

## DIRECTIONS FOR READING THE SKELETON CHART.

A full explanation of the chart can be found in the article referred to above, which may be summarized as follows: The horizontal lines extending across the chart represent the parts of the body measured, the names of which are given at the sides. The vertical lines give the percentile values of the different measurements, ranging from the minimum at 0 on the left to the maximum 100, on the right. The figures at the top show, by percentages, the relative values of the heavy vertical lines, and the intervening light lines divide these spaces into four equal parts, making each subdivision between 10 and 90 per cent  $2\frac{1}{2}$  per cent in value, but only  $1\frac{1}{4}$  per cent outside these points. The figures above indicate the per cent of individuals who were found to surpass, and the figures below the per cent of those who failed to surpass any given point. For example, the height of 3 is found on the 50 per cent line, indicating that 50 per cent of all those making up the table were below and 50 per cent above the height of this individual; his sitting height is on the 45 per cent line (45 per cent being below and 55 per cent above him), while his weight is  $62\frac{1}{2}$  per cent ( $37\frac{1}{2}$  per cent being above). The weight and height of 2 are at  $82\frac{1}{2}$  per cent (women's table), while the first three measurements of 1 are  $98\frac{3}{4}$  per cent (only  $1\frac{1}{4}$  per cent being larger in these particulars). In the same manner all the other points of intersection may be read, the divergence from a straight line indicating the departure from symmetry.

The table charts serve the double purpose of tables and charts, and are designed to show the distribution of any American community as to physical power and proportions. Those now ready are largely made up of the measurements of students taken at various colleges and preparatory schools, according to the directions submitted by the author, and adopted by the American Association for the Advancement of Physical Education. They range from 10 to 26 years of age for either sex, there being one for each age, except that the ages from 22 to 26 for men, and from 18 to 26 for women, are combined, since it is found that little change takes place during these periods of development.

The advantages of these closer comparisons are so apparent that it will now seem manifestly unjust to any individual to compare his measurements with tables made up of the combinations of ages formerly used.

The normal lines on the charts for these older ages represent the measurements of the statues of typical American students on exhibition at the World's Fair in Chicago. But as those statues are not intended to represent physical perfection, it is not to be assumed that the measurements of any individual should all fall on the same normal line, though such a person would be of great interest.

The similarities and differences in the old and new charts will readily appear after a moment's comparison. While the arrangement of the vertical lines is similar to a degree, the horizontal lines on the table charts represent the graded values of the various parts measured, as indicated by the columns of figures on the left and right in Metric and English measures. The curved lines show the range of the various measurements as labelled on each line, from minimum to maximum, according to the age and sex for which the table was computed; capacity of lungs, however, though recorded in cubic inches, is read by the figures in the outside left column.

## DIRECTIONS FOR PLOTTING THE CHARTS.

The relation of an individual in size, strength, and development to the normal standard of the same age and sex may be found in the following manner: After selecting a table chart of the same sex and of a corresponding or the nearest age, find the figures in either of the columns corresponding to those of the measurements being compared, then follow the horizontal lines leading from these figures till they cross the curved lines of the measurements under consideration; from these points trace the vertical lines to the figures at the top, which indicate the percentages of individuals surpassing or failing to surpass the values of the various measurements of the individual in question. Where the size of the parts measured exceeds or falls below the figures defined by the curved lines, it indicates that this part is larger or smaller than that possessed by 98 per cent of those examined; in this case the mark can be made on the side lines at the figures indicating the actual measurements.

If the various points found on the table charts have been marked (where the measurements of the limbs are different the points can be marked with the letters r and l), they can be transferred to corresponding positions on the skeleton chart and connected by a line which will show more clearly the divergence from symmetry represented by the figure of the individual.

Symmetry, or asymmetry, will be determined by the degree to which the line of the individual corresponds in directness to the percentage lines, or departs therefrom.

As a rule, the measurements of a small person will fall to the left, and those of a large person to the right of the chart. If strong for one's size, the points indicating strength will fall to the right of those indicating weight, height and girths.

Development will be shown by the position of the muscle measurements; and capacity for development by the excess of the bone over the muscle measurements of corresponding parts, such as the knee to the calf.

On careful study it will appear that the uses of the chart are numerous, suggesting many other comparisons of interest, and stimulating the individual to more earnest efforts towards improvement. They open up a wide field for observation, and the boy or girl having his or her measurements plotted regularly, beginning at an early period, will be able to note the rate of growth each succeeding year in different particulars, as well as the age at which full development is reached in any particular.

The charts are so arranged that anyone can study out and mark the comparisons, if the measurements have been taken in the same manner as those making up the charts; and also be able to see in advance the degree of change it is desirable to make, as well as the whole range of measurements for the same age.

It is designed that these charts shall go together, and they will be furnished at the same price as the old one alone.

D. A. SARGENT, M. D.,  
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