Distribution of observations of the height of 8-year-old girls—Continued.

Height in centimeters.	Number of girls measured, age 8 years and—				
	0 to 2 months.	3 to 5 months.	6 to 8 months.	9 to 11 months.	0 to 11 months.
130	2	3	5	8	18
131		2	1	1	4
132	1	2	3	5	11
133			2		2
134	1	1	2	1	5
135				1	1
136			1	1	2
137				1	1
138				1	1
139					
140				1	1
Whole number of cases	186	207	238	203	834
Average height	118.9	119.7	121.3	122.4	120.63
Variability	±5.23	±5.60	±5.08	±5.46	±5.50

The average of the variability of the four quarters is ±5.34, while that for the total year is ±5.50, a very considerable difference, which will be the greater, the more rapid the growth or the more rapid the change of variability during the year.

Previous investigations have shown that variability decreases very rapidly in the period of adolescence. During this time it is imperative to divide the series according to intervals shorter than years in order to obtain results that bring out the physiological relations clearly.

We will call the variability at any given period t of a certain year μ_t; the average value of the measurement for the same period, A_t. The sum of the squares of all the deviations for this period, divided by the number of observations n_t for this period, will then be

$$\frac{\Sigma(A_t-x)^2}{n_t}=\mu_t^2.$$

The variability for the whole year is computed according to the formula

$$\frac{\Sigma(A-x)^2}{n}=\mu^2,$$

where A is the general average, and n the total number of cases. For this we can substitute

$$\mu^2=\frac{1}{n}\Sigma n_t\frac{(A-x)^2}{n_t}=\frac{1}{n}\Sigma n_t\frac{(A-A_t+A_t-x)^2}{n_t}$$

$$=\frac{1}{n}\Sigma n_t\frac{(A-A_t)^2}{n_t}+\frac{1}{n}\Sigma n_t\frac{(A_t-x)^2}{n_t}+\frac{2}{n}\Sigma n_t\,(A-A_t)\frac{A_t-x}{n_t}.$$

A_t being the average of all the values of the measurement at the period t, then

$$\Sigma(A_t-x)=0.$$

and the last member of the sum disappears.

We will call $$A-A_t=d_t.$$

As stated above $$\Sigma\frac{(A_t-x)^2}{n_t}=\mu_t^2.$$

Therefore $$\mu^2=\frac{1}{n}\Sigma n_t\,(d_t^2+\mu_t^2).$$

We will assume that n_t can be represented by the formula

$$n_t=\ n_0\,(C+at+bt^2),$$

also $$\mu_t^2=\mu_0^2\,(1+a_1t+b_1t^2),$$

and $$d_t^2=a_2t+b_2t^2.$$