

POST-EXERCISE HEART RATE

and others with abnormal hearts, the post-exercise pulse of eleven normal and eight abnormal cases is recorded.

The chi-square test is applied to the data to test the hypothesis that there is no relationship between normality and abnormality of the heart and the factor of secondary rise of pulse rate. Chi-square was found to be .12. Since this value would be found by chance approximately 70 per cent of time, it is impossible to reject the hypothesis that there is no relationship.

THE PULSE-RATIO

The Effect of the Resting Pulse Rate on the Pulse-Ratio.—In order to observe the effect of the resting pulse rate on the pulse-ratio, the significance of a difference in means of 29 subjects with resting rates of 58 or less beats per minute and 34 subjects with resting rates of 86 or more beats per minute is estimated by means of the *t*-test.

The mean pulse-ratio of the low resting pulse rate sample is 2.909, and of the high is 2.757. The value of *t* is 2.204. In a large number of samples like this, the value of *t* as large as 2.204 would be found only between 5 per cent and 2 per cent of the time.

With such a high value of *t*, the hypothesis that the samples were drawn at random from the same population may be rejected and it may be said with a high degree of confidence that the means do differ. Low resting rates are associated with high pulse-ratios and high resting rates with low pulse-ratios.

The Relationship of the Rate of Stool-Stepping Exercise to the Pulse-Ratio.—The linear proportionality between the pulse-ratio and the rate of the exercise reported by Tuttle and others^{4,5} does not extend to light exercise. In fact, a stool-stepping exercise of ten steps per minute may produce a higher pulse-ratio than a similar exercise of twenty steps. An observation of the pulse-ratios of five normal subjects tabulated below bears out this relationship.

Subject Number	Pulse-Ratio at 10 Steps	Pulse-Ratio at 20 Steps	Pulse-Ratio at 30 Steps	Pulse-Ratio at 40 Steps
115	2.19	2.13	2.52	3.29
116	2.10	2.09	2.51	3.16
117	2.01	1.97	2.44	3.09
118	2.01	1.97	2.31	2.65
119	2.01	1.99	2.19	2.52

THE RECOVERY TIME

The Relationship of the Intensity of Weight-Lifting Exercises to the Recovery Time.—The average recovery times of ten normal male

⁴ W. W. Tuttle, "Response of the Heart to Exercise of Graded Intensity," *Proc. Soc. Exper. Biol. and Med.*, 29 (March 1931) 598.

⁵ W. W. Tuttle and G. Wells, "The Response of the Normal Heart to Exercises of Graded Intensity," *Arbeitsphysiol.*, 4 (Feb. 1931) 519.