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ecrease in explained with very Bowditch and Roberts have shown that, on the average, children of well-to-do parents are taller and heavier than those of poorer parents. Carlier has shown the same phenomenon by proving that a number of children of a certain class, when brought under more favorable conditions—in his case into a military training school—grow more rapidly than the rest, who were left in their former conditions. The mortality of children is greater among the poorer classes than among the well-to-do classes. Therefore among the young children a greater percentage of the individuals measured belongs to the poorer classes, whose children are at the same time shorter of stature than among the older children. This fact affects undoubtedly the averages of measurements collected in our public schools.

It does not seem unlikely that the correlation between measurements and mortality is more strongly emphasized at certain periods than at others. If, for instance, many individuals of retarded growth should die during the period of adolescence, this might give the real explanation of the curious overlapping of the curves of growth of boys and girls, the girls between about the twelfth and fourteenth years being heavier and taller than boys of the same age. I am strengthened in this opinion by the observation, made by Dr. G. M. West, that the extent of this period and the amount of overlapping are the smaller the more favorable the conditions under which the individuals live. It would be interesting in this connection to study the curves of growth of a people which has a very high death-rate among young children.¹

Social causes are apt to introduce other complications which restrict the comparability of the results. The poorer classes do not send their children to school as long and as regularly as the well-to-do; consequently their proportionate number among the school children decreases steadily, and this changing composition of the series must affect the results of the measurements.

The state of health of the children also affects the series, particularly during the first and last years. Weak children will be sent to school later than strong children, and the teachers will be inclined not to promote them as rapidly as strong children, so that the oldest school children will include an undue proportion, not only of those who are dull, but also of those who have been of weak health during a portion of their life.

For all these reasons, investigations based on single observations of children of various ages do not give us results which can be considered to indicate with the highest accuracy attainable the processes of human growth. The series for the various years differ in composition, an. the physiological constants are therefore modified to a greater or less extent by a variety of disturbing factors. In order to obtain the physiological results with the greatest accuracy, the material upon which we base our studies must be made homogeneous. This can be accomplished in two ways. A very large number of children may be measured once; and year after year those who die and those who on account of social reasons are removed from the field of observation must be eliminated from the list. When all have become adults, the remaining individuals and those who dropped out for various reasons must be treated separately. But the best way would be to take measurements of a large series of children at stated intervals, as in this manner the fullest information on the manner of growth will be given, and as these repeated measurements furnish all the necessary material for subdividing the series so that each division will be homogeneous.

These limitations must be borne in mind in interpreting results of a single set of observations on children of various ages, or, to use Hertel's term, in interpreting results obtained by the generalizing method.

Besides this, certain corrections must be made which heretofore have not received sufficient attention. The number of children of various ages who have been measured is not equal. All the series begin with comparatively few children. The number increases from year to year until, beginning with the tenth or eleventh year, it decreases facin, year to year until, beginning with the tenth or eleventh year, it decreases facin, that among 6-year-old children, for instance, there are in the measured series more of the age of 6 years and 11 months than of 6 years exactly; and that, on the other hand, among the 15-year-old children there are more of the age of 15 years exactly than of 15 years and 11 months. In treating the various series of observations, all children between 6 and 7 years, 7 and 8 years, etc., or all the children between 6_1 and 7_2 years, etc., have been grouped together and the series is assumed to represent the sizes for the average ages, i. e., 6.5 years, 7.5 years, etc., or, in the other case, 6, 7, 8 years. On account of the varying frequency of the several months this is not quite correct. Among the young children the average will be

¹I expressed these views first in Science, Vol. XX., p. 351, December 23, 1892.