In combining these, we must give each the weight corresponding to the number of cases, n_1, n_2, n_3 . . . . , from which it is derived. Let n be the total number of cases. Then we have the average for the whole year.

$$a = \frac{n_1 (a_1 + dt_1) + n_2 (a_2 + dt_2) + \ldots .}{n}$$
$$= \frac{(n_1 a_1 + n_2 a_2 + \ldots .) + d (n_1 t_1 + n_2 t_2 + \ldots .)}{n}.$$

As a_1 is the average of all the values of the period 1, we have $a_1 = \frac{s_1}{n_1}$, where s_1 is the sum of all the values of the period 1. Therefore

$$a = \frac{(s_1 + s_2 + s_3 + \ldots .) + d (n_1 t_1 + n_2 t_2 + \ldots .)}{n}.$$

The sum of all the s is evidently equal to the sum total of all the observations during the year, which we will call S.

$$a = \frac{S}{n} + d \frac{n_1 t_1 + n_2 t_2 + \ldots .}{n}.$$

The last quotient in the equation is the average of all the periods, which is multiplied by the annual increment d. We have therefore the average value for the year equal to the average of all the observations, plus a correction which is equal to the annual increment multiplied by the difference between the average period for all the observations and the full or half year, as the case may be.

While the average may be corrected in this manner without much difficulty, the variability of the series for the whole year is affected in a much more complex manner. We will suppose that the variability did not change much in the course of one year, which at certain periods of life is, however, not the case. Since the values of the average increase from month to month, it is clear that the range of variation for the early periods must begin at a lower point than for the later periods, so that the variation for the total year covers a wider range than the variations at a given moment do.

As an example I will give here the distribution of observations of 8-year-old girls, first in periods of three months, then for the whole year, with their averages and the means of the squares of deviations.

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

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.
105	1	1	.....	(a)	a 2
106	1	.....	.....	.....	1
107	.....	1	.....	.....	1
108	1	2	.....	1	4
109	3	4	2	.....	9
110	4	2	1	3	10
111	4	4	4	.....	12
112	6	7	8	.....	21
113	9	7	1	2	19
114	9	9	3	6	27
115	11	13	10	5	39
116	13	15	15	8	51
117	10	12	10	4	36
118	14	9	15	16	54
119	15	9	10	13	47
120	17	24	22	15	78
121	11	33	22	14	60
122	12	10	21	18	61
123	6	10	15	17	48
124	11	13	18	12	54
125	8	7	16	16	47
126	6	11	9	12	38
127	4	5	12	14	35
128	5	5	8	3	21
129	1	6	2	3	12

a One of 102 centimers.