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CHAPTER IV

DISCUSSION OF RESULTS

Part I Cross-Sectional Study

As noted in the preceding chapter, all data were subjected to adequate statistical techniques for analysis, keeping in view the objectives of the study mentioned earlier. These results on each aspect of measurements of physical growth in relation to the influence of some of the possible factors studied have been summarized in tables, illustrated with figures as far as possible and discussed under separate heads in the pages that follow.

The results of the whole investigation have been presented and discussed in two parts, viz. Part I dealing with Cross-sectional approach, and Part II dealing with longitudinal approach, as explained earlier. The main investigation has been devoted to the cross-sectional study of 1858 children of both sexes from urban and rural areas, who were observed at different intervals, some at least five times continuously at interval of three months starting from their specific age-point, and most not available continuously over a length of period, but available only for very few times or even only once after the first observation for measuring various aspects of physical growth at

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specific age-points. The former approach with continuous observations on same children for various age-points has been termed longitudinal study, and the latter one is treated as a cross-sectional study, consisting of observations on different measures of growth, combining same as well as different children, concentrating only on measures at each specific age-point, irrespective of being of the same or different child. It should be borne in mind that in a cross-sectional study the number of observations at a specific age-point can be treated for all practical purposes of analysis as corresponding to the number of subjects (children) studied at that particular age-point.

With this difference of approach in view, all the record sheets were examined. The record sheets of the subjects whose data were found incomplete for any reason in any of the two approaches were rejected from the analysis. After this scrutiny, the longitudinal study consisted of complete data of 600 children (316 boys and 284 girls) only from urban area (hardly few from rural area being available continuously for study) available out of the total sample of 1858 children whose complete data (not necessarily of same subjects) served as the cross-sectional study for the main investigation. The results of analysis of data of these 600 children of different age levels (as summarized in table 3.4 in earlier Chapter III) observed continuously for five times at interval of three months, thus giving 600 X 5 = 3000 observations in all have

been discussed separately in the next part. The present part I of chapter IV is devoted to the discussion of results of analysis of data on 1858 children, giving in all 5699 observations as classified in the preceding Chapter III (tables 3.1, 3.2 and 3.3) area wise, sex-wise, socio-economic level-wise, as well as age-level-wise, forming the main cross-sectional study. As noted in the preceding chapter, thirteen different aspects of measurements of physical growth - twelve actually measured and one derived from measures taken - were recorded at each of 17 age-points from 2 to 6 years of age at interval of three months. These data have been analysed with a view to finding the norms (mean norms) of these aspects of physical growth at varied age-levels as well as studying the area differences, sex differences and also, if possible, the influence of some variables affecting the growth of children. In addition to the general study of all data on 5699 observations of 1858 children at 17 age-points from 2 to 6 years at interval of three months, efforts have been concentrated - for convenience, comparison and more useful purpose - on the analysis of more specific measures of 1692 subjects or observations at main fixed points of ages, viz. age-levels of 2, 3, 4, 5 and 6 years and these results were specifically analysed with a view to studying the trend of growth that can be compared more usefully with that obtained in other studies usually aimed at these age-levels.

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All these findings on each aspect of physical growth at these various age points in relation to area, sex, socio-economic level as well as other possible influences have been now discussed in the paragraphs that follow.

1. WEIGHT

The data on weight in terms of Kgms. were classified for different groups and studied with statistical analysis to examine the influence of relevant variables as described below.

Weight in relation to area and sex

The 5699 scores in units of kilograms representing weight of children of different groups were classified and analysed statistically to study the trend of growth at various age levels and also to study the influence of some variables. The summary of results on weight is presented in tables 4.1 and graphically represented in figure 4.1 .

The table 4.1 summarizes the number (N), mean (M) and standard deviation (SD) at each of 17 age points from 2-0 to 6-0 years at an interval of three months, for each of four area x sex groups, viz. UB (Urban Boys), UG (Urban Girls), RB (Rural Boys) and RG (Rural Girls, in columns 2-5 of table 4.1, then two area groups : U (Urban) and R (Rural), in columns 6 & 7, two sex groups: B (Boys) and G (Girls), in columns 8 & 9 and finally the general mean in column 10. Besides these means,

the amounts of increase in each successive age-point for various main and subgroups have been shown in table 4.2. The results of two area groups, two sex groups and four area x sex groups as well as total sample are illustrated in figures 4.1, 4.2, 4.3 and 4.4 respectively, along with the increase in general mean at each successive age-point in fig. 4.4 in which the curve represents the growth for different groups and histograms represent the increase (velocity) at each subsequent age-point, based on total mean. It is apparent from these results in table 4.1 that the weight mostly increases with the increase in age as it is naturally expected in each group. However, the rate of increase is not uniform as seen from table 4.2; the increase is comparatively greater in earlier years 2 to 3 and gets less in subsequent years of growth from 3 to 4, then gets steady between 4 and 5 and again increases from 5 to 6 years of age.

Further, in order to test the significance of difference in between means of two area groups and also two sex groups, i.e. to study overall area differences and sex differences in weight, the data on 5699 observations were subjected to statistical analysis by t-test. The results have been summarized in table 4.3.

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Table 4.3 - showing Results of t-test (for weight)

(i)	Area	Urban	Rural	Total		
	N	4766	933	5699	t = 6.9330	sig. beyond
	M	13.79	13.23	13.702		.001 level
	SD	2.25	2.38	2.282		
(ii)	Sex	Boys	Girls	Total		
	N	3006	2693	5699	t = 8.4899	sig. beyond
	M	13.94	13.43	13.702		.001 level
	SD	2.26	2.37	2.282		

The results clearly showed that there were statistically significant differences between boys and girls, and also between urban and rural children as far as their weight was concerned. Urban children on the whole were 0.56 kgs. significantly heavier than rural children, and boys on the whole were 0.51 kgs. heavier than girls. Differences at each age point could be seen from table 4.1 . These significant differences between urban and rural groups as well as boys and girls indicate that the data of the two groups should be kept apart and there should be separate norms for each. In other words, the means of urban boys, urban girls, rural boys and rural girls separately for each group can be treated as norms for comparison at each of 17 age points as given in columns 2-5 of table 4.1 .

This has been a picture of growth in weight at each of

17 age-points. However, for convenience and ease in general and specifically for purpose of comparison with results of other similar studies made earlier elsewhere, only the data of 1692 observations or subjects at main age-points, viz. 2, 3, 4, 5 and 6 age-levels, were specially examined in preference to data at all 17 age-points given in table 4.1 . It was also assumed that growth process being slow, it would not be proper to expect marked differences at interval of three months. In view of this, the results at interval of one year at full one-year age levels were separately concentrated upon for more useful or adequate or general comparison. These data have been reassembled in table 4.4 showing N, M and SD of group at each of 5 age-levels, area x sex-wise, and in table 4.5 showing the amount of increase in subsequent years. All these results in terms of means of weight are graphically represented by curves in fig. 4.5 area-wise and in fig. 4.6 sex-wise, in figure 4.7 area x sex-wise; the increases (distances) at successive age level are represented by histograms in fig. 4.8 and by velocity curve in fig. 4.9. The curves represent the growth for different groups and histograms or velocity curves represent the rate of increase at each subsequent age-level, based on total mean. It is observed that the trend of growth remains the same, i.e. weight increasing with age, but rate of increase in case of 5 age levels becoming less and less at each subsequent age, without any

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spurt in between as shown earlier by data at 17 age points, (spurts being smoothened up or dropped at sufficient long intervals). At each age, urban children were heavier than rural, and boys heavier than girls. The results for boys and girls can be compared with corresponding figures given by Hansman (1970) and also by Bayer and Bayley (1959) in tables in Appendix 4 .

Weight in relation to socio-economic level

Just as area and sex variables contributed significantly to the weight, it was hypothesized that the socio-economical level of the family to which children belonged would contribute all the more to the extent of weight of the children. The distribution of the total sample of 1858 children with 5699 observations has been already described earlier in Chapter III in table 3.3 for socio-economic level. With a view to studying the hypothesis about relation of weight to socio-economic level, the data of 1692 observations in terms of weight at five main age-levels were classified according to the socio-economical status of the group categorized at five levels, viz. low, low-middle, middle, high-middle and high. The category of socio-economical level of the family was determined on the basis of income, education and occupation of the father; as in Kappuswami's Scale (see Appendix 5). These

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data have been given in table 4.6 (a) & (b) showing N, M and SD for weight of boys, girls and total group of 5 SE levels at each of five age-levels, i.e. Age x sex x SE level in table 4.6 (a); Age x SE level in table 4.6 (b); and increase in table 4.6 (c). The total means and increase at successive ages are represented in figure 4.10 (i & ii) with histograms separately for each age-level. The area-wise distribution though available has been dropped in study mainly because one would not have got reliable information in view of expected confounding of socio-economical level with type of area and partly because there were very few numbers in some of the cells in area x sex x socio-economical level distribution.

A general glance at the figures in the table 4.6(a) would reveal the following findings, viz.

1. As noted earlier in general, so also even within each socio-economic level, weight increases with age for boys, girls or on the whole, and rate of increase decreases with age.
2. A general trend was observed for weight to increase with increase in socio-economic level at each age level, both in case of boys and girls, though the increase is not significantly striking in some cases.
3. As marked earlier in general, here too at each age boys were somewhat heavier than girls at each socio-

economical level, the difference getting bigger with increasing age and increasing socio-economical level.

These findings in age x sex x SE levels design have not been subjected to rigorous statistical treatment, since the number of observations in some cases was meagre when data were broken up into area x sex x socio-economic level. The relation of weight to socio-economic level needs special attention to be investigated in a follow-up work more systematically with sufficient number in each cell for more reliable results.

However, the data of total sample (5694 observations available out of 5699 observations in all at all 17 age-points as shown in table 3.3 earlier in Chapter III) were classified only according to five socio-economical levels in a randomized group design, irrespective of area or sex, and they were subjected to statistical technique of simple one-way analysis of variance. Table 4.7(a) gives the N, M and SD of the five socio-economical groups; and the summary of results of analysis of variance of these data is given in table 4.7 (b).

In order to test which pair among the five S.E. groups differed significantly in weight, the least significant difference (LSD) test was applied, and the results of this test are given in table 4.7 (c).

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Table 4.7 (b) - showing a summary of results of analysis of variance for 5 SE levels for weight.

Source	df	SS	MS	F-ratio	Significance
Between Groups (Socio-economic levels)	4	611.019	152.753	29.901	Sig. beyond .01 level
Within Groups (error)	5689	29063.112	5.109		
Total	5693	29674.122	-		

The results of 17 age-points in above table $4.7_{\wedge}^{(b)}$ reveal significant overall differences in weight as a function of socio-economic level, and this confirms the finding (no. 2) above for data of five age levels in table 4.6. The significance of pair-wise differences in socio-economic groups is shown below in table 4.7 (c).

Table 4.7 (c) Weight in kg.

Pairs	Actual difference	L.S. Diff. .05	L.S. Diff. .01	Significance
SE_1-SE_2	0.20	0.21	0.27	-
SE_1-SE_3	0.50	0.20	0.27	* *
SE_1-SE_4	0.87	0.22	0.30	* *
SE_1-SE_5	1.39	0.45	0.59	* *
SE_2-SE_3	0.38	0.14	0.18	-
SE_2-SE_4	0.69	0.17	0.22	* *
SE_2-SE_5	1.21	0.42	0.55	* *
SE_3-SE_4	0.31	0.43	0.57	-
SE_3-SE_5	0.83	0.42	0.55	* *
SE_4-SE_5	0.52	0.16	0.21	* *

* * Significant at .01 level.

The least significant difference (i.e. the minimum difference that can make the pair of groups significantly different from each other) was derived by the following formula as an extension of the t-test, with standard error based on the mean error term in the results of analysis of variance given in table 4.7 (b) :

$$t = D/SE_D$$

$$\therefore D = t \times SE_D$$

$$= t \times \sqrt{MS_w/n_1 + MS_w/n_2} \text{ for groups of unequal n,}$$

where t = tabulated value of t at .05 or .01 level for df of MS_w i.e. for 5693 df i.e. 2.58 and 1.96 respectively.

n_1 & n_2 = number of observations in two groups to be compared.

and MS_w = mean sum of squares of the error term = 5.109 in this case.

It would be seen thus that socio-economic level played a significant role in contributing to the weight of children, also in case of children at all age levels. Just as weight was found to increase with age, there was a general trend for weight to increase with socio-economic level. Children in SE 5 were found to have highest weight and those in SE 1 had lowest. (Table 4.7 (a)). Though there was overall significant difference in weight of children from different socio-economic

levels. (as seen from results in table 4.7 (b), out of 10 pairs the only pairs that were not significantly different from each other were SE_1-SE_2, ~~SE_2-SE_3~~ and SE_3-SE_4 as observed in table 4.7 (c).

Weight in relation to birth order and mother's age :

It has been assumed that physical growth is likely to be affected by a number of other family variables such as birth order position of child, age of the mother at birth of the child, as well as the number of siblings born to the mother in that family i.e. family size. The contribution of these variables to the two main aspects of physical growth, viz. weight and height has been specifically and statistically studied.

In order to study the relation of weight to birth order position and mother's age, data were classified according to the five categories of birth order positions, viz. first-born, second-born, third-born, fourth-born and born fifth and above, at each of five categories of age of the mother of the child under observation, viz. upto 20, 21-25, 26-30, 31-35 and above 35 years of age (as classified earlier in tables 3.11 and 3.12 (ii)). This classification made a total of 5696 observations available in this case. These data were treated for statistical analysis as data in a 5 x 5 factorial design and were subjected to the technique of two-way analysis of variance. The results

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are summarized in table 4.8 showing summary of results of analysis of variance (B.O. X M.A.).

Further, to study the birth order effects at each of five main age levels, viz. 2, 3, 4, 5 and 6 years of age of children, data on 1691 observations available at these 5 age levels were analysed by same statistical technique of analysis of variance separately for each age level and the results are presented in tables 4.9(a)& 4.9(b)(i-v), showing ANOVA results separately for each age level.

Table 4.8 - showing summary of results of analysis of variance for weight in kg. (Birth Order of children X Age of Mother).

Source	df	SS	MS	F-ratio	Significance
Birth order	4	77.390	19.348	3.814	Beyond .01
Mother's age	4	249.713	62.428	12.305	"
B.O. x M.A.	16	335.824	20.989	4.137	"
Error	5671	28770.828	5.073	-	
Total	5695	29433.755	-	-	

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Table 4.9 (a) - showing means weights (for each birth order at 5 age levels of children).

Birth Order		Age Levels of children 2	3	4	5	6	Total
	N	18	67	173	232	105	595
I	M	9.667	11.575	13.006	14.567	16.233	
	SD	1.188	1.462	1.293	1.703	2.084	
		31	66	125	173	86	481
II		10.258	12.015	13.468	14.573	15.735	
		1.359	1.170	2.897	1.532	1.671	
		27	52	75	125	87	366
III		9.370	11.227	13.007	14.300	15.690	
		1.229	1.191	1.316	1.696	1.910	
		7	20	28	58	47	160
IV		9.500	11.700	12.457	14.050	15.830	
		0.577	1.750	1.196	1.391	1.698	
		4	5	17	36	28	90
V		8.250	10.400	12.941	15.308	16.464	
		0.645	0.652	1.740	6.162	2.297	
	N	87	210	418	624	353	1692
Total	M						13.855
	SD						2.541

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Table 4.9 (b) (i-v) - showing results of analysis of variance separately at five age levels for birth order groups.

	Source	df	SS	MS	F-ratio	Significance
(i) At 2-0 yrs. of age (N=87)	Birth Order	4	21.274	5.324	3.579	Beyond .01
	Error	82	121.982	1.488		
	Total	86	143.276			
(ii) At 3-0 yrs. of age (N=210)	Birth Order	4	26.031	6.508	3.681	"
	Error	205	362.374	1.768		
	Total	209	388.405			
(iii) At 4-0 yrs. of age (N=418)	Birth Order	4	31.108	7.777	2.081	not significant
	Error	413	1543.143	3.736		
	Total	417	1574.251			
(iv) At 5-0 yrs. of age (N=623)	Birth Order	4	42.054	10.513	2.265	not significant
	Error	618	2868.736	4.642		
	Total	622	2910.790			
(v) at 6-0 yrs. of age (N=353)	Birth Order	4	26.371	6.593	1.796	not significant
	Error	348	1277.654	3.671		
	Total	352				
Total N = 1691						

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It would be seen from the above table 4.8 that both the variables, viz. birth order and mother's age, were on the whole significantly contributing factors to the weight of a child. However, there was also a significant interaction between the two and this indicates that though both were apparently significant by themselves, they were not independently contributing to weight, but doing so in interaction with each other.

Results in table 4.9 (b)(i-v) reveal that though birth order on the whole was found to be a significant factor (table 4.8), it was not so at all age levels, but it played a significant role only in case of children at age levels of 2 & 3 years of children's age. It would be seen from table 4.9 (a) that at 2 & 3 years the second born and the first born were higher in weight and fifth born or other were the lowest.

Weight in relation to Family Size and Mother's Age :

Finally, in order to study the influence of family size (number of siblings) in relation to mother's age, available total data of 5696 observations were statistically treated as data in a 5 x 5 factorial design and subjected to technique of two-way analysis of variance. The results are summarized in table 4.10 showing ANOVA results.

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Table 4.10 - showing ANOVA results (F.S. x M.A.).

Source	df	SS	MS	F-ratio	Significance
Family Size	4	36.837	9.209	1.817	Not significant
Mother's Age	4	247.987	61.997	12.234	Sig. .01
F.S. x M.A.	16	394.187	24.637	4.862	Sig. .01
Error	5671	28737.162	5.067	-	
Total	5695	29416.173	-	-	

It would be seen from table 4.10 that only mother's age on the whole played significant role in contributing to the weight of the child, thus confirming also the finding in table 4.8; but family size on the whole did not seem to contribute to weight. However, the significant interaction between the two casts doubt on the independent role of each of the two factors; both seemed to act significantly only in interaction with each other.

2. HEIGHT

The data on height in terms of cms. were classified and treated statistically to study the contribution of relevant variables to height with the same procedure as that for weight in the preceding section.

Height in relation to area and sex :

In order to examine the influence of area and sex on growth of height of children, the data on height of 5699 children under study were classified area-wise and sex-wise as shown below in table 4.11 for each of 17 age-points; the increase at successive age point is seen in table 4.12, and all these mean heights are graphically represented in fig. 4.11 for two areas, fig. 4.12 for two sexes, fig. 4.13 for area x sex-wise and the successive increase in fig. 4.14, the curve showing total mean at each of 17 age-points and the histograms showing the successive increase. It is evident from these results that as expected the height mostly increases with age as seen from table 4.11. However, the rate of growth is not uniform as seen from table 4.14; the increase is greater in early years from 2 to 4, then gets less, but almost uniform or steady between 4 and 5 years of age, and increases again between 5 and 6 years of age.

Further, in order to test statistically the significance of difference of means between two area groups and two sex groups in height, these data on 5699 observations were subjected to t-test separately to examine the influence of area and sex variables. The results are summarized in the following table 4.13.

Table 4.13 - showing Results of t-test.

	Urban	Rural	Total	t-value
(i) AREA				
N	4766	933	5699	
M	98.44	96.60	98.150	2.7257
SD	20.41	7.77	18.881	Significant beyond .01 level.
(ii) SEX				
N	3006	2693	5699	
M	98.88	97.31	98.150	3.1333
SD	21.15	16.08	18.881	Significant beyond .005 level.

The results clearly reveal that both area and sex were significant factors in contributing to height of the children. The urban children were statistically taller (98.44 cms.) than rural children (96.60 cms.), and boys were taller (98.88 cms.) than girls (97.3 cms.). These significant differences provide the basis for separate norms for comparison of urban and rural, boys and girls; the separate means shown in columns 2-5 of table 4.11 should be treated as norms at each age point, as in case of weight too.

Besides these observations at each of 17 age-points, the data were examined at 5 main age levels of 2, 3, 4, 5 and 6 years for convenience of general and more useful or adequate comparison. These data of 1692 observations are presented in table 4.14 (area x sex-wise) and the increase at successive age in table 4.15 and graphically illustrated in figure 4.15 showing curves for means (area-wise), fig. 416 (sex-wise), fig. 4.17 (area x sex-wise) and fig. 4.18 showing increase with help of histograms and fig. 4.19 showing rate of increase with help of velocity curve. It is seen from these tables and figures for 5 age levels that the trend of growth of height remains same as shown by data on the whole sample of 5699 observations, i.e. height increases with age. However, the rate of increase at these five points (fig. 4.18 and 4.19) is successively getting less, without any spurts in between as in data on 17 age points (fig. 4.13 & 4.14).

Height in relation to socio-economic level

In order to study the role of socio-economic level on growth of height of children, the data on 1692 observations of height of children from 2 to 6 years at 5 age levels were classified according to level of socio-economic status and sex, as done earlier with regard to observations on weight (table 4.6a). These data on means of height (S.E. level x sex) for five age levels have been summarized in table 4.16(a) for Age x Sex x

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SE level groups and in table 4.16 (b) for Age x SE level groups. The increase in height for each age level within each SE level is shown in table 4.16 (c). The general means for SE levels at each age level as well as the amount of increase at each successive age level have been illustrated separately for each age level in figure 4.20(i & ii).

The results in tables 4.16 (a), (b) and (c) in general reveal the following findings similar to those for weight :

1. As expected, even at each socio-economic level, the height increased with age in case of boys, girls or on the whole, and the rate of increase was high at ages 3 & 4 years, but then got less but almost steady with age upto 6 years.

2. A general trend was observed for height to increase also with increase in socio-economical level at each age level on the whole as well as separately in case of both boys and girls.

3. Boys were observed to be taller than girls, not only at each age, but also at each socio-economic level, difference getting more with increase in age and SE level.

In view of blank entries in some cells in age x sex x SE

level design, it was thought less adequate to treat these data statistically. However, ignoring age and sex variables, in order to study the contribution of SE levels to height growth, the data on 5694 observations available out of a total of 5699 on whole sample for all 17 age-points were classified according to five socio-economic groups as shown in table 4.17 (a) and these were subjected to statistical technique of analysis of variance as well as LSD test, as in a randomized group design, as explained earlier for data on weight. The summary of results of analysis of variance is presented in table 4.17 (b), and results of LSD test to examine the significance of pair-wise differences in SE levels are given in table 4.17 (c).

Table 4.17 (b) - showing ANOVA results for SE levels.

Source	df	SS	MS	F-ratio	Significance
Between Groups (SE level)	4	6250.729	1562.682	4.391	Beyond .01 level
Within Groups (error)	5689	2024657.1	355.890		
Total	5693	2030907.8	356.738		

Table 4.17 (c) - showing L.S.D. results pair-wise.

Pairs	Actual difference	L.S.Diff. .05	L.S.Diff. .01	Significance
SE_1 - SE_2	0.07	1.776	2.334	-
SE_1 - SE_3	1.19	1.747	2.296	-
SE_1 - SE_4	2.08	1.917	2.519	*
SE_1 - SE_5	4.28	3.780	4.968	*
SE_2 - SE_3	1.26	1.181	1.552	*
SE_2 - SE_4	2.15	1.420	1.866	* *
SE_2 - SE_5	4.31	3.540	4.653	*
SE_3 - SE_4	0.89	1.384	1.819	-
SE_3 - SE_5	3.05	3.554	4.671	-
SE_4 - SE_5	2.16	3.627	4.766	-

* Significant difference at .05 level.

** Significant difference at .01 level.

It would be seen from results in above tables that socio-economic level was a significant factor contributing to growth in height of children; height used to increase with increase in SE level. However, though there was overall significant difference in SE levels, the only pairs of significant difference as observed in table 4.17 (c) were SE_1-SE_4, SE_1-SE_5, SE_2-SE_3, SE_2-SE_4 and

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SE_2-SE_5. All these pairs showed significant differences at the .05 level; the pair SE_2-SE_4 showed significant difference at .01 level also. Children in highest SE_5 level were 101.13 cms. and those in SE_2 were lowest (96.82 cms.) and nearest to SE_1 (96.89 cms.) (table 4.17 (a)).

Height in relation to birth order and mother's age

As in case of analysis of weight data, the height data were analysed to study the relation of height to birth order position as well as to mother's age at birth of the child. The data were classified into 5 categories of children of different birth orders at each of five categories of the mother's age at birth of the child, viz. upto 20, 21-25, 26-30, 31-35 and above 35 years of age, as mentioned earlier. This classification made 5696 observations available for analysis. These data were subjected to statistical technique of analysis of variance. These results are summarised in table 4.18 (birth order x mother's age).

Table 4.18 - showing ANOVA results (Birth Order x Mother's Age).
(N = 5696)

Source	df	SS	MS	F-ratio	Significance
Birth Order	4	2187.708	1016.661	2.903	Sig. .05
Mother's Age	4	4066.644	546.927	1.562	Not significant
B.O.x M.A.	16	29094.577	1818.411	5.193	Sig. .01
Error	5671	1985745.300	350.158	-	
Total	5695	2021094.229	-	-	

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It would be seen from above table 4.18 that birth order is the only significant factor in contributing to the height of the children, and not mother's age at birth of the child. However, significant interaction between birth order and mother's age make the results somewhat difficult to be interpreted. It seems that at some birth order position, mother's age played role in one direction, while at other positions, the reverse; birth order was not contributing independently, but seemed to contribute only in interaction with mother's age.

To understand more definitely the role of birth order, data were separated for each of five main age levels of children and these are presented in table 4.19 (a) (birth order x age level of children). These data were statistically treated by analysis of variance technique separately for each age level, and the results are summarized in table 4.19(b) (i-v).

Table 4.19 (b) (i-v) - showing ANOVA results for Birth Orders separately at each of 5 age levels.

	Source	df.	SS	MS	F-ratio	Significance
(i) at 2-0 yrs. of age. N = 87	Birth Order	4	169.556	42.389	2.218	Not significant
	Error	82	1567.229	19.113	-	
	Total	86	1736.785	-	-	

Table 4.19 (b) (i-v) - contd.

	Source	df.	SS	MS	F-ratio	Significance
(ii) At 3-0 yrs. of age. N=210	Birth Order	4	235.315	58.829	3.269	Sig. .05
	Error	205	3689.545	17.998	-	Significant at .05 level
	Total	209	3924.860	-	-	
(iii) At 4-0 yrs. of age. N=418	Birth Order	4	115.602	28.901	1.749	Not significant
	Error	413	6826.014	16.528	-	
	Total	417	6941.616	-	-	
(iv) At 5-0 yrs. of age. N=623	Birth Order	4	159.396	39.849	1.685	Not significant
	Error	618	14617.886	23.654	-	
	Total	622	14777.282	-	-	
(v) At 6-0 yrs. of age. N=353	Birth Order	4	113.709	28.427	1.305	Not significant
	Error	348	7579.512	21.780	-	
	Total	352	7693.221	-	-	

Total N=1691

The results indicate that birth order played a significant role in contributing to the height of the children of only 3 years of age. It would be seen from table 4.19(a) that at age of 3., the second-born children were highest in height and the fifth- and later-born stood lowest.

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Height in relation to Family Size and Mother's Age

Finally, the data were classified to study height in relation to family size and mother's age, and this classification made 5696 cases available and they were also subjected to statistical technique of analysis of variance to study the effect of any of these two variables. The results are summarized in table 4.20.

Table 4.20 - showing ANOVA results (Family Size x Mother's Age).

(N = 5696)

Source	df	SS	MS	F-ratio	Significance
Family Size	4	1984.400	496.100	1.399	Not significant
Mother's Age	4	2199.538	549.885	1.551	Not significant
F.S. x M.A.	16	5544.848	346.553	0.977	Not significant
Error	5671	2010909.100	354.595	-	
Total	5695	2020637.800	-	-	

Results show that neither of the factors played any role in contributing to height of children. This confirms also the finding about non-significance of mother's age, as observed earlier in results of table 4.18 .

The parameters other than weight and height are discussed in part II which follows after tables 4.1 to 4.19 (a).

Table 4.1 - showing N, M and SD for weight in Kg. at 17 age-points for whole sample area-wise, sex-wise and area x sex-wise. (cross-sectional study).

Age point Yrs./months	Milieu x sex-wise							
	URBAN				RURAL			
	BOYS		GIRLS		BOYS		GIRLS	
1	2		3		4		5	
2 - 0	38	10.05 1.365	32	9.48 1.153	8	9.93 1.237	9	8.83 1.061
2 - 3	62	10.74 1.784	57	10.21 2.038	6	11.33 1.538	10	9.93 1.466
2 - 6	73	11.32 1.395	62	10.56 1.243	10	10.65 2.096	6	9.58 1.069
2 - 9	74	11.45 1.209	64	10.93 1.165	15	11.27 1.771	13	10.76 2.037
3 - 0	107	11.83 1.264	86	11.28 1.241	12	12.42 2.183	5	10.70 1.252
3 - 3	57	12.21 1.052	53	11.60 1.067	12	11.66 1.371	10	10.95 1.833
3 - 6	85	12.80 1.120	80	12.00 1.331	33	12.32 1.736	15	11.93 1.545
3 - 9	143	13.19 1.560	122	12.47 1.351	25	12.36 1.674	31	12.84 1.724
4 - 0	176	13.36 1.228	180	12.86 1.361	35	12.83 1.409	27	12.28 1.532
4 - 3	213	13.70 1.337	183	13.33 1.421	50	13.82 1.263	28	12.96 1.333
4 - 6	243	13.98 1.367	207	13.65 1.438	54	13.48 1.201	39	12.86 1.337
4 - 9	253	14.36 1.443	224	13.88 1.523	54	13.78 1.474	40	12.90 1.477
5 - 0	283	14.89 1.219	256	14.33 1.728	46	13.65 1.456	39	13.03 1.475
5 - 3	191	15.21 1.808	202	14.46 1.503	42	13.93 1.734	43	13.50 1.427
5 - 6	183	15.66 1.791	183	14.94 1.616	37	14.26 1.718	27	13.53 1.689
5 - 9	158	16.07 1.840	152	15.28 1.692	42	14.67 1.952	42	14.28 1.215
6 - 0	150	16.51 1.903	135	15.68 1.745	37	15.36 2.060	31	15.03 1.893
Total Observations	2488		2278		518		415	

Table 4.1 - contd. var. 20 weight in Kg.

age-point yrs.months	Milieu-wise Total	Urban	Total	Rural	Sex-wise Total	Boys	Total	Girls	Total Children
	6		7		8		9		10
2 - 0	70	9.79 1.295	17	9.35 1.247	46	10.03	41	9.33	87	9.70 1.291
2 - 3	119	10.49 1.919	16	10.45 1.603	68	10.8	67	10.17	135	10.48 1.879
2 - 6	135	10.97 1.377	16	10.25 1.817	83	10.18	68	10.47	151	10.90 1.440
2 - 9	138	11.21 1.214	28	11.04 1.880	89	11.41	77	10.9	166	11.18 1.344
3 - 0	193	11.58 1.280	17	11.91 2.123	119	11.88	91	11.25	210	11.61 1.363
3 - 3	110	11.91 1.097	22	11.34 1.599	69	12.11	63	11.49	132	11.82 1.208
3 - 6	165	12.41 1.287	48	12.19 1.672	118	12.66	95	11.98	213	12.36 1.381
3 - 9	265	12.86 2.119	56	12.63 1.704	168	13.06	153	12.54	321	12.82 1.053
4 - 0	356	13.11 1.391	62	12.58 1.482	211	13.27	207	12.78	418	13.07 1.343
4 - 3	396	13.53 1.387	78	13.51 1.515	263	13.72	211	13.28	474	13.53 1.402
4 - 6	449	13.83 1.408	93	13.22 1.291	296	13.88	246	13.52	542	13.72 1.407
4 - 9	477	14.14 1.498	94	13.40 1.531	307	14.25	264	13.73	571	14.02 1.527
5 - 0	539	14.69 1.198	85	13.37 1.488	329	14.71	295	14.15	624	14.51 1.262
5 - 3	393	14.82 1.748	85	13.71 1.591	233	14.97	245	14.29	478	14.63 1.653
5 - 6	366	15.30 1.741	64	13.95 1.731	220	15.42	210	14.75	430	15.10 1.733
5 - 9	310	15.68 1.810	84	14.49 1.628	200	15.77	194	15.06	394	15.43 1.738
6 - 0	285	16.11 1.874	68	15.21 1.978	187	16.28	166	15.56	353	15.94 1.925
N	4766		933		3006		2693		5699	
M	13.79		13.23		13.94		13.43		13.702	
SD	2.25		2.38		2.26		2.37		2.282	

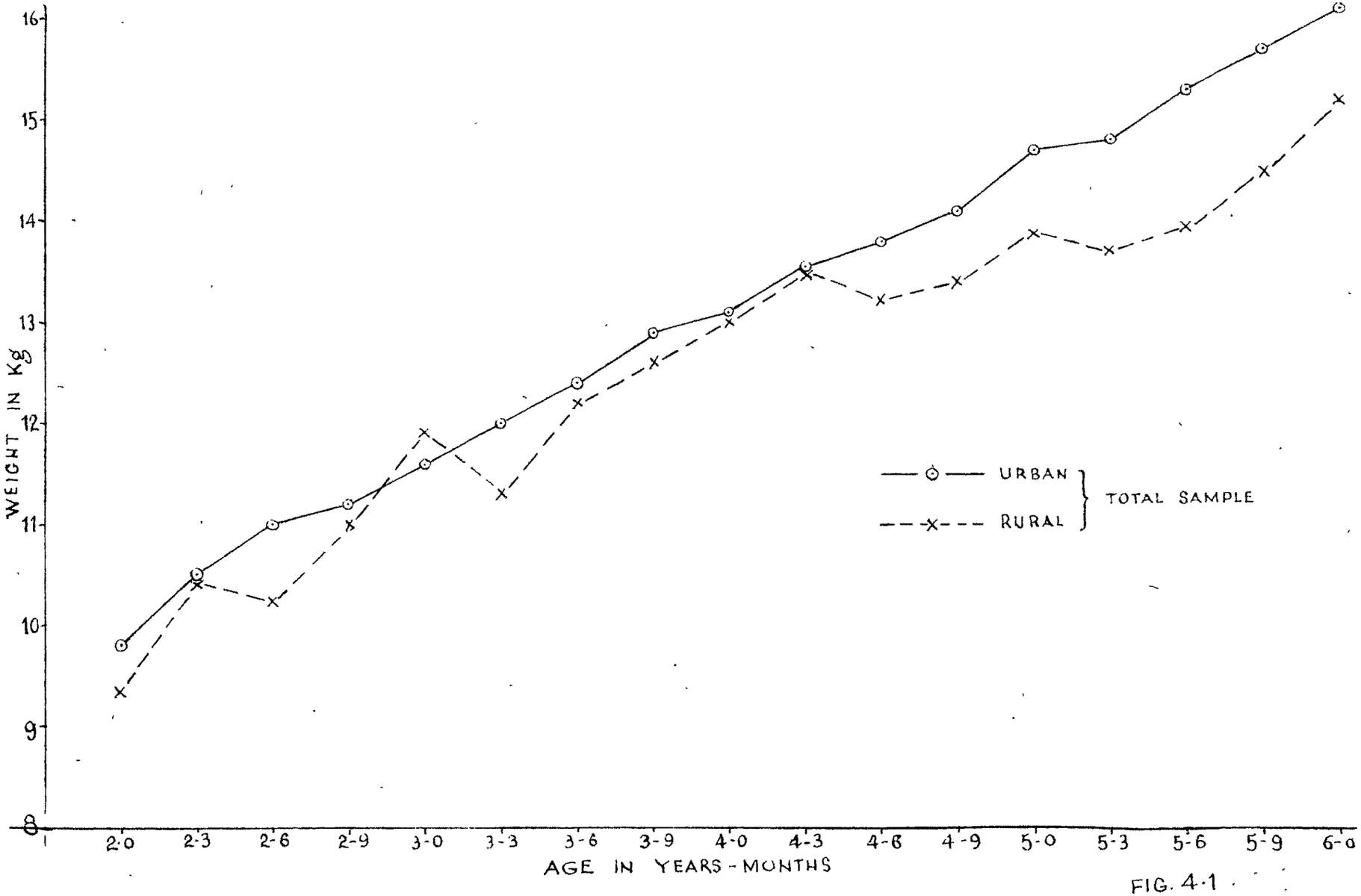
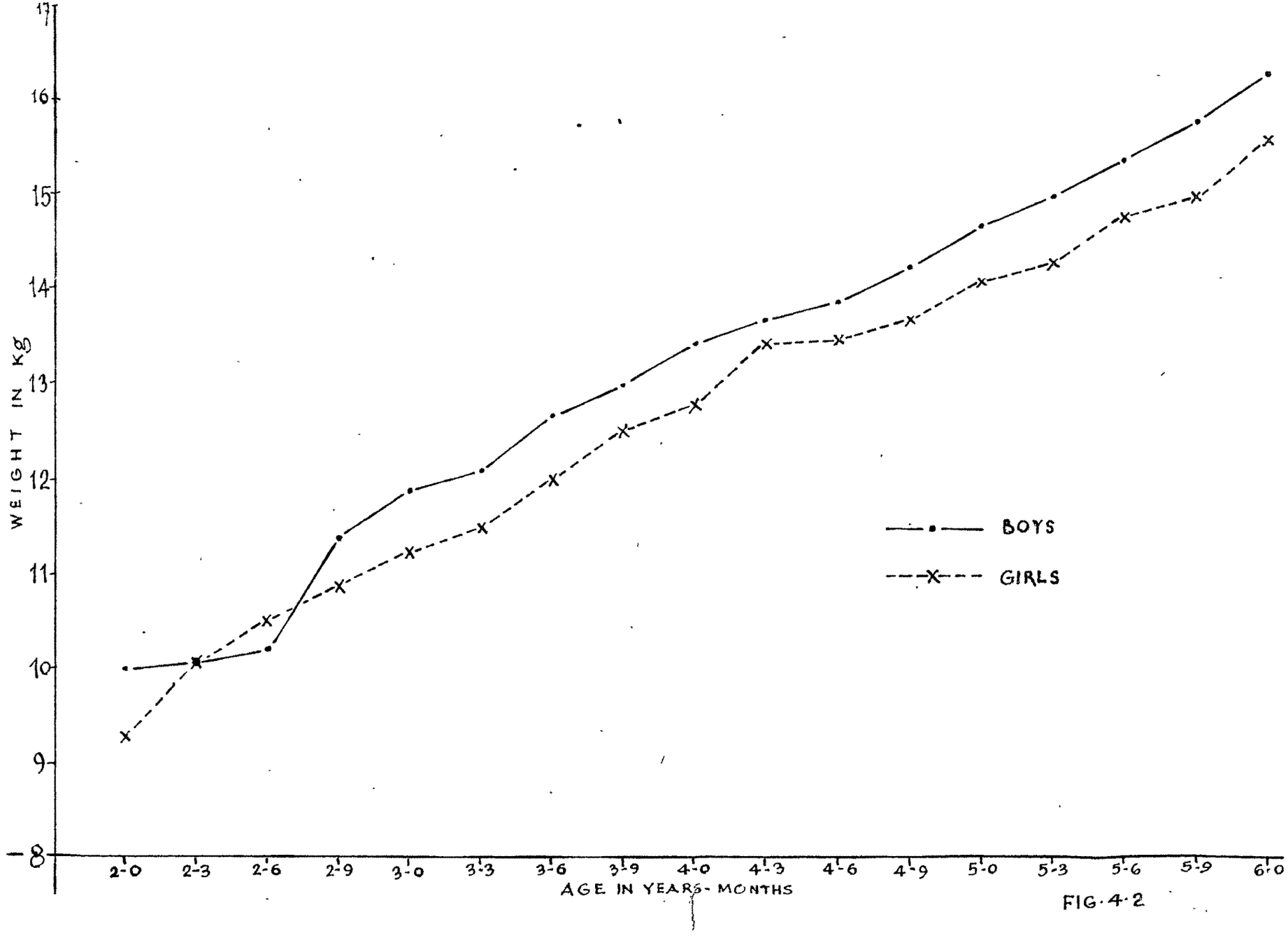

WEIGHT IN Kg
16
15
14
13
12
11
10
9
8
2·0
2·3
2·6
2·9
3·0
3·3
3·6
3·9
4·0
4·3
4·6
4·9
5·0
5·3
5·6
5·9
6·0
AGE IN YEARS - MONTHS
URBAN
RURAL
TOTAL SAMPLE

FIG. 4·1

Table 4.2 - contd. var. 20 Wt. in Kg.

Milieu-wise		Sex-wise		Total Children
Total Urban	Total Rural	Total Boys	Total Girls	
6	7	8	9	10
00.40	01.10	00.77	00.84	00.78
00.48	-00.20	-00.62	00.30	00.42
00.24	00.79	01.23	00.43	00.28
00.37	00.87	00.47	00.35	00.43
00.33	-00.57	00.23	00.24	00.21
00.50	00.85	00.55	00.49	00.54
00.45	00.44	00.40	00.56	00.46
00.25	00.44	00.21	00.24	00.25
00.42	00.44	00.45	00.50	00.46
00.30	-00.29	00.16	00.24	00.19
00.31	00.18	00.37	00.21	00.30
00.55	00.03	00.46	00.42	00.49
00.13	00.34	00.26	00.14	00.12
00.48	00.24	00.45	00.46	00.47
00.38	00.54	00.35	00.31	00.33
00.43	00.72	00.51	00.50	00.51


17
16
15
14
13
12
11
10
9
8
WEIGHT IN Kg
2-0
2-3
2-6
2-9
3-0
3-3
3-6
3-9
4-0
4-3
4-6
4-9
5-0
5-3
5-6
5-9
6-0
AGE IN YEARS - MONTHS
BOYS
GIRLS

FIG·4·2

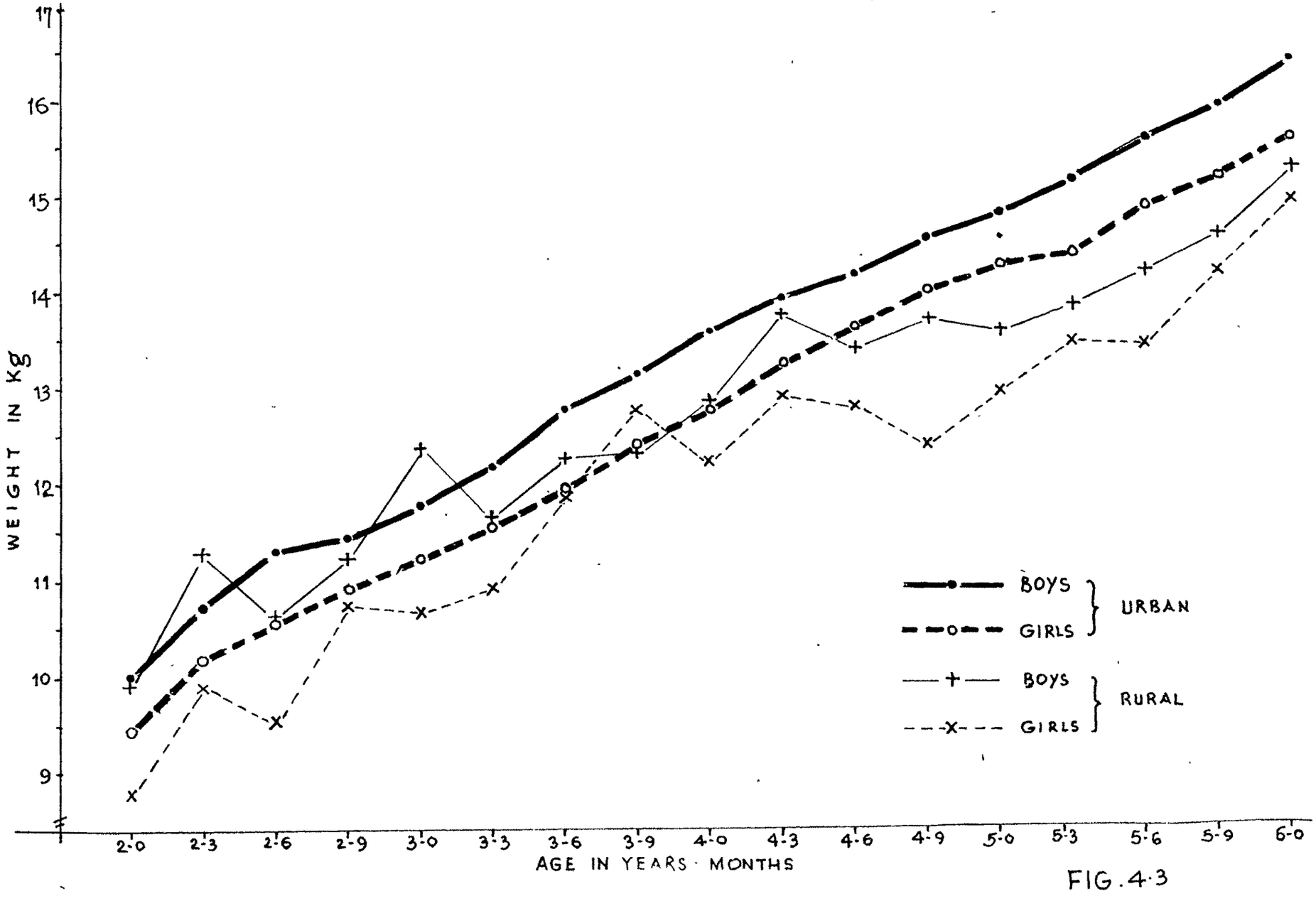

17
16
15
14
13
12
11
10
9
WEIGHT IN Kg
2·0
2·3
2·6
2·9
3·0
3·3
3·6
3·9
4·0
4·3
4·6
4·9
5·0
5·3
5·6
5·9
6·0
AGE IN YEARS · MONTHS
BOYS
GIRLS
URBAN
BOYS
GIRLS
RURAL

FIG. 4·3

Table 4.4 - showing N, M and SD of weight at each of the five age-levels area X sex-wise, area-wise, and sex-wise. (cross-sectional study)

Age-level		Area X Sex				AREA		SEX		Total
		URBAN		RURAL						
		BOYS	GIRLS	BOYS	GIRLS	URBAN	RURAL	BOYS	GIRLS	
2 yrs.	M	10.053	9.484	9.938	8.833	9.793	9.353	10.033	9.341	9.707
	SD	1.365	1.153	1.237	1.061	1.295	1.247			1.291
	N	38	32	8	9	70	17	46	41	87
3 yrs.		11.830	11.279	12.417	10.700	11.584	11.912	11.889	11.247	11.611
		1.264	1.241	2.183	1.525	1.280	2.123			1.363
		107	86	12	5	193	17	119	91	210
4 yrs.		13.364	12.863	12.829	12.278	13.110	12.584	13.275	12.786	13.073
		1.228	1.361	1.409	1.532	1.319	1.482			1.343
		176	180	35	27	356	62	211	207	418
5 yrs.		14.889	14.328	13.654	13.038	14.689	13.372	14.716	14.157	14.510
		1.549	2.728	1.456	1.475	2.198	1.488			2.162
		283	256	46	39	539	85	329	295	624
6 yrs.		16.511	15.678	15.365	15.032	16.116	15.213	16.284	15.557	15.942
		1.903	1.745	2.060	1.893	1.874	1.978			1.925
		150	135	37	31	285	68	187	166	353
Total	M	14.159	13.562	13.550	13.013	13.872	13.890	13.911	13.880	13.814
	N	754	689	138	111	1443	249	892	800	1692

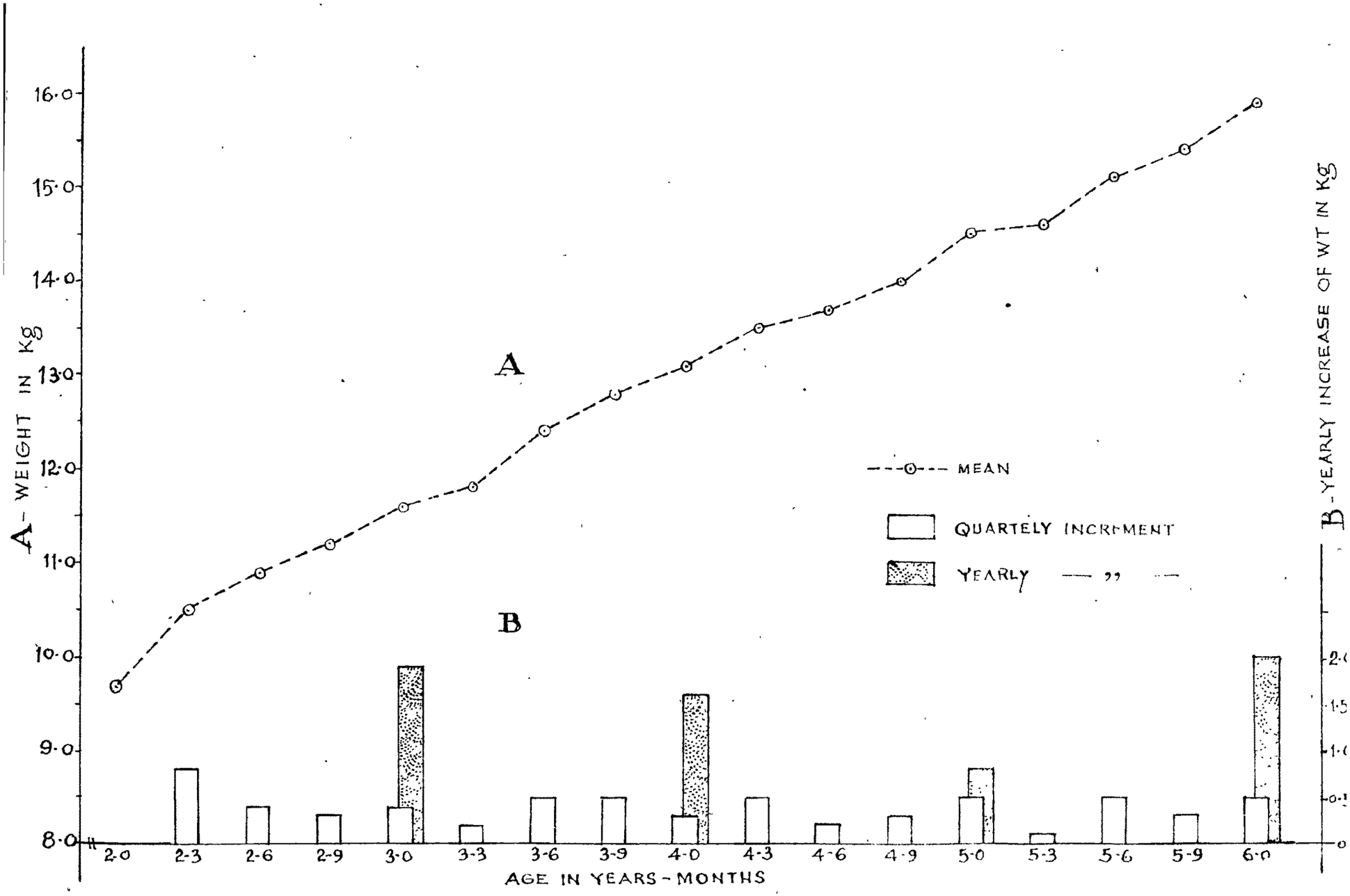
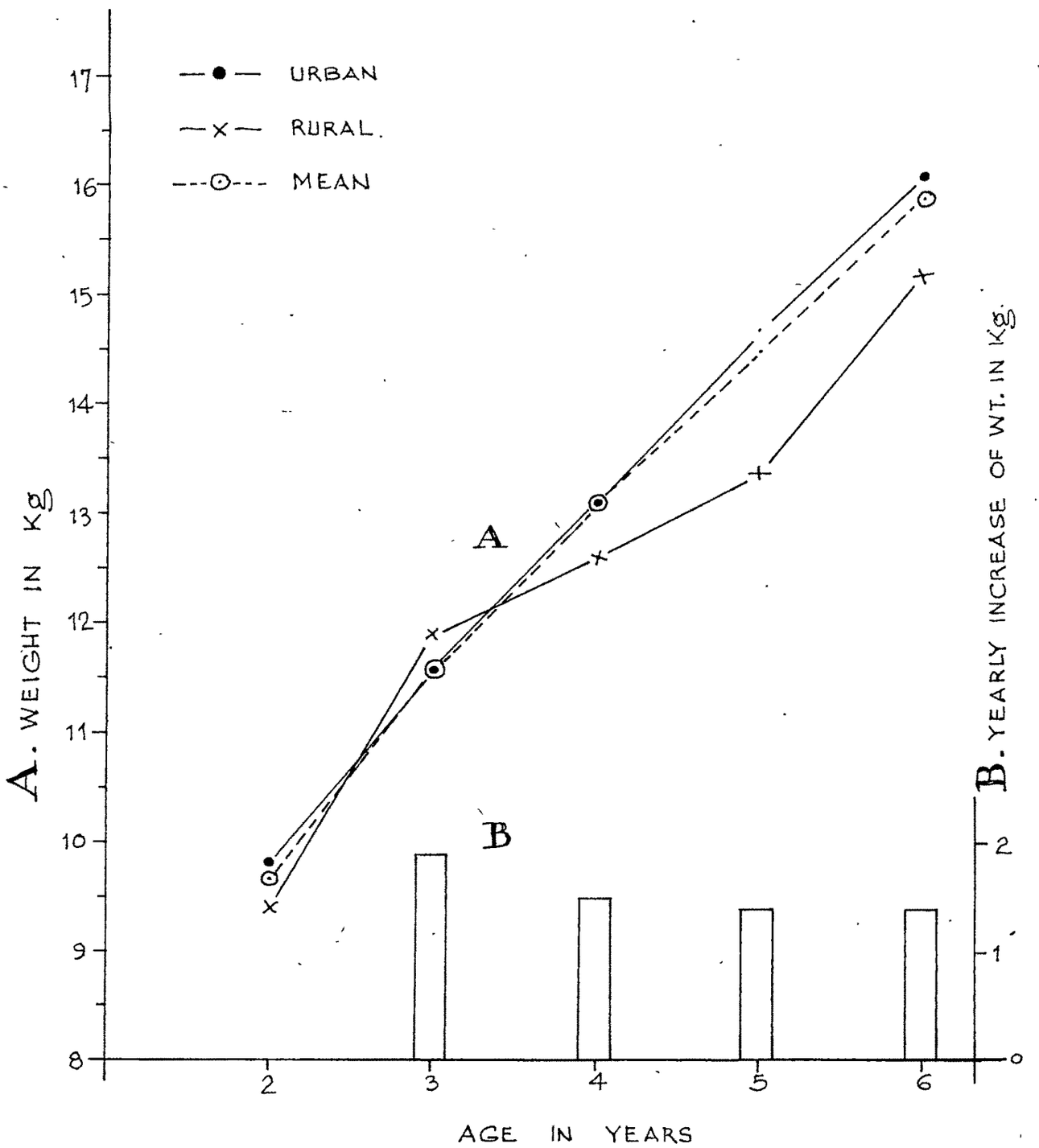

A- WEIGHT IN Kg
B- YEARLY INCREASE OF WT IN Kg
16·0
15·0
14·0
13·0
12·0
11·0
10·0
9·0
8·0
A
B
MEAN
QUARTELY INCREMENT
YEARLY
2·0
2-3
2-6
2-9
3·0
3-3
3-6
3-9
4-0
4-3
4-6
4-9
5·0
5-3
5-6
5-9
6·0
AGE IN YEARS - MONTHS

FIG. 4.4

GRAPH NO. 4·5


URBAN
RURAL.
MEAN
A. WEIGHT IN Kg
B. YEARLY INCREASE OF WT. IN Kg.
A
B
AGE IN YEARS
17
16
15
14
13
12
11
10
9
8
2
3
4
5
6
2
1
0

GRAPH NO. 4·6

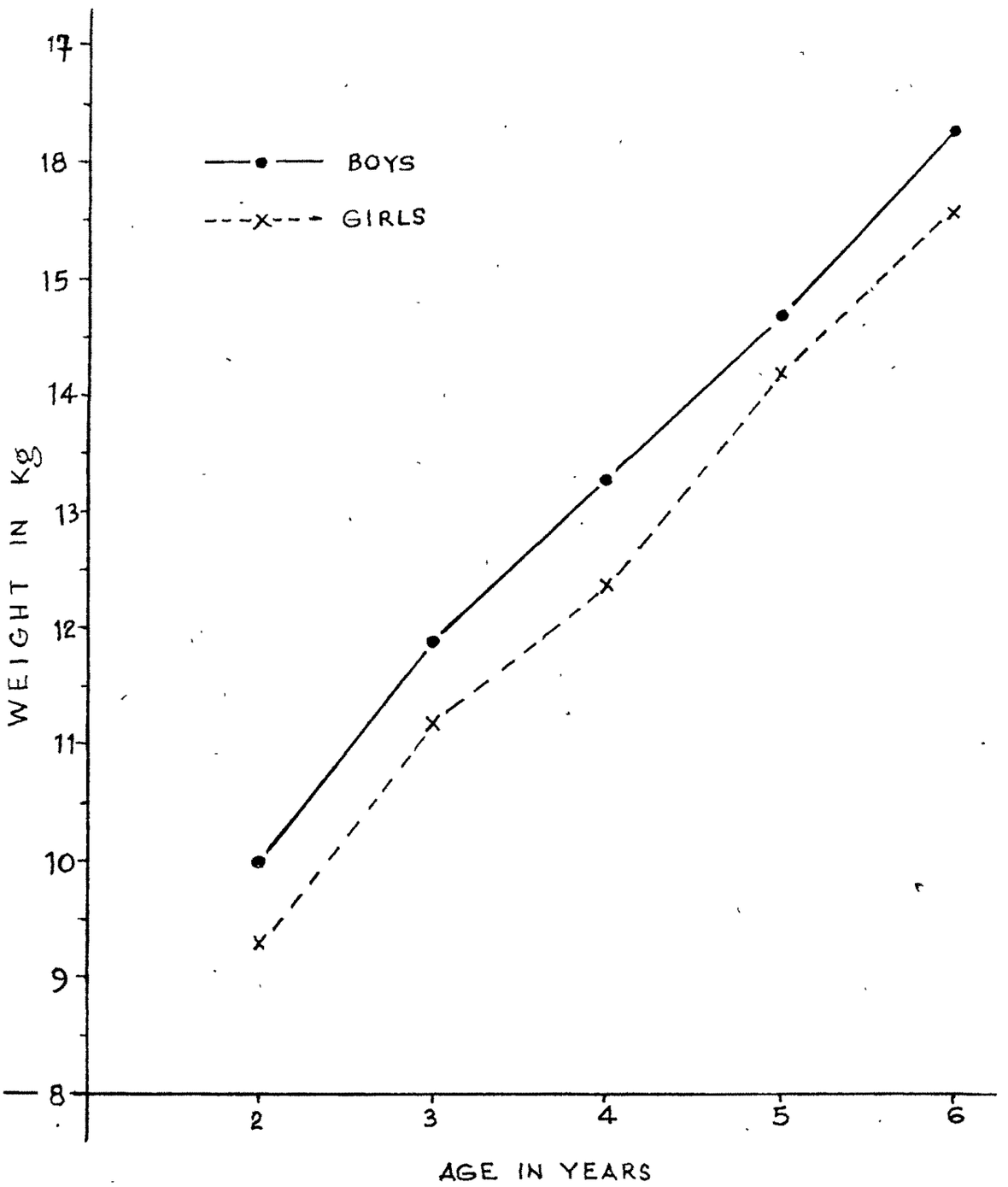

17
18
15
14
13
12
11
10
9
8
BOYS
GIRLS
WEIGHT IN Kg
2
3
4
5
6
AGE IN YEARS

Table 4.6 (a) – showing N, M and SD for weight in Kg. for the five socio-economic (SE) levels age X sex X SE level-wise.
(cross-sectional study)

Age level in years		SOCIO - ECONOMIC LEVEL										BOYS	GIRLS	Total for Age levels
		Low SE 1		Low-middle SE 2		Middle SE 3		High-middle SE 4		High SE 5				
		BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS			
2 yrs.	M	7.000	8.125	9.833	9.350	10.056	9.344	11.125	9.773	10.000	-	10.033	9.341	9.707
	SD	0.707	0.854	1.384	1.313	0.938	0.978	1.026	1.148	0.866	-			1.291
	N	2	4	15	10	18	16	8	11	3	0	46	41	87
3 yrs.		11.500	11.417	11.467	10.714	12.071	11.424	12.476	11.941	10.500	-	11.889	11.247	11.611
		2.056	1.357	1.233	1.017	1.275	1.133	1.199	1.519	-	-			1.363
		12	6	36	35	49	33	21	17	1	0	119	91	210
4 yrs.		12.400	12.518	13.147	12.500	13.392	13.273	13.461	12.397	15.500	14.000	13.275	12.786	13.073
		1.298	1.500	1.234	1.280	1.209	3.791	1.243	1.486	2.121	0.791			1.343
		15	18	68	80	88	66	38	38	2	5	211	207	418
5 yrs.		14.003	13.517	14.437	14.002	14.809	14.182	15.131	14.662	16.250	14.938	14.716	14.157	14.560
		1.275	1.491	1.704	1.496	1.521	1.596	1.475	1.475	1.636	1.741			1.612
		39	29	102	102	122	105	61	50	6	8	329	295	624
6 yrs.		15.568	14.813	16.207	15.000	16.242	15.951	16.720	16.125	17.500	15.300	16.284	15.557	15.942
		1.904	1.328	1.906	1.672	2.162	1.970	1.842	1.481	1.000	1.681			1.925
		22	16	58	52	60	61	44	32	3	5	187	166	353
Total for SE levels	M	13.6	13.01	13.81	13.51	13.53	13.91	14.20	14.02	14.81	14.43	14.04	13.41	13.83
		90	73	279	279	337	281	172	148	15	18	892	800	
		13.32		13.64		13.69		14.04		13.98				13.80
		163		558		618		320		33				1692

Table 4.6 (b) - showing the means and SD of weight in Kg. at each of the five age-levels for five socio-economic (SE) levels age X SE level-wise.

(cross-sectional study)

Age Level		Socio-Economic level					Row Total for Age level
		Low	Low-middle	Middle	High-middle	High	
		SE 1	SE 2	SE 3	SE 4	SE 5	
2 years	M	7.750	9.646	9.721	10.342	10.000	9.707
	SD	0.935	1.350	1.009	1.272	0.866	1.291
	N	6	25	34	19	3	87
3 years		11.472	11.096	11.811	12.237	10.500	11.611
		1.811	1.186	1.254	1.359		1.363
		18	71	82	38	1	210
4 years		12.470	12.797	13.341	13.079	14.429	13.073
		1.392	1.296	2.634	1.363	1.305	1.343
		33	148	154	76	7	418
5 years		13.793	14.220	14.562	14.990	15.500	14.560
		1.383	1.614	1.592	1.495	1.765	1.162
		68	204	227	111	14	624
6 years		15.250	15.636	16.095	16.470	16.125	15.942
		1.707	1.890	2.064	1.714	1.788	1.925
		38	110	121	76	8	353
Total	M	13.32	13.64	13.69	14.04	13.98	13.8
	N	163	558	618	320	33	1692

Table 4.6 (c) - showing the increase in weight in Kg. at each age level within each Socio-economic (SE) level.

(cross-sectional study)

Age-level	Socio-economic level					Mean Increase for the age-level
	Low	Low-middle	Middle	High-middle	High	
	SE 1	SE 2	SE 3	SE 4	SE 5	
2 years						
3 years	3.722	1.450	2.090	1.895	0.5000	1.904
4 years	0.998	1.701	1.530	0.842	3.929	1.462
5 years	1.323	1.423	1.221	1.911	1.071	1.487
6 years	1.457	1.416	1.533	1.480	0.625	1.382
Total for SE level	7.500	5.990	6.374	6.128	6.125	6.235

Table 4.7 (a) - showing N, M and SD of the weight in Kg. for each of the five socio-economic (SE) levels.

Age point Yrs./months	SE 1		SE 2		SE 3		SE 4		SE 5
2 - 0	7.750		9.640		9.721		10.342		10.000
	6 .935	25	1.35	34	1.009	19	1.270	3	.866
2 - 3	9.000		9.815		10.463		11.345		10.714
	8 1.165	34	2.206	46	1.160	40	1.238	7	4.471
2 - 6	10.333		10.098		10.894		11.629		12.800
	12 1.935	41	1.314	52	1.165	41	1.141	5	1.525
2 - 9	10.824		10.942		11.173		11.700		11.500
	17 1.713	52	1.378	59	1.237	37	1.181	1	
3 - 0	11.472		11.096		11.811		12.237		10.500
	18 1.811	71	1.186	82	1.254	38	1.359	1	
3 - 3	11.864		11.500		12.046		12.318		
	11 1.286	56	1.079	54	1.290	11	1.055	0	-
3 - 6	12.133		12.096		12.430		12.859		13.250
	15 1.846	76	1.208	88	1.421	32	1.339	2	0.354
3 - 9	12.238		12.495		12.886		13.404		14.000
	21 1.554	111	1.315	127	1.331	57	3.853	5	1.541
4 - 0	12.470		12.797		13.341		12.929		14.429
	33 1.392	148	1.296	154	2.634	76	1.363	7	1.305
4 - 3	12.878		13.346		13.688		13.706		14.750
	42 1.368	156	1.458	176	2.474	90	1.370	10	1.671
4 - 6	13.075		13.531		13.803		14.110		15.000
	54 1.182	176	1.421	201	1.366	100	1.377	11	1.432
4 - 9	13.471		13.846		14.172		14.248		15.136
	70 1.361	177	1.529	210	1.537	103	1.465	11	1.690
	69	176		209		102		10	
5 - 0	13.793		14.220		14.562		14.990		15.500
	68 1.383	204	1.614	227	1.592	111	3.715	14	1.765
5 - 3	13.910		14.427		14.716		15.211		15.350
	62 1.473	144	2.023	179	1.942	83	1.638	10	1.651
5 - 6	14.323		14.849		15.248		15.564		15.773
	48 1.642	132	1.828	153	1.868	86	1.607	11	1.292
5 - 9	14.356		15.266		15.581		15.962		15.667
	45 1.547	114	1.828	148	1.935	78	1.595	9	1.458
6 - 0	15.250		15.636		16.095		16.470		16.125
	38 1.707	110	1.890	121	2.064	76	1.714	8	1.788
M	13.23		13.41		13.79		14.10		14.62
N	568		1827		2111		1078		115
	567		1826		2110		1077		114
							M	13.702	
							SD	2.282	
							N	5694	

GRAPH NO. 4·7

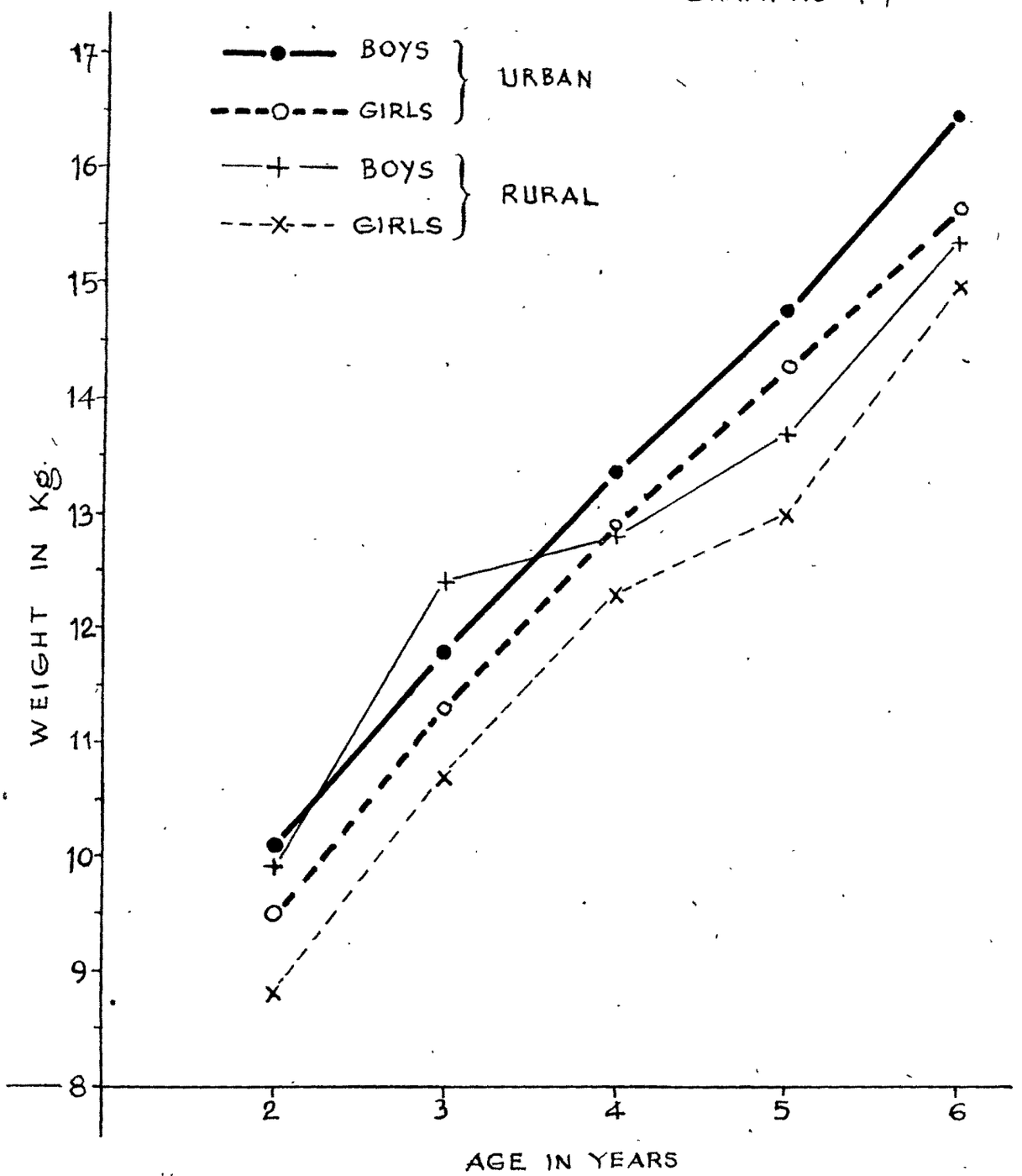
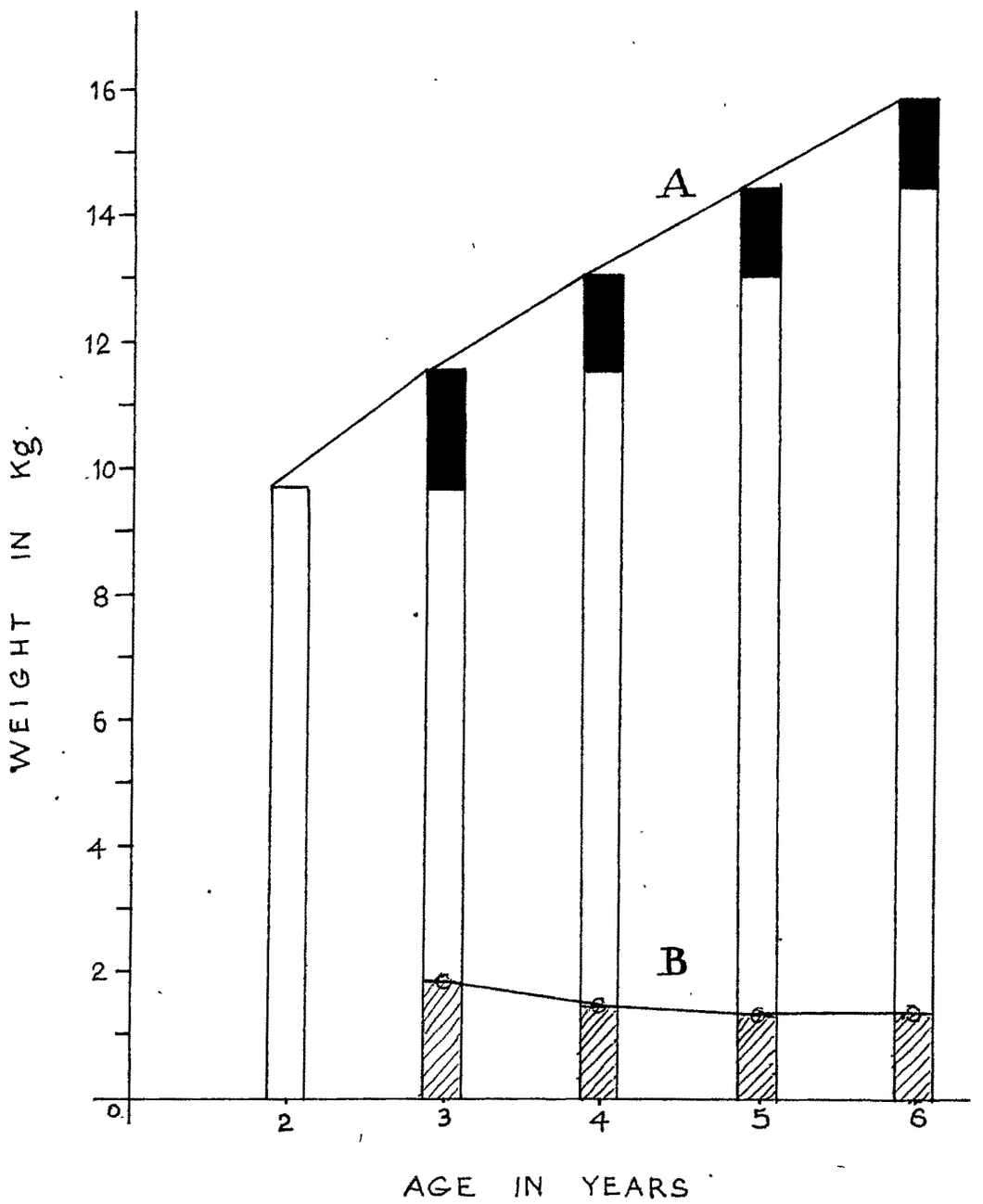

BOYS
GIRLS
URBAN
BOYS
GIRLS
RURAL
17
16
15
14
13
12
11
10
9
8
WEIGHT IN Kg.
2
3
4
5
6
AGE IN YEARS

Table 4.9 (a) - showing mean weight in kg. (for each birth order at 5 age levels of children).

Birth order		Age-levels					Total
		2 years	3 years	4 years	5 years	6 years	
1st born	M	9.667	11.575	13.006	14.567	16.233	13.916
	SD	1.188	1.462	1.293	1.703	2.084	
	N	18	67	173	232	105	595
2nd born		10.258	12.015	13.468	14.573	15.735	13.871
		1.359	1.170	2. 897	1.532	1.671	
		31	66	125	173	86	481
3rd born		9.370	11.227	13.007	14.300	15.690	13.557
		1.229	1.191	1.316	1.696	1.910	
		27	52	75	125	87	366
4th born		9.500	11.700	12.457	14.050	15.830	14.56
		0.577	1.750	1.196	1.391	1.698	
		7	20	28	58	47	160
5th & higher born		8.250	10.400	12.941	15.308	16.464	14.62
		0.645	0.652	1.740	6.162	2.297	
		4	5	17	36	28	90
Total	M	9.707	11.611	13.105	14.510	15.942	13.855
	SD	1.291	1.363	1.943	2.162	1.925	2.541
	N	87	210	418	624	353	1692

GRAPH NO. 4·9



GRAPH NO. 410 (i)

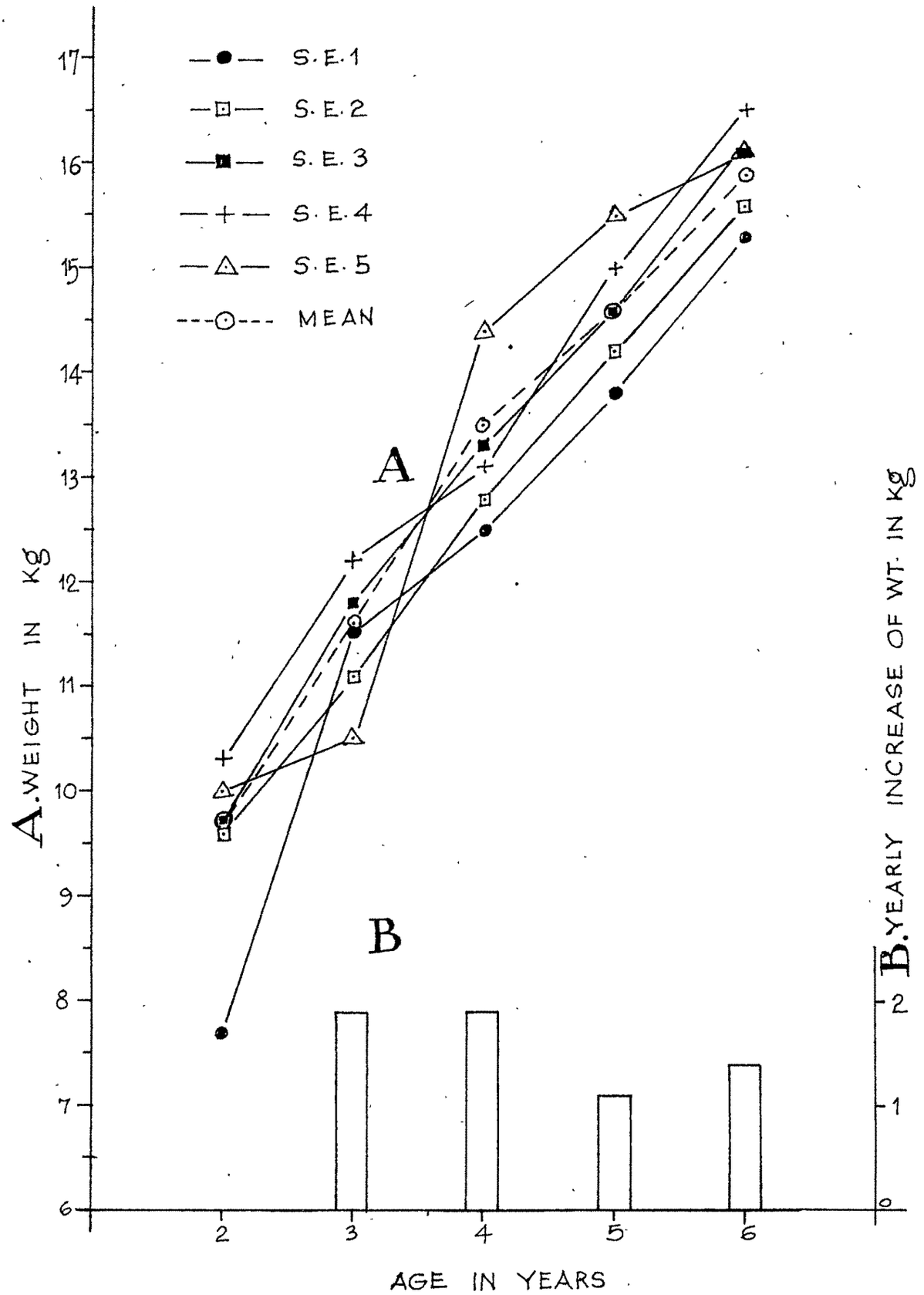


FIG. 4-10 (ii)

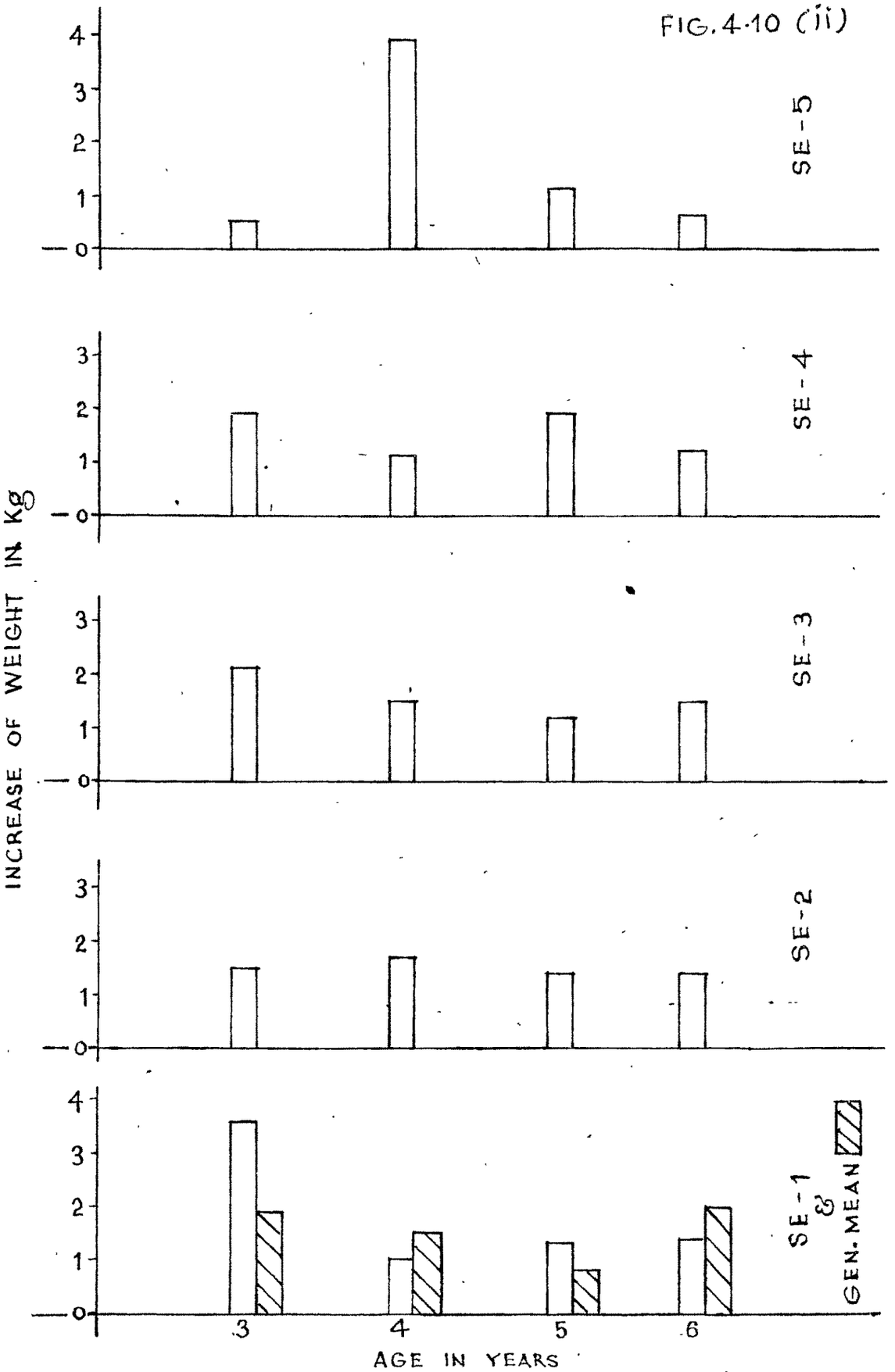

INCREASE OF WEIGHT IN Kg
SE-5
SE-4
SE-3
SE-2
SE-1 & GEN. MEAN
AGE IN YEARS
3
4
5
6

Table 4.11 - showing N, M and SD for height in cm. at 17 age-points for whole sample area-wise, sex-wise and area x sex-wise. (cross-sectional study)

Age point Yrs./months	Milieu x sex-wise			
	U R B A N		R U R A L	
	BOYS	GIRLS	BOYS	GIRLS
1	2	3	4	5
2 - 0	80.79 4.378	78.91 3.375	82.95 4.676	77.97 3.443
2 - 3	82.73 4.119	81.00 3.442	85.11 4.513	79.77 4.956
2 - 6	85.05 4.039	83.23 3.540	87.04 5.06	81.71 1.078
2 - 9	86.42 4.178	85.36 3.740	89.16 4.12	85.56 4.210
3 - 0	88.28 4.009	87.10 3.913	92.25 4.610	85.64 4.830
3 - 3	90.59 3.433	88.79 3.322	91.42 4.809	88.22 4.830
3 - 6	92.89 3.433	90.99 4.266	91.83 4.946	90.20 5.353
3 - 9	95.19 3.433	93.03 4.072	93.04 4.053	92.88 5.449
4 - 0	95.90 3.577	94.42 4.180	94.46 4.470	93.96 3.909
4 - 3	97.58 3.894	96.50 3.997	95.88 5.322	95.04 4.681
4 - 6	99.25 4.132	98.05 3.936	96.56 4.889	96.00 4.681
4 - 9	100.82 4.218	99.31 4.061	99.14 5.021	96.38 5.282
5 - 0	102.53 4.171	101.01 4.83	99.45 4.933	97.44 6.465
5 - 3	103.59 4.171	102.12 3.927	100.09 5.266	99.12 5.772
5 - 6	105.69 4.243	103.93 4.128	102.85 5.630	99.83 5.358
5 - 9	107.18 4.154	104.73 4.128	102.96 5.742	102.50 4.916
6 - 0	108.59 4.282	106.76 4.191	105.93 5.519	105.42 5.938
Total N	2488	2278	518	415

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Table 4.11 - contd. Height in cm.

Age-point Yrs.Mo.	Milieu-wise		Sex-wise		Total Children
	Total Urban	Total Rural	Total Boys	Total Girls	
	6	7	8	9	10
2-0	79.93 4.036	80.31 4.181	81.16	78.70	80.01 4.090
2-3	82.32 3.712	84.84 4.752	82.94	80.81	82.00 4.495
2-6	84.21 4.063	85.04 4.537	85.23	83.17	84.30 4.528
2-9	85.93 4.002	87.49 4.140	86.88	85.39	86.19 4.010
3-0	87.76 3.999	90.31 4.210	90.67	87.02	87.97 4.341
3-3	89.72 3.483	89.97 4.826	92.70	88.70	89.76 3.861
3-6	91.94 3.483	91.32 5.078	94.59	90.86	91.84 3.861
3-9	94.24 3.483	92.95 4.835	95.68	93.00	94.14 3.861
4-0	95.15 3.959	93.70 4.201	97.30	94.36	94.79 4.085
4-3	97.08 3.973	95.58 5.087	98.74	96.30	96.84 4.207
4-6	98.69 4.083	96.31 5.121	100.51	97.72	98.22 4.401
4-9	100.11 4.029	97.96 5.289	101.99	98.86	99.76 4.471
5-0	101.82 4.578	98.53 5.742	103.10	100.54	101.28 4.872
5-3	102.84 6.723	99.60 5.516	105.18	101.59	102.26 6.636
5-6	104.81 4.272	101.58 5.677	105.21	103.40	104.33 4.646
5-9	105.98 6.728	102.73 5.317	106.29	104.24	105.29 6.583
6-0	107.72 4.330	105.69 5.677	108.06	106.51	107.33 4.679
Total N	4766	933	3006	2693	5699
M	98.44	96.60	98.88	97.31	98.150
SD	20.41	7.77	21.15	16.08	18.881

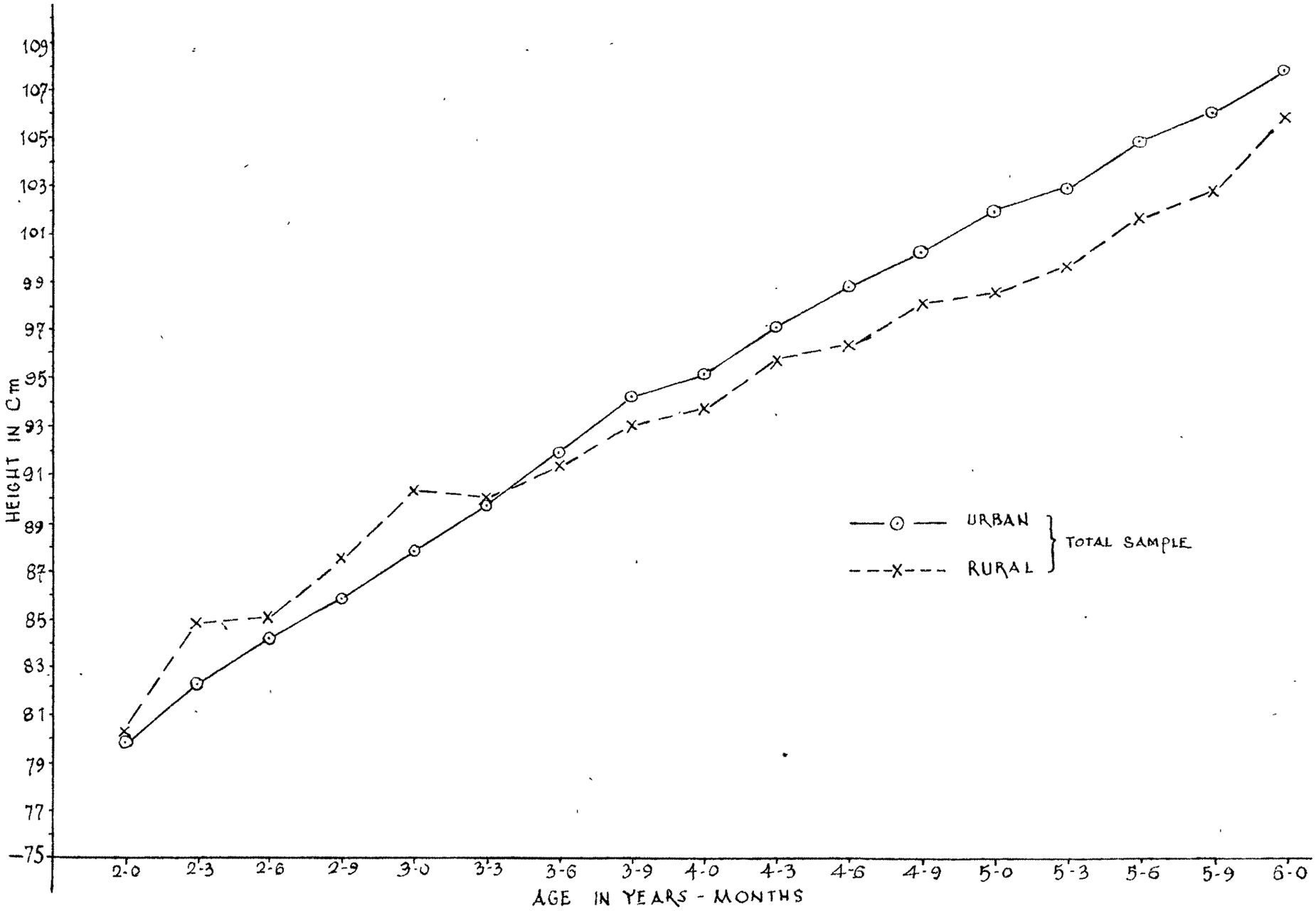

HEIGHT IN Cm
109
107
105
103
101
99
97
95
93
91
89
87
85
83
81
79
77
75
2·0
2·3
2·6
2·9
3·0
3·3
3·6
3·9
4·0
4·3
4·6
4·9
5·0
5·3
5·6
5·9
6·0
AGE IN YEARS - MONTHS
URBAN
RURAL
TOTAL SAMPLE

FIG. 4·11

163

Table 4.12 - showing increase in height at each successive age-point for whole sample area-wise, sex-wise and area x sex-wise. (cross-sectional study).

Age point Yrs./Months	Milieu x sex-wise			
	U R B A N		R U R A L	
	BOYS	GIRLS	BOYS	GIRLS
1	2	3	4	5
2 - 0				
2 - 3	1.74	2.09	2.16	1.80
2 - 6	2.32	2.229	1.83	1.94
2 - 9	1.37	2.132	2.12	3.85
3 - 0	1.86	1.739	3.09	0.08
3 - 3	2.31	1.89	0.83	2.58
3 - 6	2.30	2.20	0.41	1.98
3 - 9	2.21	2.03	1.21	2.68
4 - 0	0.71	1.39	1.42	1.08
4 - 3	1.68	2.08	1.42	1.08
4 - 6	1.67	1.55	2.10	0.96
4 - 9	1.57	1.28	2.58	2.58
5 - 0	3.28	1.70	0.31	0.31
5 - 3	1.06	1.11	0.64	0.61
5 - 6	2.10	1.81	2.76	2.76
5 - 9	1.49	0.80	0.11	0.11
6 - 0	1.41	2.03	2.97	2.97

Table 4.12 - contd. var. 21 Height in cm.

Milieu-wise		Sex-wise		Total Children
Total Urban	Total Rural	Total Boys	Total Girls	
6	7	8	9	10
2.39	4.53	1.78	2.11	1.99
1.89	0.20	2.29	2.26	2.30
1.72	2.83	1.65	1.12	1.89
1.83	2.82	3.79	2.23	1.78
1.96	0.34	2.03	0.28	1.79
2.22	1.35	1.89	2.04	2.08
2.30	1.63	1.09	2.14	2.30
0.91	0.75	1.62	1.36	2.70
1.93	1.88	1.44	1.94	2.65
1.61	0.83	1.77	1.38	1.38
1.42	1.65	1.48	1.14	1.54
1.71	0.57	1.11	1.68	1.52
1.02	1.07	2.08	1.05	0.98
1.97	1.98	0.03	1.81	2.07
1.17	1.15	1.08	0.84	0.96
1.74	2.96	1.77	2.27	2.04

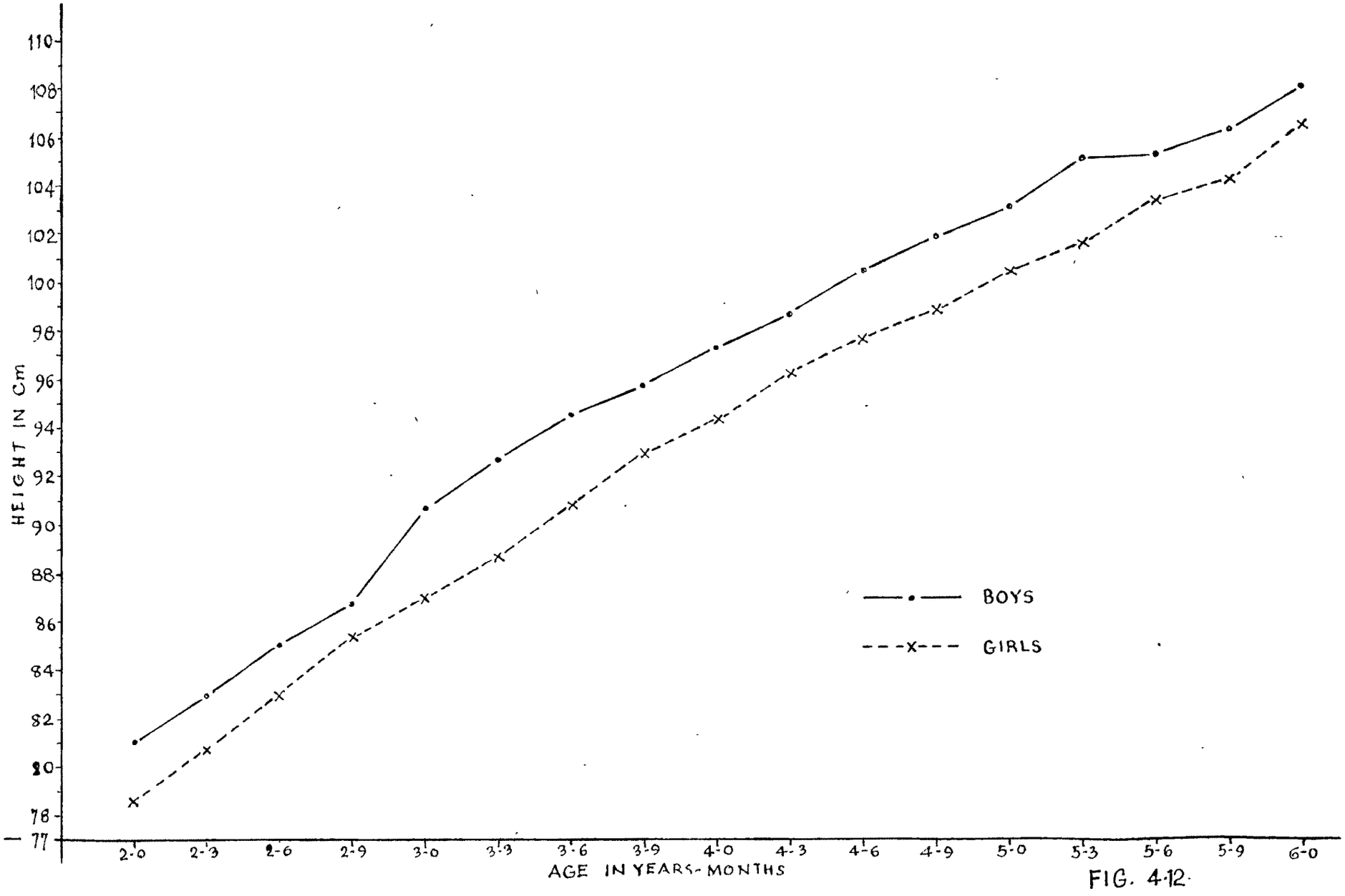

110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
78
77
HEIGHT IN Cm
2-0
2-3
2-6
2-9
3-0
3-3
3-6
3-9
4-0
4-3
4-6
4-9
5-0
5-3
5-6
5-9
6-0
AGE IN YEARS-MONTHS
BOYS
GIRLS

FIG. 4-12.

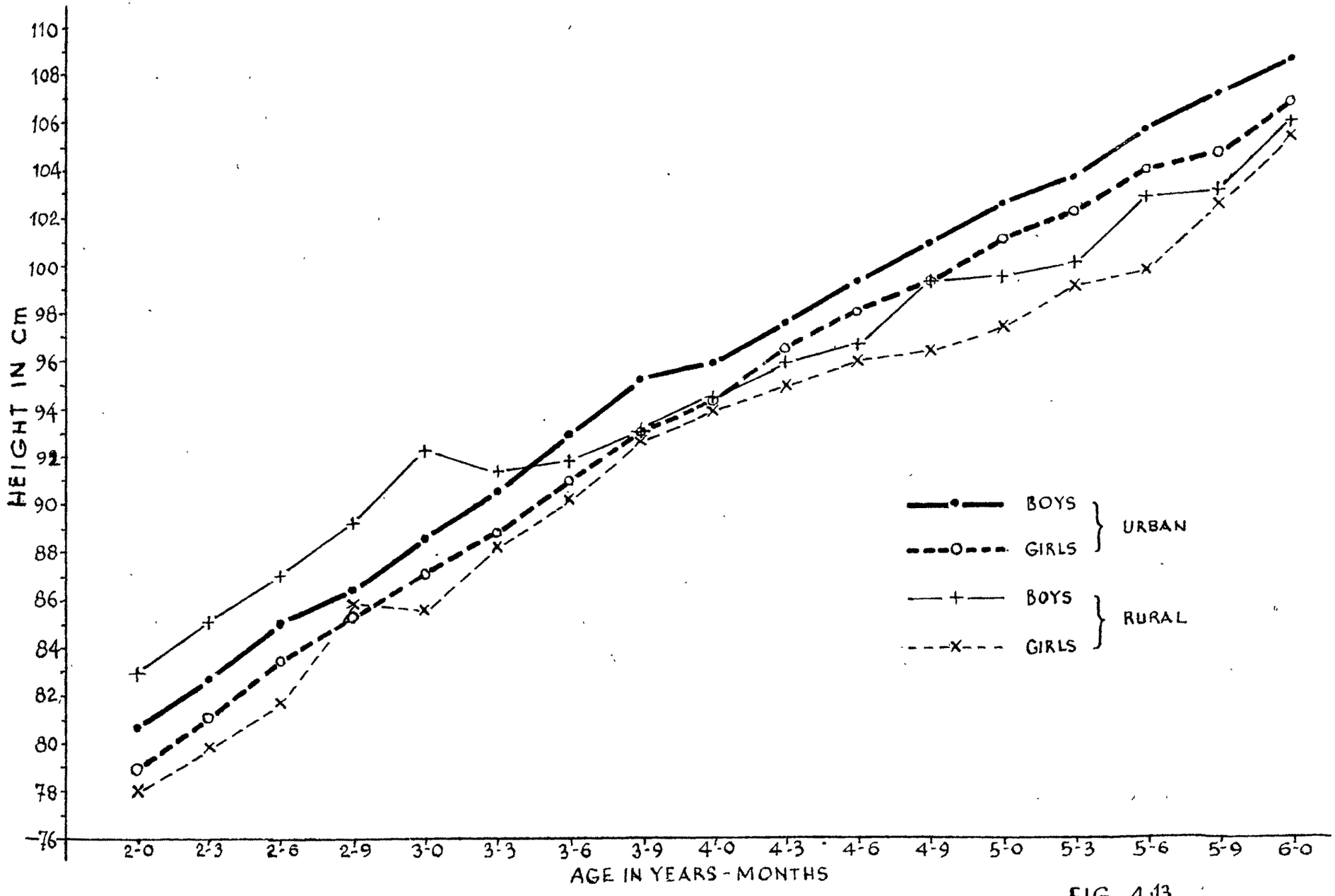

HEIGHT IN Cm
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
78
76
2'-0
2'-3
2'-6
2'-9
3'-0
3'-3
3'-6
3'-9
4'-0
4'-3
4'-6
4'-9
5'-0
5'-3
5'-6
5'-9
6'-0
AGE IN YEARS - MONTHS
BOYS
GIRLS
URBAN
BOYS
GIRLS
RURAL

FIG. 4·13

Table 4.14 - showing N, M and SD for height in cm. at each of the five age-levels (2,3,4,5 and 6 years) area X sex-wise. (cross-sectional study).

Age - level		Area X sex				AREA		SEX		Total
		URBAN		RURAL						
		BOYS	GIRLS	BOYS	GIRLS	URBAN	RURAL	BOYS	GIRLS	
2 yrs.	M	80.792	78.912	82.950	77.978	79.933	80.318	81.16	78.70	80.008
	SD	4.378	3.375	7.670	3.442	4.036	6.181			4.495
	N	38	32	8	9	70	17	46	41	87
3 yrs.		88.287	87.105	92.258	85.640	87.761	90.312	90.67	87.02	87.967
		4.009	3.913	6.818	4.993	3.999	6.918			4.341
		107	86	12	5	193	17	119	91	210
4 yrs.		95.907	94.420	92.680	92.737	95.155	92.705	97.30	94.36	94.792
		3.577	4.180	4.470	3.909	3.959	4.201			4.085
		176	180	35	27	356	62	211	207	418
5 years.		102.531	100.814	99.456	97.441	101.716	98.532	103.10	100.53	101.282
		4.171	4.839	4.933	6.465	4.578	5.742			4.872
		283	256	46	39	539	85	329	295	624
6 yrs.		108.593	106.760	105.930	105.423	107.725	105.698	108.06	106.51	107.334
		4.282	4.191	5.519	5.938	4.330	5.677			4.679
		150	135	37	31	285	68	187	166	353
Total	M	99.02	97.556	97.835	96.378	98.326	97.028	99.95	97.487	98.014
	N	754	689	138	111	1443	249	892	800	1692

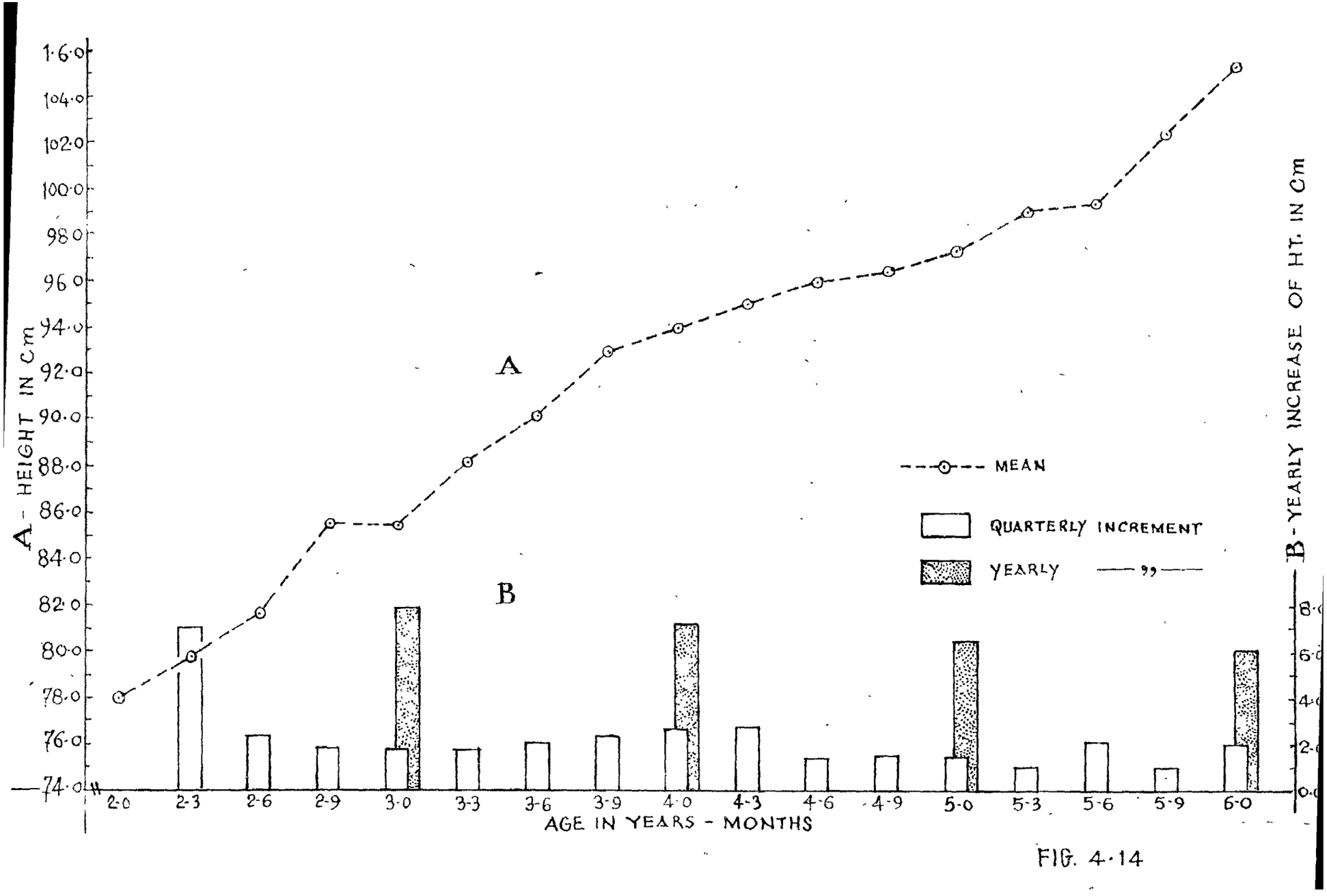

A - HEIGHT IN Cm
B - YEARLY INCREASE OF HT. IN Cm
A
B
MEAN
QUARTERLY INCREMENT
YEARLY
AGE IN YEARS - MONTHS
2-0
2-3
2-6
2-9
3-0
3-3
3-6
3-9
4-0
4-3
4-6
4-9
5-0
5-3
5-6
5-9
6-0

FIG. 4-14

Table 4.15 - showing the increase in height in cm. in successive years (at the five age-levels) in the age group two-to-six years.

(cross-sectional study)

	Age-level				
	2 years	3 years	4 years	5 years	6 years
Mean Height in cm.	80.008	87.967	94.792	101.282	107.334
Year		3rd year	4th year	5th year	6th year
Yearly Increase in cm.		7.859	6.825	6.490	6.052

GRAPH NO. 4-15

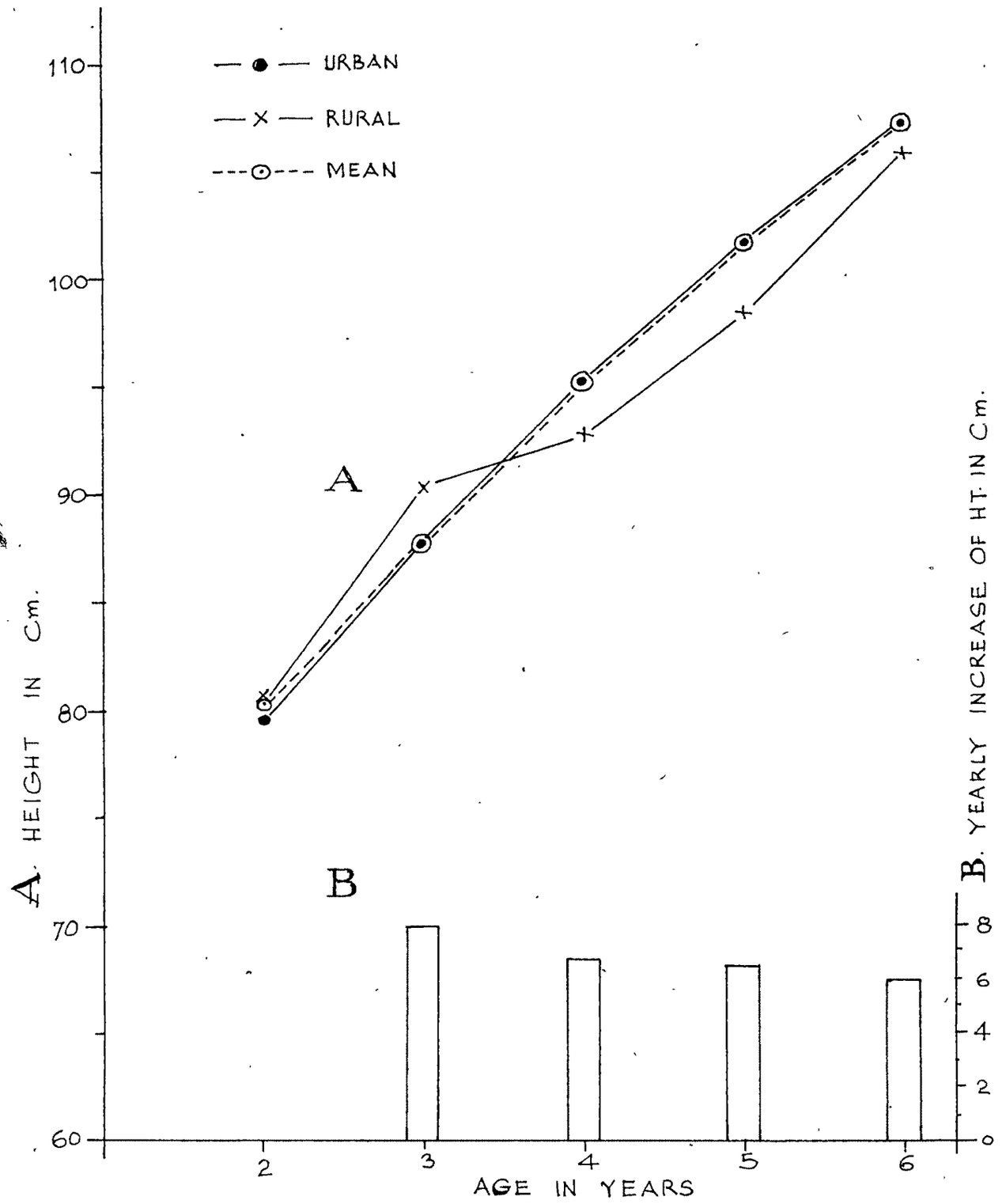

URBAN
RURAL
MEAN
A
B
110
100
90
80
70
60
A. HEIGHT IN Cm.
B. YEARLY INCREASE OF HT. IN Cm.
8
6
4
2
0
2
3
4
5
6
AGE IN YEARS

Table 4. 16 (a) - showing N, M and SD for height in cm. for the five socio-economic (SE) levels age X sex X SE level-wise. (Cross-sectional study).

Age level in years		SOCIO - ECONOMIC LEVEL										BOYS	GIRLS	Total for Age levels
		Low		Low-middle		Middle		High-middle		High				
		SE 1		SE 2		SE 3		SE 4		SE 5				
		BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS			
2 yrs.	M	74.250	74.775	81.787	78.770	80.733	79.256	82.587	79.282	81.500	-	81.16	78.70	80.008
	SD	5.303	2.630	6.793	2.948	3.762	3.216	3.675	3.601	3.270	-			4.496
	N	2	4	15	10	18	16	8	11	3	0	46	41	87
3 yrs.		86.750	89.633	87.856	85.397	89.371	87.145	89.795	89.223	85.200	-	90.07	87.02	87.967
		8.043	5.683	3.646	3.010	4.335	3.255	2.903	4.876	-	-			4.335
		12	6	36	35	49	33	21	17	1	0	119	9[illegible]	210
4 yrs.		92.800	94.511	94.781	92.706	95.673	94.366	96.379	96.353	102.350	98.620	97.30	94.36	94.792
		4.568	5.373	4.223	3.982	3.460	3.188	3.195	4.409	7.283	1.964			4.087
		15	13	68	80	88	66	38	38	2	5	211	207	418
5 yrs.		100.900	97.541	101.030	100.044	102.493	100.890	103.292	101.164	107.883	102.587	103.10	100.53	101.282
		4.555	5.940	4.592	4.127	4.194	4.707	3.717	7.158	3.842	3.707			4.880
		39	29	102	102	122	105	61	50	6	8	329	295	624
6 yrs.		106.850	103.481	107.577	105.159	107.716	107.657	109.613	107.953	110.733	107.040	108.06	106.51	107.334
		5.022	4.503	3.934	5.059	4.948	4.077	4.695	3.641	5.486	3.552			4.681
		22	16	58	52	60	61	44	32	3	5	187	166	353
Total for M SE sex-wise etc.		102.015	96.154	93.853	96.231	98.504	97.910	100.701	98.394	100.880	102.444	99.95	97.487	98.014
	N	90	73	279	279	337	281	172	148	15	18	892	800	1692
Total for SE levels		97.493		97.168		97.994		99.980		101.857				98.014
		163		558		618		320		33				1692

Table 4.16 (b) - showing the means and SD of height in cm. at each of the five age-levels for five socio-economic (SE) levels age X SE level-wise.
(cross-sectional study)

Age Level		Socio-Economic level					Total for Age level
		Low	Low-middle	Middle	High-middle	High	
		SE 1	SE 2	SE 3	SE 4	SE 5	
2 years	M	74.600	80.580	80.038	80.674	81.500	80.008
	SD	3.138	5.697	3.543	3.908	3.270	4.496
	N	6	25	34	19	3	87
3 years		87.711	86.644	88.475	89.539	85.200	87.967
		7.301	3.548	4.066	3.862	-	4.335
		18	71	82	38	1	210
4 years		93.733	93.659	95.109	96.366	99.686	94.792
		5.021	4.210	3.399	3.825	3.837	4.087
		33	148	154	76	7	418
5 years		99.446	100.537	101.751	102.333	104.857	101.282
		5.423	4.382	4.500	5.612	4.525	4.880
		68	204	227	111	14	624
6 years		105.432	106.434	107.686	108.914	108.425	107.334
		5.038	4.641	4.510	4.337	4.411	4.681
		38	110	121	76	8	353
Total	M	97.439	97.168	97.994	99.980	101.857	98.195
	SD						8.640
	N	163	558	618	320	33	1692

Table 4.16(c) - showing the increase in height in cm. at each age level within each socio-economic (SE) level.

(cross-sectional study)

Age-level	Socio-economic level					Mean Increase for the age-level
	Low	Low-middle	Middle	High-middle	High	
	SE 1	SE 2	SE 3	SE 4	SE 5	
2 years						
3 years	13.1	6.1	8.4	8.9	3.7	8.0
4 years	6.0	7.0	6.6	6.8	4.5	6.8
5 years	5.7	6.9	5.5	6.0	5.2	6.5
6 years	6.0	5.9	7.1	6.6	3.6	6.1
Total for SE level	30.8	25.9	27.6	28.3	17.0	27.4

GRAPH NO. 4·16

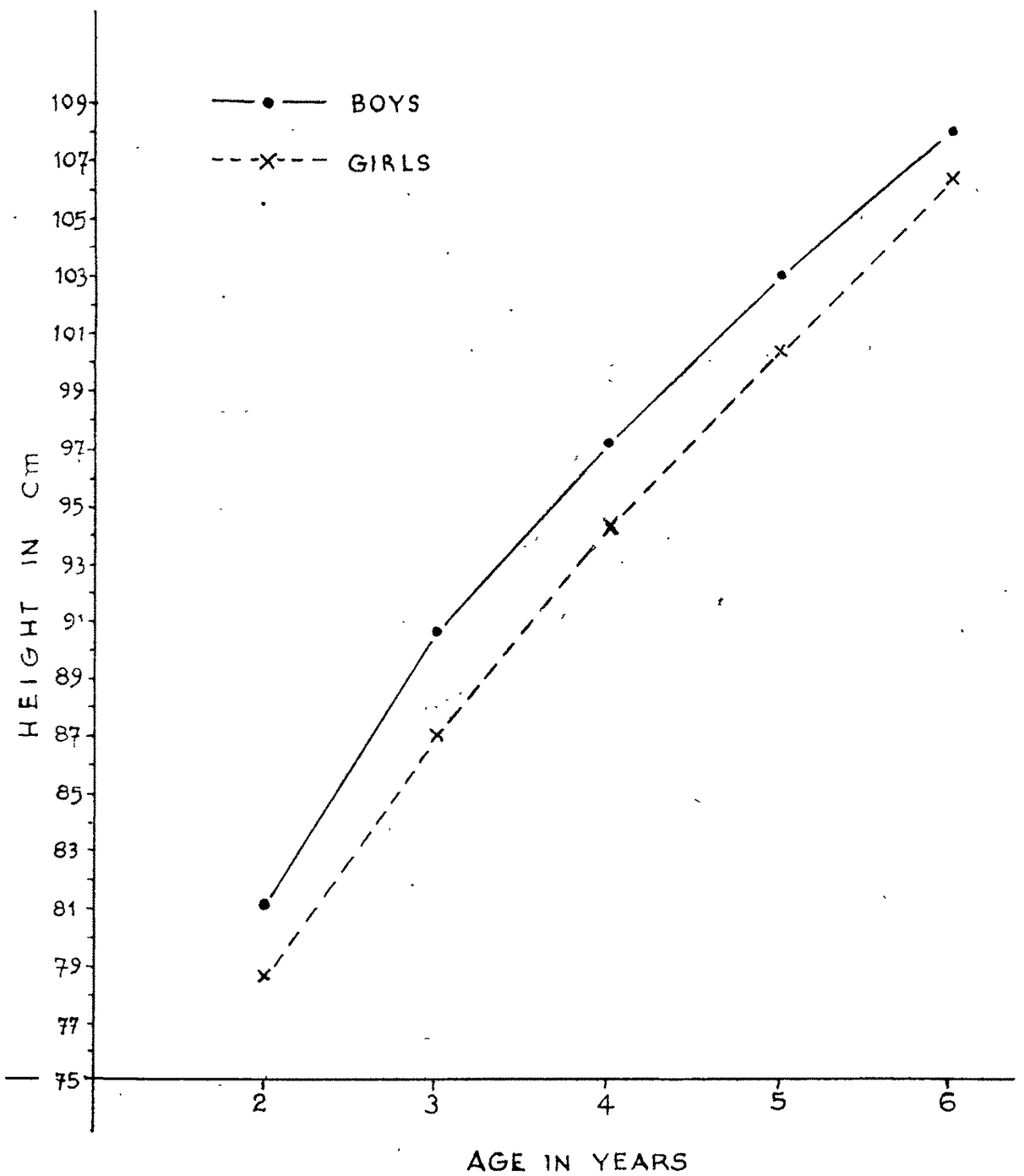
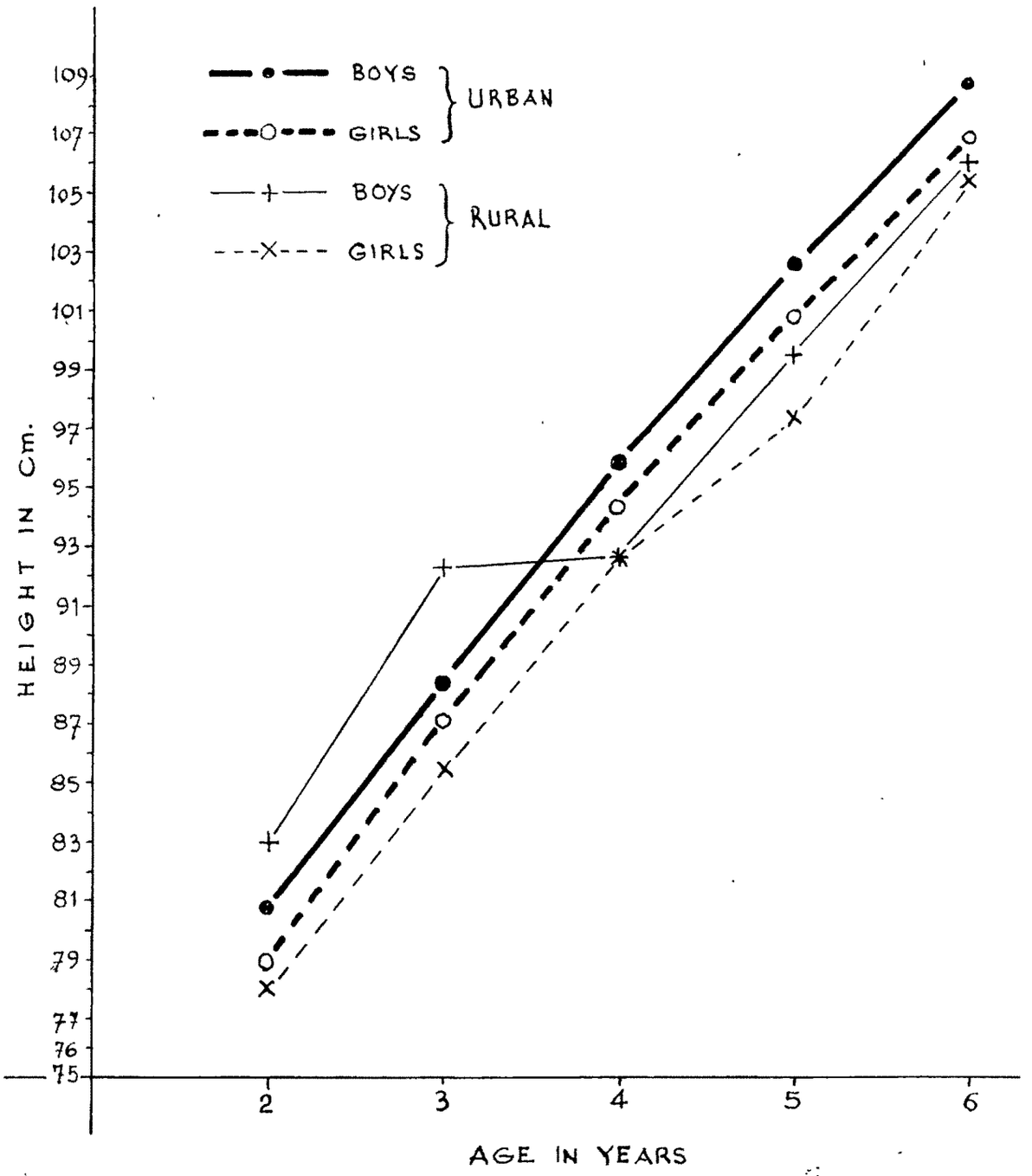

BOYS
GIRLS
HEIGHT IN Cm
109
107
105
103
101
99
97
95
93
91
89
87
85
83
81
79
77
75
2
3
4
5
6
AGE IN YEARS

Table 4.17 (a) - showing N, M. and SD of the height in cm. for each of the five socio-economic (SE) levels.

Age point Yrs./months	SE 1	SE 2	SE 3	SE 4	SE 5
2 - 0	74.600	80.580	80.038	80.674	81.500
	6 3.138	25 5.697	34 3.543	19 3.908	3 3.270
2 - 3	77.350	82.100	82.202	84.217	85.486
	8 2.653	34 4.743	46 3.773	40 3.972	7 2.873
2 - 6	83.917	82.702	84.223	85.778	87.080
	12 7.944	41 4.743	52 3.853	41 3.256	5 3.772
2 - 9	85.723	85.598	86.127	87.416	83.600
	17 7.208	52 5.162	59 4.673	37 3.455	1 -
3 - 0	87.711	86.644	88.475	89.539	85.200
	18 7.301	71 3.548	82 4.066	38 3.862	1 -
3 - 3	90.582	88.852	90.285	91.054	
	11 4.739	56 3.570	54 3.980	11 3.130	-
3 - 6	90.727	90.868	92.144	94.209	94.850
	15 6.002	76 3.963	88 3.706	32 4.213	2 1.910
3 - 9	92.100	92.534	94.002	95.288	98.440
	21 5.194	111 3.793	127 3.706	57 3.825	5 4.677
4 - 0	93.733	93.659	95.109	96.366	99.686
	33 5.021	148 4.210	154 3.399	76 3.825	7 3.837
4 - 3	94.922	96.082	97.143	97.919	101.240
	42 4.258	156 4.458	176 3.796	90 3.950	10 3.505
4 - 6	96.172	97.237	98.598	99.787	102.436
	54 4.698	176 4.459	201 4.133	100 3.891	11 3.442
4 - 9	97.955	99.081	100.133	100.982	103.555
	70 4.545	177 4.579	210 4.262	103 4.035	11 4.871
	69	176	209	102	10
5 - 0	99.446	100.537	101.751	102.800	104.857
	68 5.423	204 4.382	227 4.500	111 5.612	14 4.525
5 - 3	100.223	101.435	102.575	104.131	105.390
	62 4.723	144 9.611	179 4.881	83 4.028	10 4.175
5 - 6	101.458	103.745	104.980	105.436	106.282
	48 5.046	132 4.701	153 4.299	86 4.275	11 4.265
5 - 9	103.331	104.681	105.810	107.175	107.033
	45 5.126	114 4.804	148 4.551	78 4.337	9 4 .495
6 - 0	105.432	106.434	107.686	108.914	108.425
	38 5.038	110 4.641	121 4.510	76 4.337	8 4.411
M	96.89	96.82	98.08	98.97	101.13
SD					
N	568	1827	2111	1078	115
	567	1826	2110	1077	114

M 98.150
N 5699
5694

GRAPH NO 4·17


BOYS
GIRLS
URBAN
BOYS
GIRLS
RURAL
HEIGHT IN Cm.
109
107
105
103
101
99
97
95
93
91
89
87
85
83
81
79
77
76
75
2
3
4
5
6
AGE IN YEARS

GRAPH NO. 4·18

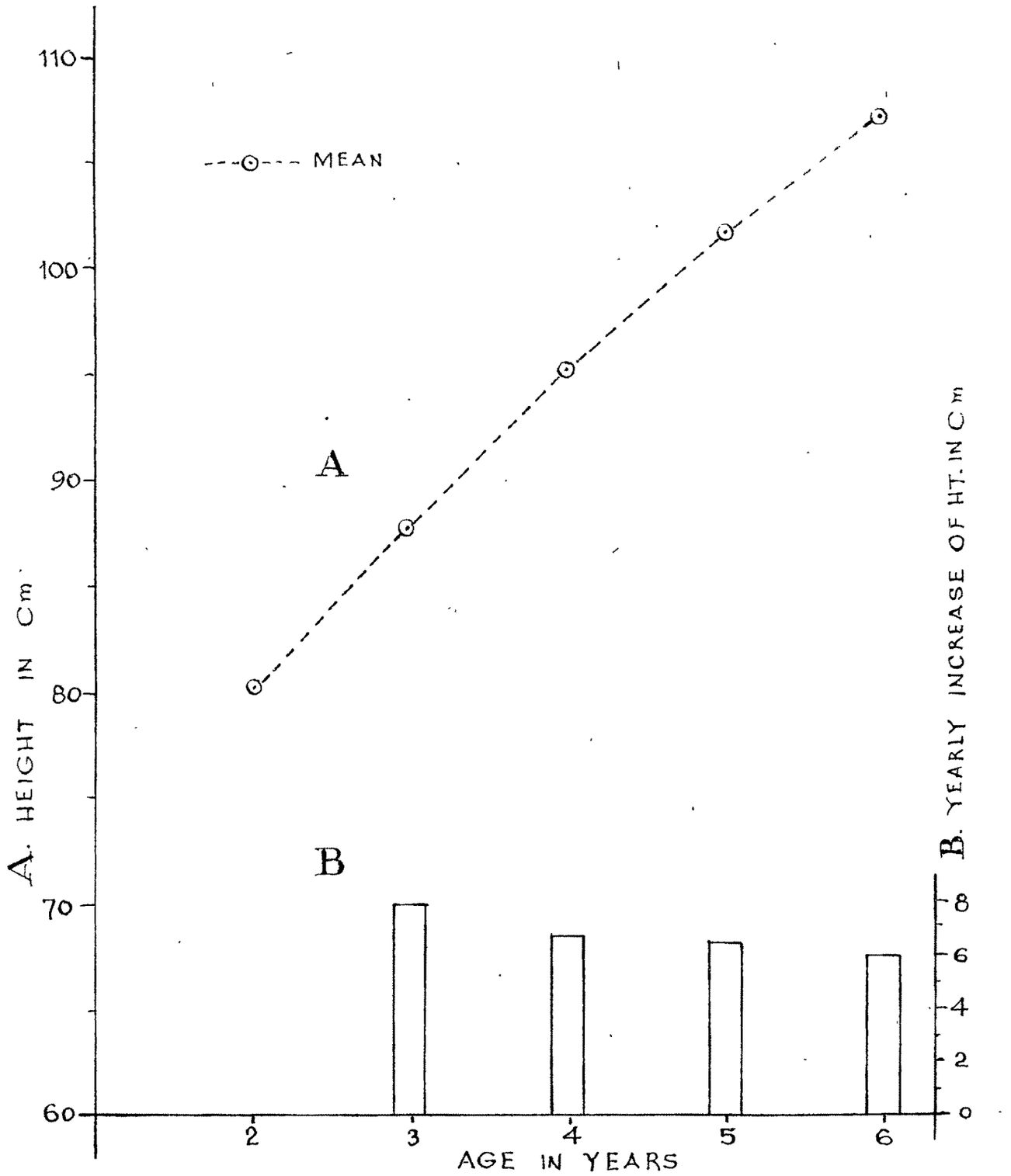
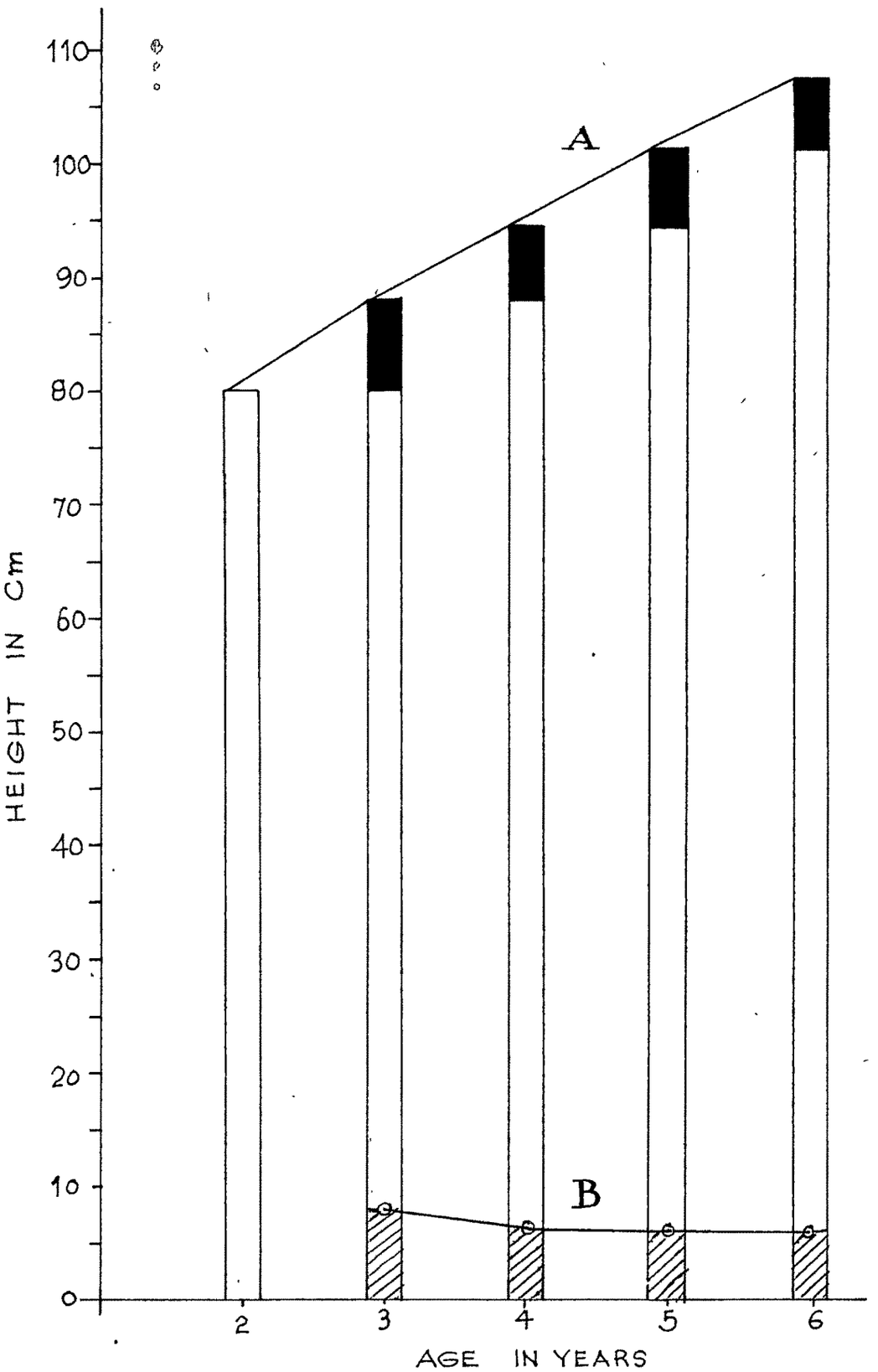

110
100
90
80
70
60
MEAN
A
B
A. HEIGHT IN Cm
B. YEARLY INCREASE OF HT. IN Cm
8
6
4
2
0
2
3
4
5
6
AGE IN YEARS

Table 4.19 (a) - showing mean height in cm. (for each birth order at 5 age levels of children).

Birth order		Age-levels 2 years	3 years	4 years	5 years	6 years	Total
1st born	M	80.444	88.471	94.777	101.616	107.790	92.029
	SD	4.600	4.367	4.037	4.697	4.750	
	N	18	67	173	232	105	595
2nd born		81.203	88.509	95.310	101.565	107.051	97.780
		5.025	3.355	4.154	4.216	4.868	
		31	66	125	173	86	481
3rd born		79.648	86.748	94.765	101.110	107.191	97.582
		3.393	4.206	4.261	5.162	4.336	
		27	52	75	125	87	366
4th born		77.357	88.820	93.600	100.248	106.302	98.410
		4.051	6.264	2.905	3.722	4.334	
		7	20	28	58	47	160
5th & higher born		75.850	83.340	93.218	100.025	107.925	99.2
		4.188	3.818	4.556	8.300	5.321	
		4	9	17	36	28	90
Total	M	80.008	87.967	94.792	101.282	107.334	98.195
	SD	4.496	4.337	4.086	4.877	4.684	8.640
	N	87	210	418	624	353	1692

. GRAPH NO. 4·19


110
100
90
80
70
60
50
40
30
20
10
0
HEIGHT IN Cm
A
B
2
3
4
5
6
AGE IN YEARS

GRAPH NO. 420(i)

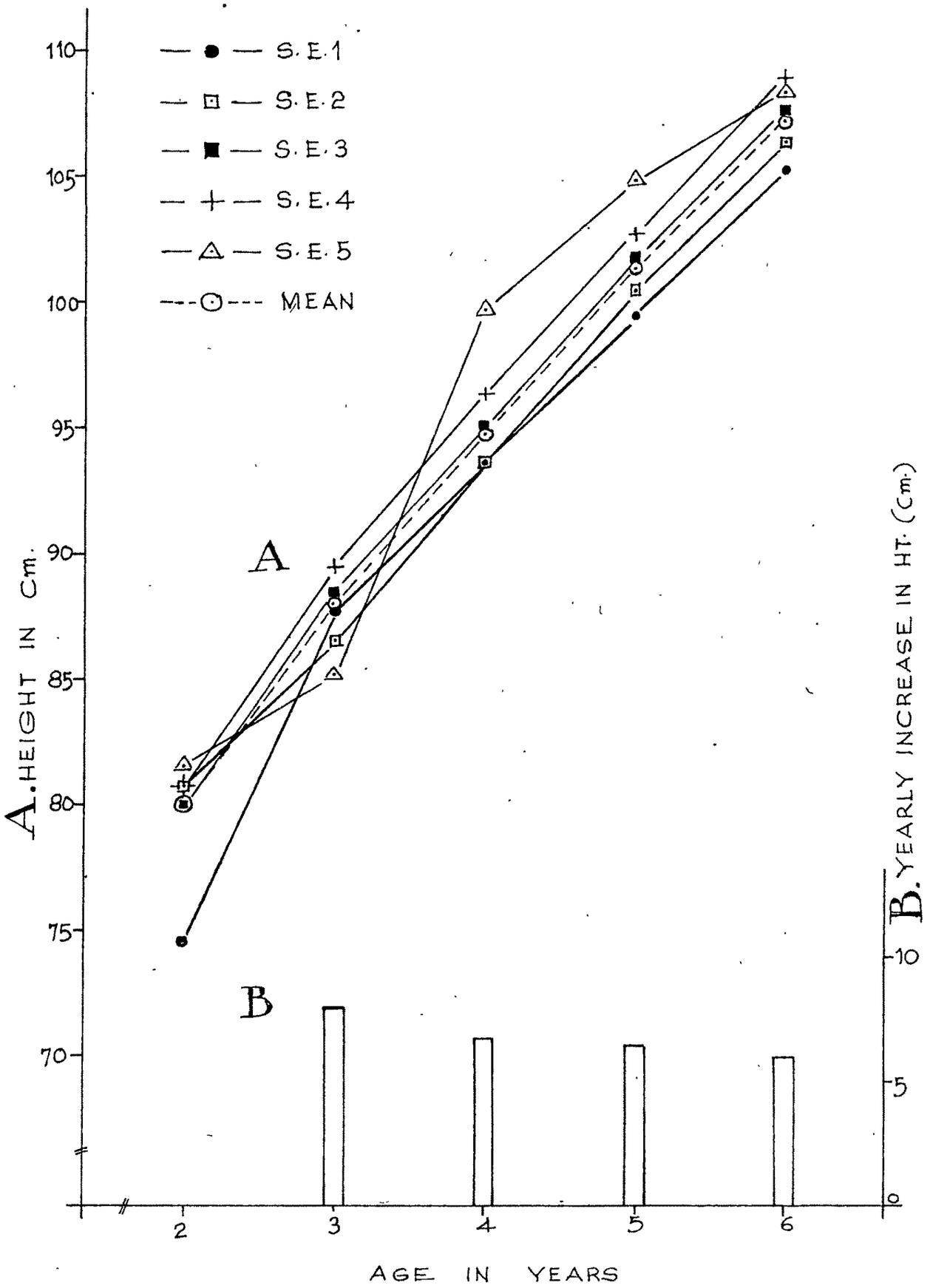
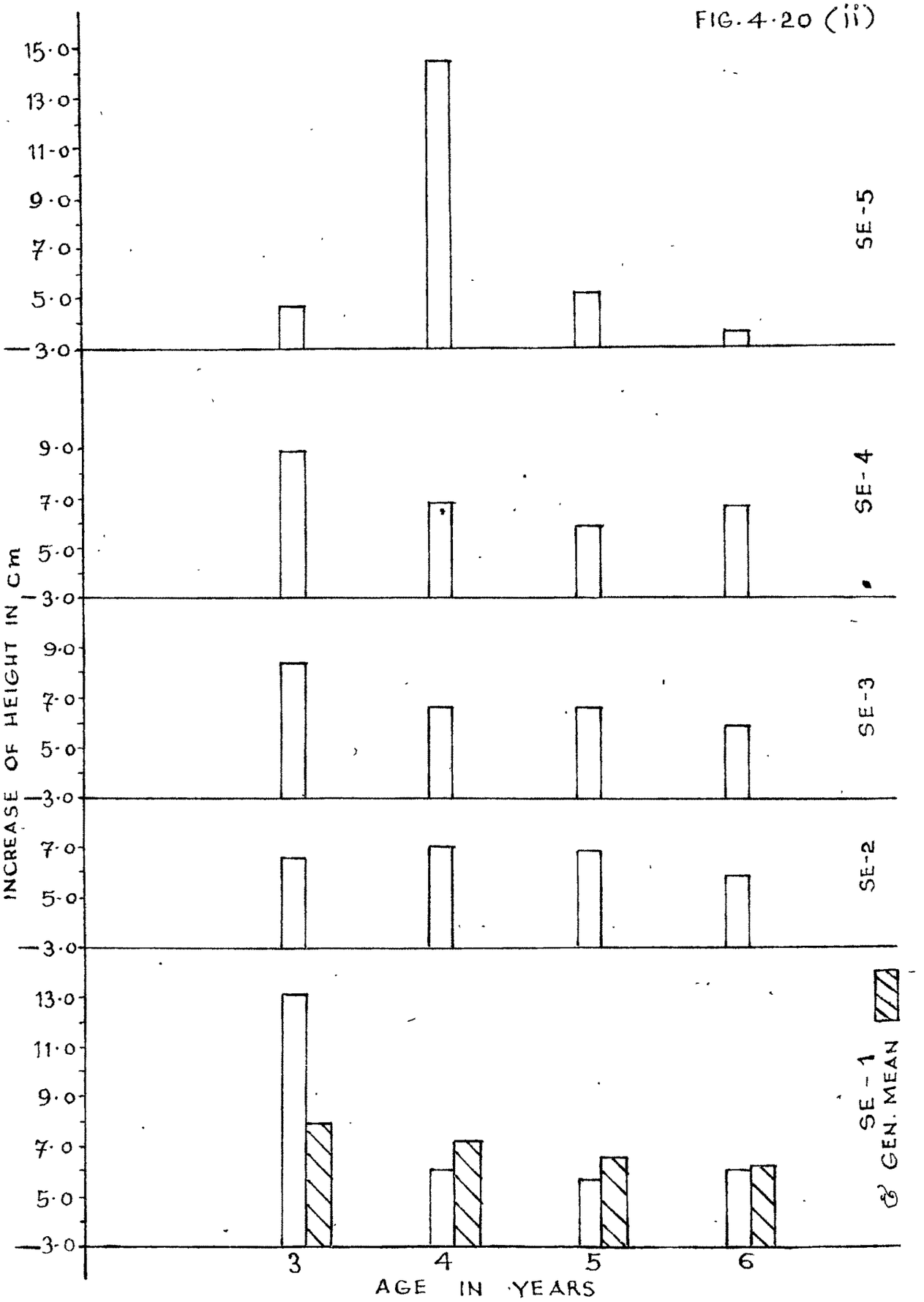


FIG. 4·20 (ii)


INCREASE OF HEIGHT IN Cm
15·0
13·0
11·0
9·0
7·0
5·0
3·0
SE-5
SE-4
SE-3
SE-2
SE-1
♂ GEN. MEAN
3
4
5
6
AGE IN YEARS