudley Allen Sargent, "Speed and Endurance," American Physical Education Review, 18:445, Oct., 1913

6. F. W. Cozens, M. H. Trieb, N. P. Neilson, Physical Education Achievement Scales for Boys in Secondary Schools, (A. S. Barnes and Co., New York, 1936)

is based on height.

Frederick R. Rogers, in his work with physical capacity tests states that: "Primarily tests measure certain important phases or manifestations of physical fitness which are susceptible of improvement through physical activity."<sup>7</sup>

He further states that: "Physical Education is generally defined as, 'education through, or by means of, large muscle activity.'" Thus the large skeletal muscles are primary "tools" by means of which physical educators improve the pupils' health.

The pupil with weak musculature cannot react effectively to leadership or teaching which needs strong muscles for the most productive responses.

A prime objective of the physical education program is improvement of pupils' physical fitness, their power or capacity to live physically, to perform physical acts, to manipulate the limbs and external objects. Such powers are expressed in muscular activities, which, in turn, depend on muscular strength.

As a measure of physical activity habits, muscular strength is also an outcome of physical activity. Therefore, the existence of strength is indisputable evidence of previous activity; and if strength be great in relation to age and weight, activity habits are indicated.

To continue any activity, whether mental or physical, over extended periods of time, muscular power is of paramount importance as a measure of endurance.

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7. Frederick R. Rogers, Physical Capacity Tests, (A. S. Barnes and Co., New York, 1938) pp 29, 30, 31, 32, 33

G. S. Hall<sup>8</sup> says: "The muscles are by weight about forty-three per cent of the average adult male body. They expend a large fraction of all the kinetic energy of the adult body, which a recent estimate places as high as one fifth. Muscles are in a most intimate and peculiar sense the organs of the will. They have built all the roads, cities, and machines in the world, written all the books, spoken all the words, and, in fact, done everything that man has accomplished with matter. If they are undeveloped or grow relaxed and flabby, the dreadful chasm between good intentions and their execution is liable to appear and widen."

Since 1928, McCloy has made a number of significant contributions to the field of measurement in physical education. Most of these are measures of strength, and of these he has rightly concentrated on pull-ups and push-ups to measure arm strength. McCloy's<sup>9</sup> volume on this and other related subjects is an excellent presentation of masterly statistical analysis. McCloy has greatly improved the validity of arm strength test as measures of athletic ability by his formulae and techniques.

In 1907, J. M. Tyler<sup>10</sup>, published Growth and Education, a book which was and is a milestone in physical education. In the first few chapters were assembled a galaxy of biological facts which have never been seriously

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8. G. S. Hall, Adolescence, 1924, Vol. 1, p 131

9. C. H. McCloy, The Measurement of Athletic Power, (A. S. Barnes and Co., New York: 1932)

10. C. H. McCloy, "How About Some Muscle," Journal of Health and Physical Education, VII, 5:302, May, 1936

disputed. Tyler showed that vigorous exercise of the great fundamental trunk and limb muscles is utterly essential during youth and young adulthood for the purpose of stimulating the normal growth and development, not only of the fundamental organ systems of the body, but also of the brain and mind as well. And this exercise need--an inheritance from the remote past--is a need for more than pretty movements. What is needed is a great deal of oxidation within the body tissues. Tyler made clear the fact that an organism whose evolutionary development was dependent upon vast amounts of exercise could not function adequately on a semisedentary ration of activities.

## CHAPTER III

### METHOD OF COLLECTING DATA

#### A. SUBJECTS INCLUDED IN THIS STUDY

This study consisted of one hundred highly selected men between the ages of twenty-one to thirty-five. Forty-eight of these men were in the age range of twenty-one to twenty-five. Thirty-three were in the age range of twenty-six to thirty, and nineteen were in the age range of thirty-one to thirty-five. Weight was not considered as a factor because the writer felt that individuals executing similar tests as pull-ups and rope climbing would be handicapped or aided alike, depending on their respective weight ranges.

#### B. PROCEDURE

1. Each candidate before being tested is given an explanation and demonstration of the method to be used in performing the pull-ups. The standard gymnasium high bar, one and one quarter inches, was used for testing in these cases. Only the complete number of chins was recorded.

2. The next day or not later than two days after the chinning, the same man was tested on the rope climb. A brief explanation and demonstration was given. The candidate started at a mark at the full extension of one hand. He was not allowed to jump from the floor but rather to pull from the floor with both hands and thereafter was to proceed hand over hand as far as he could go. In this test the rope was marked at one-foot intervals and only after both hands had passed the mark was he given credit for that height.

### C. TECHNIQUE OF TEST ADMINISTRATION

#### 1. Chinning

With ordinary grasp, knuckles to the face, the candidate places his chin over the bar at each pull-up and comes down to a straight-arm-hang. The pull-up is repeated as many times as possible.

The following regulations were observed for all subjects tested:

- a. The feet must not be allowed to touch the floor.
- b. Chin over bar and straight-arm-hang must be observed.
- c. No rest is allowed between pull-ups.
- d. The contestant's performance is recorded as the number of times he is able to pull up completely. No parts of a pull-up shall be recorded, (for example, one half or three quarters, etc.)<sup>1</sup>

#### 2. Rope Climbing

Cozens<sup>2</sup> recommends the use of standard gymnasium rope, one and one-half to one and three quarters inches in diameter. Standard gymnasium rope of one and one half inches in diameter was used in this study. Climb is started with candidate's hand placed on rope at full extension of the arms. Leaving the floor by pulling, (not with jump), candidate climbs hand over hand to the limits of his capacity. There shall be no contact on the rope by squeezing or nipping with the legs during the climb.

#### 3. Motivation

As these men were all candidates for a life long career, motivation was at a very high level. Motivation was increased by the fact that these men were expected to take their examinations in the near future and their utmost went into everything that was suggested to help them prepare for their examination.

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1. Frederick W. Cozens, Achievement Scales in Physical Education Activities for College Men, (Lea and Febiger, Philadelphia: 1936) pp 27

2. Ibid., pp 28

## CHAPTER IV

## PRESENTATION AND ANALYSIS OF DATA

1. Using the "Method of Rank-Difference" as outlined by Henry E. Garrett<sup>1</sup>, it was found that there is a correlation of .90 between pull-ups and rope climbing with a probable error of .0012.
2. The test-retest method of checking reliability of performance was utilized. Fifty of the subjects were retested within a two-week period using the same procedure heretofore mentioned. It was found that a correlation of .90 existed between test and retest pull-ups, with a probable error of .0182. It was further found that a correlation of .99 existed between the test and retest rope climb with a probable error of .00018.
3. Figures one and two on the following pages indicate very clearly the high correlation between the two tests administered.
4. Using the formula, " $Y = bx$ ," as found in Kellogg and Brumbaugh, Business Statistics<sup>2</sup>, the prediction chart on Figure III was arrived at. This chart indicates that there is a difference of .8 feet on the rope climb over one pull-up, but as the pull-ups increase, the difference on the rope climb decreases until at seventeen and eighteen, pull-ups and rope climbs are identical.

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1. Henry E. Garrett, Statistics in Psychology and Education, (Longmans, Green and Co., New York: 1947) p 344

2. M. A. Brumbaugh, L. S. Kellogg, I. J. Graham, Business Statistics, (Richard D. Irwin, Inc., Chicago: 1947) pp 713

SCATTERGRAM

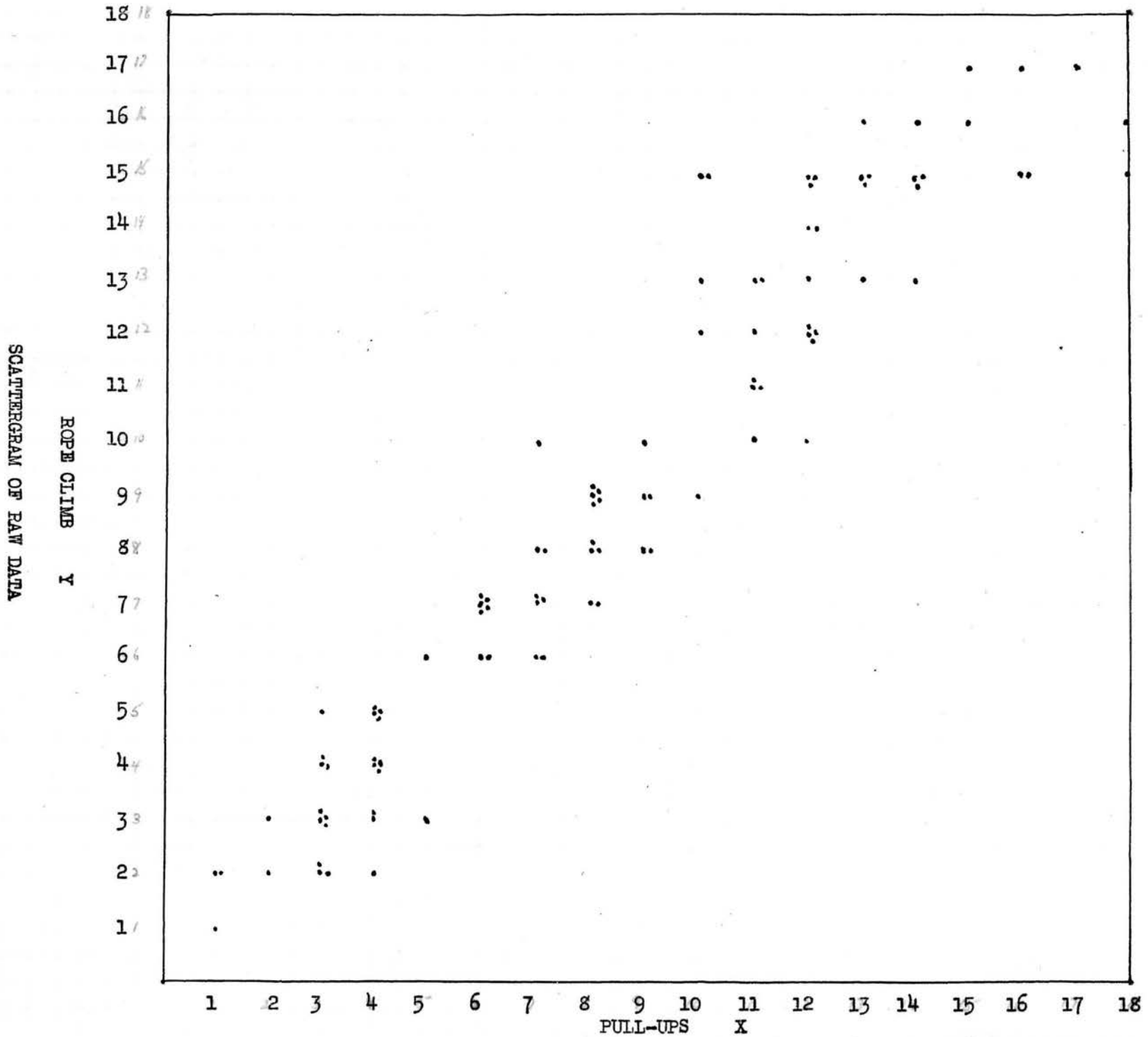


FIGURE I

LINE OF REGRESSION AND PREDICTION

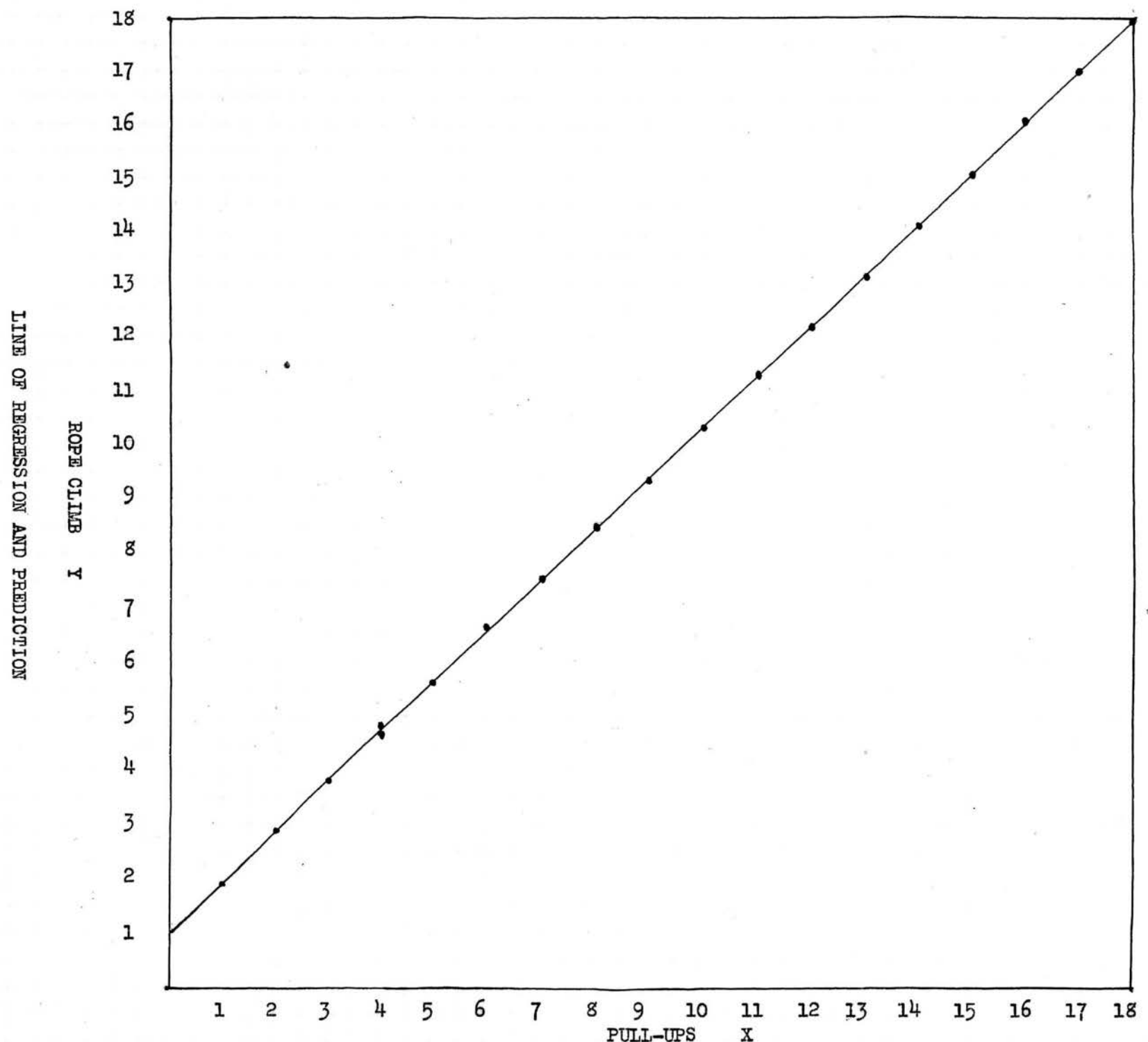


FIGURE II

## FIGURE III

## PREDICTION CHART

The following chart shows the prediction that this study has brought forth. It can be noted that the rope climb is slightly higher than the pull-ups. A man achieving one pull-up is predicted to climb one and eight-tenths feet on the rope, etc.:

	PULL-UPS	ROPE CLIMB
1.	x = 1	y = 1.8
2.	x = 2	y = 2.7
3.	x = 3	y = 3.7
4.	x = 4	y = 4.7
5.	x = 5	y = 5.6
6.	x = 6	y = 6.6
7.	x = 7	y = 7.5
8.	x = 8	y = 8.5
9.	x = 9	y = 9.4
10.	x = 10	y = 10.4
11.	x = 11	y = 11.3
12.	x = 12	y = 12.3
13.	x = 13	y = 13.2
14.	x = 14	y = 14.2
15.	x = 15	y = 15.1
16.	x = 16	y = 16.1
17.	x = 17	y = 17
18.	x = 18	y = 18

## CHAPTER V

### SUMMARY AND CONCLUSIONS

#### SUMMARY

1. The purpose of this study was to establish a prediction table that an individual, who was taking the Fire or Police Strength Examinations in Massachusetts, could refer to and tell how far up a one and one half inch rope he could climb by the number of pull-ups he could perform.

2. The number of individuals selected for this study was one hundred, with fifty of these used for the test-retest method of reliability.

3. The data was collected as follows:

The subject was given an explanation and demonstration of each test used. He was tested on the pull-ups one day and not later than two days after this he was tested on the rope climb. His performance was recorded on the number of complete pull-ups and the number of complete footage climbed on the rope.

#### CONCLUSIONS

1. It was found that a correlation of .90 exists between pull-ups and rope climbing. This is a high correlation and indicates a good prediction chart.

2. The possibilities of the prediction chart are twofold.

a. It acts as a motivation factor for individuals who can train for this test away from regular gym facilities which are inaccessible to some individuals.

b. It supplements the training of those who are training at available facilities.

#### POSSIBILITIES FOR FURTHER RESEARCH

Although the writer believes that weight and height have no direct bearing on the relationship of pull-ups to rope climbing, as carried out in this study, it still leaves this channel open for further research.

The police and fire strength examinations which are included in the Appendix have between six and eight other events. It would be of tremendous aid to many individuals if research of a similar nature could be studied objectively.

B I B L I O G R A P H Y

## BIBLIOGRAPHY

- Garrett, Henry E., Ph.D., Statistics in Psychology and Education. New York: Longmans, Green and Company, 1947
- Cozens, F. W., Physical Education Achievement Scales for Boys in Secondary Schools. New York: A. S. Barnes and Company, 1936
- Sargent, D. A., "Speed and Endurance," American Physical Education Review. 18:445, Oct. 1913
- Bliss, James G., Study of Progression in Elementary Schools
- McCloy, C. H., Tests and Measurements in Health and Physical Education. New York: F. S. Crofts and Company, 1944
- McCloy, C. H., The Measurement of Athletic Power. New York: A. S. Barnes and Company, 1932
- McCloy, C. H., "How About Some Muscle," Journal of Health and Physical Education. VII, 5:302, May 1936
- Cozens, Frederick W., Achievement Scales in Physical Education Activities for College Men. Philadelphia: Lea and Febiger, 1936
- Cureton, Thomas K., Physical Fitness Workbook. Champaign, Illinois: Stipes Publishing Company, 1944
- Brumbaugh, M. A., Kellogg, L. S., Graham, I. J., Business Statistics. Richard D. Irwin, Inc., Chicago: 1947
- Rogers, Frederick R., Physical Capacity Tests. New York: A. S. Barnes and Company, 1938
- Hall, G. S., Adolescence. 1924

A P P E N D I X

TABLE I

RAW DATA SHOWING AGE, PULL-UPS, AND  
ROPE CLIMBING ABILITY OF SUBJECTS TESTED

NUMBER	AGE	PULL-UPS	ROPE CLIMB	RECHECK	
				PULL-UPS	ROPE CLIMB
1.	23	15	14	15	15
2.	32	6	7		
3.	21	16	17		
4.	26	4	4	8	9
5.	31	7	7	10	11
6.	25	9	8		
7.	21	7	10		
8.	25	2	3	7	8
9.	26	12	12		
10.	24	6	7		
11.	21	3	2	4	4
12.	29	13	15		
13.	21	4	4	7	6
14.	22	14	15		
15.	21	4	2		
16.	22	8	7	10	11
17.	24	14	15		
18.	29	12	10	12	12
19.	21	13	15		
20.	21	9	8	10	9
21.	22	4	5	10	10
22.	26	12	15		
23.	21	4	4	9	9
24.	28	10	15		
25.	27	8	9		
26.	27	6	6	6	6
27.	26	11	13	7	7
28.	28	12	12		
29.	21	18	15	19	17
30.	22	13	11	14	14
31.	25	13	15		
32.	27	6	5	7	7
33.	24	10	15		
34.	24	11	10		
35.	21	5	3		
36.	26	10	15		
37.	31	8	9	9	9

TABLE I (continued)

RAW DATA SHOWING AGE, PULL-UPS, AND  
ROPE CLIMBING ABILITY OF SUBJECTS TESTED

NUMBER	AGE	PULL-UPS	ROPE CLIMB	RECHECK	
				PULL-UPS	ROPE CLIMB
38.	22	16	15	16	15
39.	22	5	6		
40.	23	9	8		
41.	29	3	4	5	6
42.	23	3	4	4	4
43.	26	8	9		
44.	27	9	9		
45.	26	10	13	11	13
46.	34	11	12		
47.	30	7	7		
48.	30	1	2	3	2
49.	31	14	15		
50.	34	4	3	4	5
51.	33	12	11		
52.	31	2	2	4	4
53.	34	17	17	17	17
54.	33	8	9	9	9
55.	30	3	2		
56.	28	11	11		
57.	24	7	8	8	9
58.	32	3	3	3	4
59.	21	14	16	15	16
60.	29	10	9		
61.	24	6	7	7	7
62.	33	1	1	3	4
63.	33	12	12		
64.	27	8	7	8	8
65.	23	18	17		
66.	21	13	14	13	14
67.	28	4	5		
68.	21	3	2	4	5
69.	32	11	11		
70.	26	8	8	10	9
71.	21	3	5	4	5
72.	25	12	14	13	13
73.	26	9	9		
74.	24	3	3	4	5
75.	27	10	12		
76.	27	4	3	4	4
77.	24	6	7		
78.	31	8	8		

TABLE I (continued)

RAW DATA SHOWING AGE, PULL-UPS, AND  
ROPE CLIMBING ABILITY OF SUBJECTS TESTED

NUMBER	AGE	PULL-UPS	ROPE CLIMB	RECHECK	
				PULL-UPS	ROPE CLIMB
79.	22	8	9	14	14
80.	26	14	13		
81.	22	7	6		
82.	23	4	5	5	6
83.	29	11	11		
84.	31	3	3		
85.	29	7	8	7	8
86.	22	7	7		
87.	27	3	4		
88.	21	1	2	2	2
89.	24	15	16		
90.	24	11	13	13	14
91.	32	12	12		
92.	34	5	6	5	6
93.	31	8	8	8	9
94.	21	4	5	5	5
95.	21	13	13		
96.	27	12	14	13	14
97.	25	7	6	8	7
98.	23	3	3		
99.	22	15	17	16	17
100.	29	9	8		

TABLE II

MASSACHUSETTS CIVIL SERVICE POLICE ENTRANCE EXAMINATIONS  
REQUIREMENTS FOR STRENGTH TEST

1. DUMMY LIFTS: 150-lb. DUMMY AND 125-lb. DUMMY

Candidate will stand astride the dummy. Arms should be well wrapped around the middle of the dummy. Candidate should lift the dummy from the floor to his chest in one motion. From the chest position, candidate may use legs in jumping or driving dummy onto his shoulders. Examiner will notify candidate when he has dummy in proper position. Candidate will then lower dummy returning it gently to its original position. Two tries given on each weight starting with 150-lb. dummy. Candidate starting with 125-lb. dummy will not be allowed a later trial on 150-lb. dummy.

2. STANDING BROAD JUMP:

Toes must be kept behind the take-off mark. Toes extending or sliding over this mark on the take-off or jump will count as one try, but no credit will be allowed for this jump. Bouncing or crow-hopping on the take-off disqualifies the jump. Measurement of the jump is taken from the nearest part of the body touching the mat toward the take-off mark. Three tries will be given and the result of the best jump will be taken.

3. DUMBBELLS: WEIGHTS - 75 - 70 - 65 - 60 - 50 lbs.

Weights may be lifted from floor to shoulder with either one or both hands. There must be a definite pause with the weight at the shoulder. From shoulder position, the weight must be pushed or pressed upward from the shoulder until the arm is fully extended over the head. After the weight has reached the shoulder position, the candidate must keep heels on the floor, knees must be straight, hips firm until the lift has been completed. Jumping the weight up by bending and then extending the knees, rolling and snapping of hips or body to start the weight is not permitted. Two tries with each hand on each weight starting with the heavier weights are permitted. Right and left hand lifts are added together for total.

4. ABDOMINALS:

From supine position with 35-lb. dumbbell on chest, candidate will come to a sitting position without raising thighs or legs more than two inches. The dumbbell must be held against the chest on or above the nipple line. Deliberate rolling the dumbbell in order to get momentum

TABLE II (continued)

MASSACHUSETTS CIVIL SERVICE POLICE ENTRANCE EXAMINATIONS  
 REQUIREMENTS FOR STRENGTH TEST

is not permitted. Roll caused by the natural movement of the wrist involved in sitting up is permitted. Arching and bouncing of back in order to sit up is not allowed. Improper performance does not rate partial credit. Only one test will be allowed.

5. ROPE CLIMBING:

Standard gymnasium, climbing rope marked at two-foot intervals from the mark fourteen feet above the starting point. Climb is started with candidate's hands placed on mark six feet from floor. Climb must be done by hand-over-hand method. Arms only are permitted to be used. There shall be no contact on the rope by squeezing or nipping with the legs during the climb. Candidate must climb fourteen feet to get the minimum marking of sixty per cent. Any climb less than this is complete failure in event. Only one try will be given.

6. FENCE VAULT:

A standard gymnasium low horizontal bar is used. Standing or running is allowed. No part of body may touch bar except hands. Candidate must release his hand grip on bar before he lands on mat on far side. Candidate will be given three tries at each of the following heights:

5 feet, 6 inches  
 5 feet  
 4 feet, 6 inches

7. LADDER:

Equipment -- 18-foot, straight-side ladder placed against balcony or running track. 125-lb. dummy placed on floor of balcony or running track near ladder. Bottom of ladder braced against floor cleat to prevent slipping. Top of ladder held by two safety men in balcony or track.

Candidate starts from standing position at foot of ladder. He climbs to balcony or track and lifts or swings dummy to shoulders. It is advisable to use fireman's carry on dummy. He then descends ladder. Event is completed when candidate reaches floor at original starting position. Dummy must be under control throughout the event. Event on time basis. Only one trip allowed.

8. 440-YARD RUN:

To be marked on time basis. Only one try allowed.

## TABLE II (continued)

MASSACHUSETTS CIVIL SERVICE POLICE ENTRANCE EXAMINATIONS  
REQUIREMENTS FOR STRENGTH TEST

## 9. 50-YARD SWIM:

No time limit.

Examiner will describe and illustrate each event. If candidate does not follow or comply with instruction, he will be given no credit and will be taken off that event.

## RE-EXAMINATION AND APPEALS

Appeals from the findings of the examining physician may be referred by the Director to the Medical Board for review and report.

An applicant who is unable to appear on the first date set for physical examination or strength test because of illness or physical condition, may request of the Director opportunity to appear at a later date.

An applicant who appears for physical examination or strength test, but claims that he is unable to take the examination or test at that time on account of physical conditions may notify the examiner verbally that he is appealing in writing to the Director for a second notice. The examiner will make record to that effect on the Physical Examination sheet. The Director may after a complete investigation of all the facts, grant the request.

An applicant beginning test must, to receive credit, complete it unless excused for illness or injury. In such cases, the examiner will make a record to that effect on the physical examination sheet. If the applicant has not incurred a failure prior to the recording of the illness or injury, the Director may, after a complete investigation of all the facts, grant a request for another test on all the events. Otherwise, each candidate must abide by the marks obtained in the test.

An applicant who is unable to appear on the postponed date set for his physical examination and strength test will not be given further opportunity for examination without approval by the Director, upon a statement of the facts submitted by the applicant.

TABLE II (continued)

RATINGS OF POLICE STRENGTH TESTS  
All towns and cities will be rated according  
to the same standards

ORDER	POINTS	RESULT	PER CENT
1.	5 Dummy Lifts	150 lbs. 125 lbs.	100%
If unable to lift 125-lb. dummy in proper manner, failure in event.			
2.	5 Standing Broad Jump	<u>LENGTH</u> 8' 7' 8" 7' 4" 7' 6' 8"	100% 90 80 70 60
Any jump below 6' 8" is failure in event.			
3.	6 Dumbbells	<u>TOTAL BOTH HANDS</u> 150 lbs. 145 lbs. 140 lbs. 135 lbs. 130 lbs. 125 lbs. 120 lbs. 110 lbs. 100 lbs.	100% 95 90 85 80 75 70 65 60
Total below 100 lbs., failure in event.			
4.	5 Abdominals	<u>SIT-UPS</u> 5 4 3 2 1	100% 80 60 40 20
If unable to perform at least 1 sit-up, failure in event.			

TABLE II (continued)

RATINGS OF POLICE STRENGTH TESTS  
 All towns and cities will be rated according  
 to the same standards

ORDER	POINTS	RESULT	PER CENT			
5.	7 Rope Climb	<u>HEIGHT</u>				
		22'	100%			
		20'	90			
		18'	80			
		16'	70			
		14'	60			
Not attaining 14', failure in event.						
6.	5 Vault	<u>HEIGHT</u>				
		5' 6"	100%			
		5'	85			
		4' 6"	70			
Not attaining 4' 6", failure in event.						
7.	6 Ladder	<u>SECONDS</u>				
		35	100%			
		35-40	90			
		40-45	80			
		45-50	70			
		50-55	60			
		55-60	50			
Slower than 60 seconds, failure in event.						
8.	9 440-Yard Run	Straightaway	4 Laps	6 Laps	8 Laps	
		<u>Seconds</u>	<u>Seconds</u>	<u>Seconds</u>	<u>Seconds</u>	
		55-60	60-65	65-70	70-75	100%
		60-65	65-70	70-75	75-80	85
		65-70	70-75	75-80	80-85	70
		Slower than: 70 Secs., 75 Secs., 80 Secs., 85 Secs., Failure in event.				
9.	2 50-Yard Swim	No time limit				

TABLE III

MASSACHUSETTS CIVIL SERVICE FIRE ENTRANCE EXAMINATIONS  
REQUIREMENTS FOR STRENGTH TEST.

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1. DUMMY LIFTS: 150-lb. DUMMY AND 125-lb. DUMMY

Candidate will stand astride the dummy. Arms should be well wrapped around the middle of the dummy. Candidate should lift the dummy from the floor to his chest in one motion. From the chest position, candidate may use his legs in jumping or driving dummy onto his shoulders. Examiner will notify candidate when he has dummy in proper position. Candidate will then lower dummy returning it gently to its original position. Two tries given on each weight starting with 150-lb. dummy. Candidate starting with 125-lb. dummy will not be allowed a later trial on 150-lb. dummy.

2. DUMBBELLS: WEIGHTS--- 75-70-65-60-50-lbs.

Weights may be lifted from floor to shoulder with either one or both hands. There must be a definite pause with the weight at the shoulder. From shoulder position, the weight must be pushed or pressed upward from the shoulder until the arm is fully extended over the head. After the weight has reached the shoulder position, the candidate must keep heels on the floor, knees must be straight, hips firm until the lift has been completed. Jumping the weight up by bending and then extending the knees, rolling and snapping of hips or body to start the weight is not permitted. Two tries with each hand on each weight starting with the heavier weights is permitted. Right and left hand lifts are added together for total.

3. ABDOMINALS:

From supine position with 35-lb. dumbbell on chest, candidate will come up to a sitting position without raising thighs or legs more than two inches. The dumbbell must be held against the chest on or above the nipple line. Deliberate rolling the dumbbell in order to get momentum is not permitted. Arching and bouncing of back in order to sit up is not allowed. Improper performance does not rate partial credit. Only one test will be allowed.

4. ROPE CLIMB:

Standard gymnasium, climbing rope marked at two-foot intervals from the mark fourteen feet above the starting point. Climb is started with candidate's hands placed on mark six feet from floor. Climb must be done by hand-over-hand method. Arms only are permitted to be used. There shall be no contact on the rope by squeezing or nipping with the legs during the climb. Candidate must climb fourteen feet to get the

TABLE III (continued)

MASSACHUSETTS CIVIL SERVICE FIRE ENTRANCE EXAMINATIONS  
 REQUIREMENTS FOR STRENGTH TEST

minimum marking of 60 per cent. Any climb less than this is complete failure in event. Only one try will be given.

5. FENCE VAULT:

A standard gymnasium low horizontal bar is used. Standing or running start is allowed. No part of body may touch the bar except hands. Candidate must release his hand grip on bar before he lands on mat on far side. Candidate will be given three tries at each of the following heights:

5 feet, 6 inches  
 5 feet  
 4 feet, 6 inches

6. LADDER:

Equipment -- 18-foot straight-side ladder placed against balcony or running track. 125-lb. dummy placed on floor of balcony or running track near ladder. Bottom of ladder braced against floor cleat to prevent slipping. Top of ladder held by two safety men in balcony or track.

Candidate starts from standing position at foot of ladder. He climbs to balcony or track and lifts or swings dummy to shoulders. It is advisable to use fireman's carry on dummy. He then descends ladder. Event is completed when candidate reaches floor at original starting position. Dummy must be under control throughout the event. Event on time basis. Only one try allowed.

7. 440-YARD RUN:

To be marked on time basis. Only one try allowed.

Examiner will describe and illustrate each event. If candidate does not follow or comply with instructions, he will be given no credit and will be taken off the event.

## TABLE III (continued)

MASSACHUSETTS CIVIL SERVICE FIRE ENTRANCE EXAMINATIONS  
REQUIREMENTS FOR STRENGTH TEST

## RE-EXAMINATION AND APPEALS

Appeals from the findings of the examining physician may be referred by the director to the Medical Board for review and report.

An applicant who is unable to appear on the first date set for physical examination or strength test because of illness or physical condition, may request of the Director opportunity to appear at a later date.

An applicant who appears for physical examination or strength test, but claims that he is unable to take the examination or test at that time on account of physical conditions may notify the examiner verbally that he is appealing in writing to the Director for a second notice. The examiner will make record to that effect on the physical examination sheet. The Director may after a complete investigation of all the facts, grant the request.

An applicant beginning a strength test must, to receive credit, complete it unless excused for illness or injury. In such cases, the examiner will make a record to that effect on the physical examination sheet. If the applicant has not incurred a failure prior to the recording of the illness or injury, the Director may, after a complete investigation of all the facts, grant a request for another test on all the events. Otherwise, each candidate must abide by the marks obtained in the test.

An applicant who is unable to appear on the postponed date set for his physical examination and strength test will not be given further opportunity for examination without approval by the Director, upon a statement of the facts submitted by the applicant.

TABLE III (continued)

RATINGS OF FIRE STRENGTH TESTS  
All towns and cities will be rated according  
to the same standards

ORDER	POINTS	RESULT	PER CENT
1.	7 Dummy Lifts	150-lbs. 125 lbs.	100% 70
If unable to lift 125-lb. dummy in proper manner, failure in event.			
2.	7 Dumbbells	<u>TOTAL BOTH HANDS</u> 150 lbs. 145 lbs. 140 lbs. 135 lbs. 130 lbs. 125 lbs. 120 lbs. 110 lbs.	100% 95 90 85 80 75 70 65
Total below 110 lbs., failure in event.			
3.	5 Abdominals	<u>SIT-UPS</u> 5 4 3 2 1	100% 80 60 40 20
If unable to perform at least 1 Sit-Up, failure in event.			

TABLE III (continued)  
RATINGS OF FIRE STRENGTH TESTS

ORDER	POINTS	RESULT	PER CENT			
4.	7 Rope Climb	<u>HEIGHT</u>				
		22'	100%			
		20'	90			
		18'	80			
		16'	70			
		14'	60			
Not attaining 14', failure in event.						
5.	6 Vault	<u>HEIGHT</u>				
		5' 6"	100%			
		5'	85			
		4' 6"	70			
Not attaining 4' 6", failure in event.						
6.	9 Ladder	<u>SECONDS</u>				
		35	100%			
		35-40	90			
		40-45	80			
		45-50	70			
		50-55	60			
Slower than 55 seconds, failure in event.						
7.	9 440-Yard Run	<u>Straightaway</u>				
		<u>4 Laps</u>				
		<u>6 Laps</u>				
		<u>8 Laps</u>				
		<u>Seconds</u>				
		55-60	60-65	65-70	70-75	100%
		60-65	65-70	70-75	75-80	85
65-70	70-75	75-80	80-85	70		
Slower than: 70 Secs., 75 Secs., 80 Secs., 85 Secs., failure in event.						