

R E P O R T

of the

Statistical Analysis of the Health of
Pupils in Poona between the ages 10
and 18 with special reference to their
Height and Weight, and Menarche in
case of Girls.

P A R T - I: REPORT

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separate Gynaecological one in case of girls). One list was sent to the respective school, one to the respective specialist having consulting rooms in the vicinity of the school and in this way the work was got done. Attempt was made to check up the follow-up work twice or thrice during the year.

Expert advice and examination regarding pathological X-ray, skin defects, etc. were available to the Association at any moment it was deemed essential. I was closely associated with the work of planning and execution of the medical examination in the capacity of the Honorary Secretary of the Association since its inception till my relinquishing the post in June 1958 - in order to be able to devote more time for this analytical work.

3. Selection of the Sample:

The details regarding the health of the pupil examined were noted on the prescribed schedule in which space was provided for seven years continuous record. So the form moved with the pupil taking on it the previous records of the medical examination from standard to standard in the school. The table No. 1.1 shows the total number of pupils medically examined in each year from 1950-51 through 1956-57.

Financial considerations necessitated the number of continuous cases of boys and girls to be limited to about 30,000. Such a type of material could be ^ucalled out from 20 schools only. So all cases of girl pupils and every

alternate schedule of boys of ages 10 through 18 studying in Standard V to Standard XI were picked out for the purpose of analysis from the standardwise arranged yearly records for the four years 1953-54, 1954-55, 1955-56 and 1956-57 in each of these 20 schools. With this procedure we could cover, on the basis of treating each pupil in each year as a case, 16,828 cases of girls and 14,957 cases of boys.

Table No. 1.2 gives distribution of schools with the total number of medically examined cases of boys and of girls for the four years, by wards. This would give an idea of the representative spread on the supposition that large bulk of pupils in a school were residents of the locality round about it.

4. Peculiarity of the Data:

Data used was the result of team work of medical professionals, changing from year to year, though the same team in a year observed the same physiological system in the school. Part of the schedule was the actual record of the health examination by a professional, viz. visual acuity, pulse rate, diseases of teeth, E.N.T., Renal, Circulatory, and respiratory, digestive, etc.; another part relating to measurements by trained assistants viz. height, weight, chest expiration and inspiration, etc.; and the rest from the information supplied by the guardians viz. history of diseases, operations, etc. and by the examinee regarding diet, exercise, etc. Details of monthly course and menarche

were obtained from girl examinees. Biased trends were slightly observable in the schedules completed by these categories. On the whole they were not significantly prominent in items particularly covered in this study. Detailed characteristics are noted at the appropriate place in the study while discussing the item.

In the scrutiny of the schedules it came out that residential address and community and marital condition were not noted at all and age was given in round figures. At this late stage to fill in this type of lacunae from other school records would have been a stupendous task by itself and so was not adopted.

5. Some Definitions:

(i) Age: Use of the word "Age" without any qualification means the age ^{in years} at the time of medical examination.

(ii) Case, Schedule, pupil etc: Separate set of data relating to medical examination of the pupil in each year.

Section - II: Report with general observations:

1. Standard and Age:

This study is based on the medical examination reports of pupils studying in Standards V to XI of ages 10 through 18 during the years 1953-54, 1954-55, 1955-56 and 1956-57.

Large bulk of the examination work used to be over by October vacation in each year. Distribution of finally included cases of 14,957 boys and of 16,828 girls by standards and ages is given in Table No. 1.3. It would be easily observed that the spread of pupils by standards and by age is smooth. The highest proportion is about 19 in Standard VIII gradually coming down on either side to nearly 13 at standards V and X in the cases of boys and girls. Highest proportion of pupils at standard VIII might be due to the direct admission to this class from the primary school. Cases at standard XI were in proportion a little less than X for both boys and girls.

Generally, pupils admitted in the Vth standard were of age 10. So the average age of pupils in the VIIIth standard would be 13 or 14. Highest percentage slightly less than 15 was at age 14 for both sexes, gradually tapering down to round about 9 at age 10 and 17. It would be natural to have very low percentage of cases at age 18, because the average age of pupils in Standard XI would be 16 or 17, for both boys and girls.

It is interesting to note that sufficient number of cases were available for the study of pre-pubertal and pubertal and post pubertal periods. The last might be overlapping the on-set of adolescence state. Details of secondary characteristics were not available from the collected data. This puts a sort of limitation on the exhaustiveness of the

analysis. Continuous examination reports of pupils afforded us to have growth in height and in weight by ages.

2. General Constitution (Health):

Height and weight at a specific age for both boys and girls might be taken to represent the net effect in the bodily transformations and changes due to known and unknown biological growth of some and or decay of other parts of the human body. A composite scale in the form of the standard table (see table No. 1.4) was prepared by the Four Man Committee of the Students Health Association, Poona, in 1953 under the chairmanship of Dr. M.P.Joshi. This was mainly based on the data collected during the years 1951 to 1953, after referring similar materials. In this table normal average height with its corresponding average weight for every age for boys and girls separately was underlined. Taking this as a norm every examinee was graded. Grade A, B, or C was given to those who had their weight within the limits of plus 10 lb. or more to minus 10 lb. to mean good healthy constitution, below minus 10 lb. to minus 25 lb. average normal health, and below minus 25 lb. weak or poor health, respectively. Every examinee was given his appropriate grade according to this Standard table throughout the four years period under consideration for this report.

Agewise distribution of boys and girls by health scores is given in Table No. 1.5. On an average nearly a third of boys showed good health (Grade A) and only 4.28 per cent poor health, (Grade C). Corresponding percentages

for girls were found to be 38.54 and 6.07. It is interesting to note that consideration of both grades A and B together showed the attainment of the same level i.e. 95 per cent, comparatively girls were higher than boys in the case of grade A, and grade C, but vice versa regarding grade B. Highest proportion in grade A was found at the age 18 for boys and at 15 for girls. Similarly for grades B & C it was at age 11 and 16 for boys and 10 and 12 for girls. Rate of increase or decrease from age 10 onwards regarding grades A, B or C was different in boys than that in girls. Highest rate of increase between two consecutive ages in grade A and Grade B was observable at the age range 14 to 15, and 10 to 11 for boys; and at the age range 12 to 13 and 16 to 17 for girls respectively. Similarly the age ranges of highest decrease were 10-11 for grade A and 14-15 for grade B in the case of boys and 16-17 for grade A and 12-13 for grade B in the case of girls.

Maximum percentage of cases with grade A, good health, were observable at age 18 for boys and age 15 for girls. This coincided roughly with the pubertal approach age for both sexes respectively. Calculation of the pubertal age of boys was not a simple affair. But average age of menar menarche in girls was found to be 14.1. Accepting menarche age as one of the prominent manifestations of pubertal approach, it would be most important and interesting to note the concurrence of menarche age of girls with nearly the same age range within which the ^{maximum} percentage for grade A,

good health, fell. In case of boys we had no other supplementary data (i.e. about factors which might have been of use to decide the pubertal age or the pre-pubertal age). Same was the case with girls too. But data relating to menarche, one of the prominent indications of pubertal approach, age of girls being available, we might perhaps be nearer the truth by its use.

Another most important thing, which ought to have been mentioned before giving the comparative figures of findings for boys and girls, is that there is a wide variation in the development and its age in boys and girls and hence the comparison will not be a fair one. Study of this type may only be possible to a certain extent, if one studies the data in both cases under the same circumstances continuously for a long time say 5-10 years, something important may then be available for detailed analysis. Differences as regards only grades A, B & C detected in boys and girls are shown, simply because they are interesting ones.

3. Vaccination and B.C.G.

Information regarding vaccination and B.C.G. was collected from the guardians. It could not be correctly ascertained the exact age at which primary vaccination (P.V.), Re-vaccination (R.V.) or B.C.G. was not done. Age-wise data regarding these is given in Table No. 1-6.

Data revealed that the small-pox incidence was a bit higher in boys than in girls. Detailed information was

lacking for knowing whether the small-pox attack was before P.V., or was after P.V. or even R.V.; and whether primary vaccination or Re-vaccination, as the case might have been, was done later on after the attack of small-pox. It was also difficult to say what percentage of small-pox incidence was during childhood and what later on upto the age of 19.

Some cases of Re-vaccination being done twice or even thrice were on record, but the interval between primary vaccination and Re-vaccination, or between Re-vaccination and Re-vaccination was not known.

Primary vaccination was done on an average in 98 per cent boys and in 99 per cent girls and Re-vaccination in 75.7 percent boys and 86.3 percent girls. Re-vaccination was not got done in 24.3 percent boys and 13.7 percent girls on an average upto the age of 18, too long an interval. Percentages of primary vaccination as also Re-vaccination being got done was higher in girls than that in boys.

If information regarding exact age at which primary vaccination and Re-vaccination was done was available, it would have been possible to draw out some conclusions regarding fixing Re-vaccination age and also maximum possible safe interval between primary vaccination and Re-vaccination and between Re-vaccination and Re-vaccination. The information available now might even help to decide the Re-vaccination age and make it compulsory as done in primary vaccination and thus avoid even the rare possibility of occurrence of Encephelitis Lethargica, etc. or a small-pox attack during the epidemics.

B.C.G. inoculation was introduced on mass basis in schools only recently. Cases of B.C.G. inoculation were 21.5 percent in 1953, 27 percent in 1954, 57 percent in 1955 and 65.5 percent in 1956 (taken from SHA reports). Thus the tendency went on increasing considerably every year. On an average we found that 68.17 percent boys and nearly the same percent of girls got B.C.G. done. This information was collected from guardians and lacked the details regarding the age at which B.C.G. was got done. In some cases it might have been done more than once.

The most important thing in this respect is to study the reactions of B.C.G. by following the pupils later on. As the means at our disposal were very very limited, it was not possible for the SHA to undertake this work. The work of B.C.G. inoculation was entirely entrusted to the Poona Municipal Corporation. It might be having detailed records of this work. While studying this subject in detail that information will prove to be of great value. This is however, a subject of such an urgent importance, that immediate steps regarding its further study are essential.

4. Diet i.e. Drinking Tea, Coffee, Milk or No Drinks:

Record of drinking tea, coffee or milk was collected both quantitatively and qualitatively. Those who used to take regularly daily at least a medium size cupful (say about 5 oz.) were reckoned to fall in the appropriate category of tea, coffee, milk severally or jointly.

Normally it appeared to be the usual practice of taking drinks twice in a day most probably in the morning and in the evening. Though this was a good topic of study from the point of nutritional value, the pattern of medical examination itself put a limitation on its usefulness in analysis. No attempt was made to use the quantitative data except for giving appropriate category. Minimum level of consumption of each variety can be roughly calculated from the Tables No. I, 7 and 8.

On an average it was observed that among both boys and girls about 8 percent were in the habit of taking no drink at all, and about 27 percent taking milk regularly. Percentages of tea and coffee drinkers among boys were 60.37 and 16.81 and among girls 42.17 and 28.88. On an average percent of taking tea was greater in boys than in girls and regarding coffee reverse was the case.

4.1 Hot Drinks and General Health:

Bearing in mind the limited effect of drink statistics and its pattern on the study of nutrition as a whole, we attempted to correlate this with the general health grades. These are given in Table No. 1-9. In all the column heads except in Tea only and Milk only, prevalence of taking one alone or two conjointly of nearly the same proportion as the average for it was seen in both boys and girls. In the case of coffee only there were 12.25 percent boys and double this i.e. 26.51 percent girls. In rest of the items the level was low.

The following table is an abstract from the above-mentioned one giving the distribution by health class with tea only and milk only.

Health Grade	Boys			Girls		
	Tea only	Milk only	Total	Tea only	Milk only	Total
A	2272	1212	3484	2493	1583	4076
B	5000	1691	6691	3704	2092	5796
C	405	66	471	436	196	632
Total:	7677	2969	10646	6633	3871	10504

Applying Chi-test, it would be observed that the value of χ^2 (i.e. 150.30) was nearly 11 times the value of χ^2 for a probability of 0.001 in the case of boys and was 2 times (i.e. 17.59) that for a probability of 0.01 in the case of girls and in both boys and girls the contribution by the milk cells was nearly two-thirds of the respective values of the calculated χ^2 . This conformed to the common concept of the relation of milk with good health.

5. History of Diseases during Childhood:

Details regarding diseases during childhood were communicated to us by the guardians. In many of the reply slips mention of the date, month or even year or even the age of pupil, at the time the occurrence of the diseases was not made and hence it was not possible to calculate the age-wise incidence of particular diseases. It was the general

observation that in the majority of pupils the occurrence of the diseases was before the age 10. What we could achieve was to have a cumulative number of pupils having been affected with the specific disorder sometime in the past. This is given in Tables No. I, 10 & 11.

Average number of diseases per pupil came to 1.78 for boys and 2.02 for girls. Total count of diseases was 26,604 for boys and 33,997 for girls. Normal or no disease percentage for boys was 25.15 and for girls 15.01.

Virus diseases so also diseases in general had a higher proportion (53.92 percent and 85 percent) in girls than the corresponding ones (43.28 per cent and 75 percent) in boys. Whether this was due to low vitality or low immunity in girls, was difficult to assess. Bacterial diseases stood at about 12 per cent for both. Only mumps and small-pox percentages were higher in boys than those in girls. All this, being very important, needs further detailed study separately.

6. Diseases of Digestive, Renal, Respiratory and Nervous Systems:

(1) Digestive diseases were observed on an average of the age-wise percentages to be more or less the same i.e. 2.63 for both boys and girls. On the basis of total records the highest percentage was noted at age 11 and lowest at age 18 for both boys and girls. Percentages in general were very small and in this also the majority of the cases were

of chronic constipation, a few of abdominal pain, and only a few of intestinal worms history, etc. Although in the last two cases the number noted was small, further study and care should not be neglected. (See Table No. 1.12).

(2) Renal diseases were observed only in small number of both boys (8 i.e. 0.05 percent) and girls (37 i.e. 0.21 percent). So it was a bit more in girls than that in boys. Urine examination was not done and hence no information in this respect was available. Though the incidence itself was low, the majority of the cases were of puffiness on face, aedema of feet, and of highly anaemic condition and a few with history of burning micturition, etc. This meant all these cases came to the notice at a late stage, a point for serious consideration.

(3) Respiratory trouble was detected in 0.59 percent boys (74 in number) and in 0.56 percent girls (95). Incidence was nearly the same. These were in majority the cases of chronic cough, (reflex in some cases) chronic asthmatis, chronic pulmonary T.B. (thickened plura in some), etc.

It might be thus seen that each and every case of this type would need further consideration as the pupils concerned were not only injurious to themselves but also to others in the class.

(4) Diseases of the nervous system were detected by overt means only, 3 of boys (i.e. 0.02 percent) and 7 of girls (i.e. 0.04 percent). Mental testing was not under-

taken. Once we gave a trial of administering mental tests, but it took a lot of time and so could not be adjusted with the general medical examination team-work for budgetary considerations. This might have been the reason for the small number. In this group most of the cases were of chronic headache, polio, gross mental deficiency, etc.

It appeared to be quite essential that every pupil should be mentally examined soon after admission to the Secondary School and thereafter only suspected cases should be followed up.

7. Heart - diseases and defects:

Heart affections were detected on an average in 1.91 per cent and slightly more, i.e. 2.19 percent in girls. Highest percentage of 3.09 was observed for boys at age 18, and 2.79 for girls at age 15. (Table No. 1.13). Curiously these are the ages of maximum growth. Unfortunately many of these cases were labelled under the common terminology of 'heart disease' and further detailed analysis was not possible. In some of the records mention was made of the definite form: congenital, ^erheumatic, mitral stenosis, mitral regurgitation and haemic murmurs, tachycardia, etc. In almost all these cases, it was noted, Physical Training exemption was recommended.

Though the total number itself appeared to be small, it should not be treated as insignificant. Further treatment analysis, say E.C.G., etc. would be quite essential in such cases.

8. Pulse Rate:

Pulse rate itself is a fickle factor depending largely on the psychological condition at the moment due to the environmental effect on the examinee. At the time of the actual examination count for half a minute was measured by one and the same doctor and twice this was recorded in the schedule to mean pulse rate per minute. Nervous factor was there; but that was a common factor for all. Making proper allowance for these factors while noting (Table No. 1.14), some common trends were noted.

On an average as well as at each age the numerical value of pulse rate was observed to be higher in girls than that in boys. In general in girls on an average pulse rate in majority of cases and for all the ages was between 90 and 99 p.m. while for the boys it was between 80 and 90 per minute. Another feature of note was that the pulse rate at the lower age slowed down with higher age till from age 14 onwards pulse rate was in the range 85 to 95 per minute in both boys and girls.

The available data could not be significantly used to finding out whether pulse rate bore any relation to an, if so, its nature during monthly course as well as to the menarcheal age in girls.

9. Diseases of the Genitourinary System in Boys:

On an average normalcy was found in 92.63 percent, the lowest being 86.52 percent at the age 10, gradually improving to the level of 96 percent at age 15 and onwards. All diseases of genitourinary system combined were 7.37 percent comprising Hernia 0.40 percent, Hydrocele 0.14 percent, Phimosis 5.04 percent, undescended testicles 1.72 percent, and the rest 0.28 percent. (Table No. 1.15).

In the order of frequencies the most predominant was phimosis followed by undescended testicles. Age-wise occurrence of hernia, hydrocele and the rest of the diseases was meagre.

Percentage of undescended testicles at age 10 was 5.48 and at age 18 only 0.42. As in majority of cases the descent took place at the age 12, it might be said that this was simply delayed till the 18th year in the remaining cases. The only care in these cases would be that they should be kept under observation of a surgeon and checked up every six months or so.

Phimosis figured in 5.04 percent. The percentages at age 10 and 11 were 6.89 and 7.35 respectively. Generally the necessary development is complete at age between 8 and 10 roughly. So the defective cases would be detected easily after the age 11. Maximum percentage occurred at age 12 and the minimum at 18. The lowest at the age 18 might have been partially due to surgical steps taken in several cases

or due to complete development of the respective muscles. It was difficult to assess which factor predominated in the reduction.

It would be difficult to attribute any particular cause to any particular occurrence of the disease.

Diseases of genitourinary system in girls are treated in the next Section.

10. Defective Vision and Eye Diseases:

Acuity of vision and diseases like unilateral blindness, squint, etc. and in particular trachoma were the outcome at the time of medical examination, by administering the test of reading the standard chart from the appropriate distance. It was observed that the nervous effects were there to some extent similar to those occurring at the time of noting pulse rate, and that a few examinees committed to memory the normal grade line writing on the standard chart. On the whole the record might be taken to be representative of the situation. (See Table No. 1.16).

Squint: Detected cases were 46 among girls and 26 among boys. The majority of these belonged to the convergent group and had amblyopia in the squinting eye. This would have been avoided to a great extent, if check up would have been done in pre-primary or Montessori schools. From the experience in this respect it might be mentioned that the patients should be made more squint conscious and properly guided as regards treatment of amblyopia and early correction of refractive errors.

Unilateral Blindness: Encountered cases of unilateral blindness were only of 8 boys and 3 girls.

Visual Acuity: Incidence of low visual acuity (6/24 to 6/36, and 6/60) increased generally, with a little variation in between, from 4.6 per cent at age 10 to 9.4 percent at 18 among girls. This showed growing myopic tendency with advance in age. Percentage in this respect for boys varied from 3.7 to 5.09, the highest being at ages 11 and 17. So as regards low visual acuity incidence was found to be higher in girls than that in boys. Such a group of students would need check up work and correct glasses prescription.

Trachoma: Trachoma incidence varied from 9.2 percent to 4.5 percent in girls and from 3.9 percent to 1.9 percent in boys (i.e. only about 1/3rd of that found in girls). Generally this percentage dropped gradually from age 10 to age 18 in both boys and girls equally. The lower incidence in the older age group might be attributed to treatment carried out in between.

The cases of trachoma belonged mainly to the first two stages, the majority being in the first stage group. Pannus has nearly always been restricted to the limbal crescent. Very few students had any complaints whatsoever and most had no knowledge of this disease in their eyes until it was brought to their notice at the time of the examination.

The extraordinary quiet nature of trachoma in most of the cases might have been, amongst other things, due to

dust-free and equable climate of Poona, besides greater maintenance of hygienic care by the school going population, preventing complications of secondary infection.

The highest incidence in the earlier younger age would possibly suggest the occurrence of infection in the pre-school period.

11. Affections of E.N.T. (Ear, Nose and Throat) and Teeth:
(See Table No. 1.17)

(1) Ear diseases: These were found on the average in 0.85 percent boys and 0.69 percent girls. These consisted of impacted wax in the ear, ear discharge, ear-ache, and so on. There were hardly one or two cases which required extra care regarding Mastoiditis, etc. Highest percentages were observed at age 10, 14 and 18 in boys and at age 11 and 12 in girls. Occurrence of affection could not be related to casual factors.

(2) Nose diseases: Percentage of affected cases itself was small, 1.18 percent in boys and nearly a third of this, i.e. 0.41 percent in girls. Most of the cases were of nose bleeding, getting cold, nasal discharge off and on, congested or ~~di~~ deviated septum, etc. There were hardly 5 or 6 cases of nasal polypi. Highest percentage was at age 14 and 15 for boys and at age 17 and 18 for girls.

(3) Throat diseases: Among the E.N.T. group the incidence of throat diseases was too small, ^{0.23 p.e.} ~~2.23~~ in boys and 0.08 p.e. in girls. Majority were with congested condition of the throat due either to enlarged or septic tonsils, ear trouble, long uvula and so on. The number of affected girls was

nearly a third of that of boys. Highest percentage was found to be at age 18 in boys and at age 15 in girls.

(4) E.N.T.Group: Considering E.N.T. group together one would find 2.26 percent boys and 1.18 percent girls affected. Practically these were common cases met with in daily practice of the general medical practitioner and could be avoided or at least minimised if regular check up would have been possible.

(5) Teeth Caries: This is one of the most confronting problems not only with the school going children but also with adults. It may be that the decay started in early age may have been carried to later ages.

Nearly a fifth of school going children were found with teeth caries. (20.86 percent boys and 18.40 percent girls). The maximum incidence of 41.45 percent in boys at age 10 came down to 14 percent at age 14 and more or less maintained this level till the age 19. The highest amongst girls was 29 percent at age 10 and came down to 14.88 at age 14 and nearly stayed at this level upto age 18. It would be easily noted that the incidence was higher in boys than that in girls during the first four years and the difference nearly disappeared afterwards. So nearly 14 percent with carried teeth were found at the age 14 onwards.

The classes in which diseases of teeth were noted were two - caries and dirty.

The overwhelming predominance of decay in milk teeth would be a result of a long drawn process, since the early childhood; unhygienic methods of complete neglect of teeth cleaning, accompanied by the vitamin deficiencies and some hereditary effects. From the type of available information it was found rather difficult to guess other details.

A contributory factor to teeth decay is the habit of eating sweet-meats and taking sweet drinks. Though information regarding drinking tea, coffee, etc., was available quantitatively, and the general observations of the high prevalence of eating chocolates and consuming sweet-meats, these could not be used properly in their relative connection with teeth decay. Other well-re^corganised contributory factors are calcium and vitamins deficiency, and hereditary factors. The part played by these and their extent could not be observed though we came across pupils from the same families having caries and pupils from different sets of families having no caries at all.

In short this is again most important subject dependent on diet and several other factors and needing detailed study and investigations separately.

11.5.1 Defective Teeth and Health Grades:

Prevalence of Teeth caries was round ab^out 20 percent in all the health grades for boys and girls except in health grade A of girls it was found to be 16 percent. (See Table No. 1.18).

12. Tonsils:

At the time of examination record was sealed to three stages of tonsil enlargement. The first stage was denoted by (a) and this was to mean slight enlargement, which was in most of the cases negligible; by (b) more enlarged and were recommended for removal if found causing obstructive symptoms or septic; and by (c) enlargement of the extent requiring removal altogether. Information in this behalf is given in Table No. 1.19.

In general the normal condition of tonsil enlargement was found in 71.77 percent boys and 76.55 percent in girls. Tendency of removal of tonsils was more marked in girls, 12.32 percent than in boys, 9.11 percent but this was just the opposite with regard to the enlargement of tonsils in all the three grades together, 19.09 percent in boys and 11.11 percent in girls. The number in tonsil enlargement stages (a) and (b) each was round about 8 percent in boys and 4.75 percent in girls. The stage (c) indicating the earliest removal of tonsils was present in 3.21 percent in boys and nearly a half of this, 1.49 percent in girls. That the guardians paid early attention more specifically in girls to the tonsil affection at all stages of enlargement including tonsil removal would be apparent from the table wherein from age 14 onwards normal state gradually increased along with the corresponding lower incidence. This was but natural in consideration of the approach of marriage-age.

Whether the decrease in the percentages of tonsils enlargement with advancing age was due to removal of tonsils or removal of the underlying cause, viz. any outside septic focus, say general throat affection or ear, nose or teeth trouble, was difficult to say. Anyhow the fact that pupils showed, though gradually better results with advancing age was a matter of some satisfaction.

12.1 Health grades and Tonsil-Condition:

Tonsil condition was nearly the same, in health grades A and B, in girls as well as in boys. Prevalence of high percentage, Septic and excessive enlargement of tonsils, was found rather in a high percentages in Grade C, (See Table No. 1.20).

13. Miscellaneous:

Skin Diseases: Some cases of severe and many others of minor skin trouble were noted but as a group the proportion was too small for worthwhile deductions.

Lice infection: Lice infection was found to be present in nearly 90 percent both in boys and in girls studying in a purely refugee High School. Prevalence of this elsewhere was negligible.

Leprosy: During the course of 7 years, only four cases of leprosy were met with. These were got treated by experts.

III - MENARCHE:

1. Introductory:

There are varied opinions about what Menarche actually means. A few views noted below are self-explanatory.

- (a) Onset of first monthly course is taken as the point, when puberty is more or less established. This does not imply that puberty by any means is complete. The word 'MENARCHE' is frequently used to denote this initial menstruation and is not strictly speaking synonymous with puberty. (See Baird: *Obste. & Gynaeic.*, 5th Edition 1950, p. 60).
- (b) Menarche, a Greek word meaning month beginning, refers to the first period of physiological uterine bleeding. Puberty has been used by some as synonymous with Menarche and by others as the time, when reproduction becomes possible. (See Hamblen, 3rd Edition 1945, pp. 114, 125 to 128).
- (c) Occurrence of first monthly course has long been considered the climax or the end point of the pubertal period and that once the menses have their appearance the individual has reached full maturity. It is however now believed that this concept is incorrect and that the Menarche is merely a single event in a process, which terminates some years later. (See Davis: *Obste. Gynaeic.*, 1948 edition, Vol. I p. 1-4; Vol. II p. 17; & Vol. III p.5).

Without going into details regarding the controversy about what Menarche really means, whether it means puberty is incomplete or it is an end point or an event in the process, and whose opinion should be valued, I have taken here the simple meaning of Menarche as only the onset of first monthly course for the purpose of this report.

2. Menarche Age:

Average age at Menarche was found to be 14.120 with s.d. ± 1.089 (See Table No. 1.21). It would be appropriate in this context to reiterate the relevant part from a paper entitled "What is Menarche?" This was read by the writer at the Second Poona Medical Congress in June 1957 and was based on the information for the same four years as covered by this report of study from the secondary schools. The paper presented the variations in Menarche age in relation to (i) caste and community, (ii) locality, and (iii) economic status of the guardians.

(i) Menarche age by communities: Christians 14.0 (133); Parsis 13.75 (160); Sindhis 14.34 (67); Gujaratis 14.40 (98); Madrasis 14.28 (89); Muslims 14.12 (129) Marathas 14.17 (71); and the rest 14.56 (2330).

(ii) Menarche age by locality: (1) Deccan Gymkhana Area 14.18 (359); (2) City area more or less congested area) 14.70 (2484); and Camp area 13.96 (548).

(iii) Menarche age by economic status: (1) Poor class 14.71 and (2) Rich class 14.89 (944).

Note+- Enclosed in bracket is the number on which the average was based.

From this it might be said that the average menarchal age was in the range from age 14 to age 15, with relatively no effect due to caste, locality, or economic status.

In the present report the ^ucausal factors of ^fMenarche delay, i.e. ill health, malnutrition, anaemia, tuberculosis, severe long illness, malnutrition of genitalia or imperforate hymen, could not be studied. But it was observed in the follow-up work that adequate diet with vitamins and iron for improving general health induced menarche in delayed cases. Unfortunately this impression could not be factually presented.

Vague or very little information is available on the menarchal age in tropical countries. Although none of the figures quoted for Indian women are based on the large data series of cases, the average age of menarche is as: 15.63 (Dr. Curjel from Calcutta); 13.65 (Dr. Purandare from Bombay) and 13.79 (Dr. Parvatidevi from Madras). In the absence of data available on the large series, the age of 14 is taken as an average age of menarche for Indian women. (See Obste. & Gynaeco. Journal of India, December 1955, p. 168).

In the context of the general statement: "Age at Menarche 14.5 varies with different countries and nationalities staying in the same country", Dr. Dugald Baird makes

a mention that (i) Jewish girls menstruate earlier than others, Indian girls earlier than European girls staying in India, and (ii) Due to the wide normal variation menarche should not be considered as unduly delayed until a girl is 17 or 18 years old. (See D. Baird: *Obste. & Gynaec.* 5th edition, 1950, p. 60).

Hamblen refers to the very interesting Tilt's (British Gynaecologist) statistical report: age at menarche in hot climate is 13, temperate zones 14.3, cold countries 15.8, Europe (temperate zone) 15.5, Norway and Denmark 16, Spain 18.2, North America (i.e. temperate zone) 13.9, and in Tropics 14.8; and goes on to observe that this shows that factors other than climate alone operate. (See Hamblen: *Endocrinology*. pp. 125-127).

While observing the average menarchal age to be from 12 to 14, Dr. Moorwhite notes that in some London families monthly course started at the age of 17 or 18 or even later, girls being normal in all other respects. (See Margaret Moorwhite: *Diagnosis and Treatment of Gynaecic Disorders*. 2nd Edition. 1946).

Average menarchal age was observed to be 14 for White Women of U.S.A. and Canada in the investigation of 20,000 cases by Englemann (referred in Eden & Lockyer: *Gynaec.* 1928 Edition. pp 78-79).

3. Pecularity of phenomenon:

The following two remarks are noted down as they contain reference to many important influences affecting and the side effects of the menarchal age.

(i) Present generation daughters get menarche earlier than that of their mothers. Menarche at early age is found in early sexual life or residing in large cities as compared with rural districts. Poor girls late while rich ones early. Heredity is one of the important things. Goulds found menarche earlier by 3 months in daughters than in their mothers, only 18% menarche occurs in Summer. Menarche in July is twice that of any two months in the year. (See Mills in Human Biology, 1937, Vol. 9.43).

(ii) Somatic and sexual developments are closely related to each other (BOAS) i.e. body growth attains maximum rate as menarche approaches. This period is called the age of maximum rate of growth. First monthly course is generally found one year earlier. For this reason, girls at menarche age are taller than average individuals of the same age. Earlier the menarche more rapid is this completion of growth process. Thus women, who have menarche very early tend towards a short stature. (See Davis, *op. cit.* Vol. I p.2).

In our survey we found that height and weight in girls are more for the menarchal age than those at the same age on the average. This is described in detail in Part II.

4. Interval between Monthly Courses (M.C.) in days:

Interval days were meant to be the duration from the first day of the monthly course to the first day of the next following monthly course. This information was supplied by the examinee.. For the sake of convenience of notation and not for any specific reason the interval days were put in five groups: (i) 20 days and below, (ii) 21 to 24 days. (iii) 25 to 27 days, (iv) 28 & 29 days, and (v) 30 days or more.

Out of ^{10,964}~~10,964~~ schedules specifying menarche, the required information was furnished on 6,277 only. Break-up of this frequency is given in three different ways in order to see whether early or late menarche has any peculiar effect or effects on the duration. (See Table Nos. 1.22 to 24.)

On the whole 95.42 percent were in group V, meaning 30 or more days, only 3.21 percent in group IV, nearly one percent in groups I & II together meaning 24 or less days. The end group V had large concentration round about 31-32 and rarely a few exceeded 36. So nearly 98 percent were found to lie in the range of interval days 28 to 32. In the absence of similar data, it was thought advisable to leave to experts the question of deciding whether this range of interval days 28 to 32 would itself be a normal one or above normal. Even though the cases belonging to the first three groups ^{were} found to be small, they should be studied deeply and it should be seen, in the absence of any other complications, whether this would form a normal pattern for those individual cases.

Classification of menarche age cases according to groups of monthly course interval days was done (See Table No. 1.3.4). General pattern as described above was to be seen in this also. For such an analysis our data fell too short, as we had taken only four years consecutive data in general. Bearing this in mind it might be observed from the table that persistence in continuing in same interval days-group from one year to next, as the one at the time of menarche, did not depend on the menarche age. In other words it formed a normal pattern for those individual cases.

Whether the variations in the monthly course interval days has^{ve} any relation, and if so to what extent, with general health constitution, which in turn is the outcome of effects due to diet, climate, city life and several other factors including heredity, needs further investigation. This remark is equally applicable to the related topic of monthly course length (flow of discharge) days and quantitative measure.

5. Duration of Monthly Course:

Monthly course may start any time during day or night, count is made in days according to established convention. It was difficult to get this information in hours. Available information was in conventional day, which might contain some instances wherein less than a day had been reckoned as one whole day.

For the sake of convenience duration days were divided into 8 groups, the first 7 being the same as the serial number of days of duration and the last 8th group taking in all the cases of duration of days 8 and more. Information relating to duration in mere days would have been more enlightening if measurements of quantity of discharge during the monthly course would have been available. But this was not possible at the time of medical examination. A little less than a half were in the group four i.e. monthly course duration of 4 days only, and from one-fourth to one-fifth in duration period of 5 days in the average as well as at each age. This pattern was observed in the case of groups 3 and 6 with the strength round about one-tenth of the total. On the assumption that there would be no other complicating factors, groups three to six together might be treated as normal in consideration of possible individual variations. Cases belonging to the rest of the groups would need thorough investigation. The last group, i.e. 8 or more days had almost all cases with 8 days duration except a few with 9 or 10 days and about 5 with as long as 14 days duration. (See table No. 1.25).

The most important phenomenon in respect of Monthly Course interval and duration days is that of 'Regularisation'. Majority of girls take some time to get monthly course regularly established and this is of normal occurrence. Some girls take a year or so while a few even more than a year. Disturbing factors of 'Regularisation' in this growing period, include psychological factors

i.e. upsetment, examination pressure, etc., and marriage. Study of isolated factors will not give definite ^{results} requisite and hence it is necessary to study this as one whole problem in which all the depending factors have been included.

6. Gynaecological Diseases:

Most common of the gynaecological diseases found for the ages 10 to 18 of girls under consideration were in the descending order of frequencies; Dysmenorrhoea (69.68 p.e.), Menorrhagia (15.02 percent), Combined Menorrhagia and Dysmenorrhoea (4.66 p.e.), Amenorrhoea (3.36 p.e.) and all other diseases combined (7.25 p.e.) of the total affected cases. Actual number of the diseased was only 386 i.e. 3.52 percent of the total number examined (10, 964 with menarche). See Table Nos. 1.26 & 27).

Roughly it might be said that total disease incidence gradually fell down from menarche age 11 onwards. These diseases are mainly due to uterine muscular development, psychological conditioning, or disturbed endocrinal imbalance. Girls generally require some time to establish Monthly Course regularity and hence it is also quite possible to have predominance of such diseases.

Dysmenorrhoea: In the agewise break-up its presence was seen nearly 24 percent at ages 15, 16 and 17; and about 11 percent at ages 14 and 13. Majority of these cases were of spasmodic type and ^{it was noted} that with antispasmodic line of treatment they got better. This type generally disappears after child birth. Many cases of menorrhagia

and some of dysmenorrhoea showed considerable improvement by iron and calcium treatment. In the course of the examination it was also observed that generally either weak or too strong girls, who started monthly course at an early or late age were prone to suffer & from Dysmenorrhoea. It may be that as uterine inertia or muscle rigidity is found in some cases of late primipara, the same principle may be applicable to Dysmenorrhoea in girls who start monthly course either at an early or a late age.

We get a pretty big number of cases of phimosis in boys and of dysmenorrhoea in girls. It would be worth while to study whether there is any common underlying causative factor.

7. Height and Weight:

Effects of menarche age on height and weight are studied in detail in Part II, though some points are touched upon in the next section. (Section III: Height and Weight - serialized para 2 of same name).

IV - HEIGHT & WEIGHT & CHEST GIRTH:

1. Introduction:

Trained teachers or clerks recorded the height, weight and chest measurements. This work was however checked up every now and then by the head examiner. The head examiner noted how pupils stood on the weighing machine, or underneath the height stand, and also if there was any case of

deformity, say, hunch back, etc. Weighing machines used were with original German or English springs and got checked up and corrected off and on. It was not possible to use costly and heavy machines.

2. Chest Expiration and Chest Inspiration:

Now a word regarding the measurement of Chest. We used to take chest measurements at the nipple line and having once adopted a set procedure, it became incumbent on us to continue with the same in order to maintain uniformity and comparability of the data. Many of the pupils, even after proper instructions, would not know when to expand chest and when not to, with proper posture of standing straight with shoulders thrown back. So chest measurements could not be considered to be of high accuracy and more so in the case of girls predominantly due to the existence of movable fat. There were more accurate methods, such as cyrtometer, etc., but these could not be made available in the general medical examination on a mass scale. Some do adopt the procedure of taking chest measurements at the level of the highest point of the axillary fold and this will be a bit more accurate than the one of taking these at nipple line.

For obvious reasons noted above no attempt could be made to relate chest measurements with height. Average chest expiration at each age for boys and girls are given in Table No. 1.28 and the difference between chest inspiration and chest expiration, in Table No. 1.33. Average chest expiration was 23.01 inches at age 10 and steadily went up to 29.24" at age 18 in boys. Similarly it was 22.72" at age 10 raising to 28.72" at age 18 in girls. It was

It may be simply mentioned that absolute increase between the averages at consecutive ages assumed a peak-and-trough trend, throughout in both sexes.

In general the average difference between chest expiration and chest inspiration was more inclined forwards the value of 2", in boys and nearer to 1.5" in girls. Closer observation of the table would distinctly show that the average difference at an age, steadily but markedly increased with age in boys, whereas the same tendency was noticeable in a narrow range in the case of girls.

3. Height and Weight (Absolute and annual increase or decrease):

From the view point of methodology it is considered helpful to present here the ordinary analysis in detail, as this would compare itself with the results of the full statistical analysis, a highly technical and specialized job, presented as Part II of this Report. Some duplication there would be, but it would be unavoidable.

Deliberately no attempt was made to calculate the averages of height and weight for all ages for reasons explained earlier in this part. Suffice it to say that the occurrence of spurt in growth of the human body at a particular age, though varying from individual to individual in each sex, between the ages 10 and 18, would take away the utility of the average at any specific age. So it would not be meaningful for the whole group, for all these ages together.

The total net increase in height between the ages 10 and 18 was nearly 11" in boys and nearly 8-1/2" in girls, and corresponding total net increase in weight was 46 Lbs. and 35 Lbs. respectively. (See Table No. 1.28 & 29). Maximum increase in height between two consecutive years was 2 inches in both boys and girls. But maximum increase in weight between consecutive years was 10 lb. in boys and 7 lb. in girls. Average height at the age 18 was 63.11" in boys and nearly 60" in girls (See Table Nos. 1.31 and 1.32).

Attention is simply drawn here to Table No. 1.30 wherein average height, average weight and average chest expiration in girls for each menarchal age, cases subdivided by the agewise data for the ages 10 through 18 covering premenarchal, menarchal and post-menarchal periods. Fuller discussion would be found in Part II of the Reports.

4. Bhusrath's Nutrition Index:

Nearly 26 years back Dr. Bhusrath devised an empirical formula in the course of medical examination of children of the ages 6 to 10 in the primary schools of Bombay Municipal Corporation. This was known as the Bhusrath's Nutrition Index and calculated in the case of an individual by taking ten times the ratio of weight in lb. to height in inches. In a normal case this is to be 9 at age 6 rising to 14 at age 14. Results arrived at by

the application of this formula to the averages at ages 10 to 18 are given in Table No. 1.34. Its utility as a normalcy measure upto the age 14 has remained uncontradicted but it becomes rather difficult to say anything regarding its validity in the extended period to the age 18. According to this Index our boys and girls were found to be a little at the lower level and a slight difference was observable amongst both boys and girls.

5. Physical Training in High Schools:

While arranging P.T. time-table for different standards in a school recourse to the prescribed table, prepared by the State Inspector for Physical Education, Bombay State, as a guide had to be made for P.T. group formations. Though individual attention could not be possible while giving mass training, initiation at improving health standard amongst school going children might be said to have been made by attempting standardisation of P.T. The reference table was prepared by taking into consideration age, height and weight. (See Table No. 1.35). The composite score was used to grading and then allotting a class to standard (See Table No. 1.36). On this basis the average performance came out as C, Junior class, with the average composite score 21.56 for boys and 19.33 for girls. Upto the age 14 both boys and girls were found to have the same class with nearly the same composite score. At age 16 though both were in the same class the boys showed a lead of 3 in their score over girls. A lead in score with the next higher class was to be found in the rest of ages in favour of boys.

Average period in minutes devoted for physical training on a working day for both boys and girls ^{is} are given in Table No. 1.37. Thus at age 10 and 13 boys had to do daily P.T. for 32.5 minutes and 16.25 minutes respectively; and the girls for 23.5 minutes and 16.75 minutes respectively.

No consideration regarding whether pupils required more exercise at particular age or less, whether girls should have different exercises than those for boys, whether it would be necessary to select appropriate games with the idea of helping the increase in height of pupils, etc. seemed to have been given to these along with many other ~~practical~~ problems needing immediate attention while arranging P.T. for boys and girls. The physical training in schools was managed by three agencies: Schools, recognised Samitis and Vyayam Shalas and Home. Appropriate time and suitable type of exercise would alone bring in real and lasting healthy improvement in the existing conditions.

6. Miscellaneous:

A trial of giving milk to pupils in 5-6 schools was given for nearly three years and it was found that on an average pupils decidedly showed an increase in weight, but the added gain was upset by an equivalent loss during both the long vacations of May and Dipavali, most likely due to the non-availability of milk. Factual material relating to this is not presented here. The point is

mentioned here because occurrence of discontinuity in the regular in-take of milk needs careful watching when free feeding is instituted so that lasting beneficial effects would be forthcoming.

V - GENERAL REMARKS:

1. Preliminary Remarks:

The situation regarding the care of health of school going children on the eve of the establishment of the Students Health Association in 1949 can rightly be depicted by use of the word "SCANT", i.e. almost negligible, attention was paid to the health of growing children, the wealth of our country, by the State, by the school authorities or even by the guardians. Even during the past ten years of our experience we observed that majority of the schools could do nothing beyond arranging an annual medical examinations, a few sent the health reports to the respective guardians, and here ended the whole show. In some schools doctors as well as school-principals were very enthusiastic, but attempts to improve the defectives failed due to the non-cooperative attitude of the guardians. It is not the intention to accuse guardians of the deliberate negligence. Genuine causes like poverty, ignorance, circumstantial difficulties, etc. might have been present. Result of all these is that many defects or diseases as defective vision, teeth caries, etc. remained untreated

or even undetected and prove detrimental to the child in its future life. In this regard the methods adopted in other countries are worth noting. In England and other countries there is a law and if the guardians do not follow the instructions given by the school-doctors, they are fined to the extent of Rs. 75 or so.

In the Second Five Year Plan school health service did not receive proper emphasis directly. But indirect hopeful signs may be perceived from the appointments of chief inspectors of Physical Education in the States and from the allotment of functional activities in the State on behalf of the Central National Discipline and the overall general support to sports. In order to get and achieve concerted beneficial results, all these activities need a well-thought-out coordinated plan which will have its rightful place in the Third Five Year Plan.

2. Plan for annual Medical Examination:

From the experience of nearly past ten years a "One Rupee Scheme" was submitted to the Central Government Educational Department through the Bombay State in August 1957. In it, it was shown how it would be ^{possible} able to manage the whole work of medical examination and its ancillary follow-up work satisfactorily at a cost of one Rupee per pupil per year, excluding the cost of actual treatment and how it would be possible to accumulate valuable data side by side for further analysis.

3. Nature of Coordinated Plan of Health Examination:

The End view of a perfect plan is to be that every individual will have a thorough medical examination accompanied by suitably administering of psycho-analytical tests soon after the admission to the secondary school, another at the age of 14 and the last when the individual will be in the XIth Standard. These are to be interspersed by regular check-up type of annual medical examinations. All the observations being recorded on a suitably designed card which is to move with the individual from one standard to the next in the same school or with the school leaving certificate when desiring transfer to another school. The difficulties in the way of achieving such a desired end are varied and numerous. Participants in shouldering the responsibility will of course be the Government, the School Authorities, and the guardians. Cooperation from medical associations and from public workers will largely help to lighten the financial burden in addition to quickening the space of reaching the target.

The part to be played by the State Government will be of the nature of suitably revising the existing Grant-in-Aid Code of schools in addition to properly enforcing the already existing provisions relating to school medical and-physic examination and physical training. At present the Educational Inspector, in addition to his work of educational inspection, looks after this in so-to-say a salutary manner. Really beneficent arrangement will

be to bring in a proper professional from the Health Department to scrutinise the work, ^{so} such that Inspector of Physical Education will work as a liaison officer.

Schools will have a School Doctor encumbered with the responsibility of annual medical examination, properly filling and maintaining the individual health record cards, apportioning and vigilance over the follow-up work of detected defectives, and over physical training and sports work.

Guardians will have to be dissuaded from neglecting necessary follow-up instructions of the School Doctor and from refusing or neglecting the furnishing of the disease history of the pupil, even with the aid of suitable legislative enactment. Such a legal measure will have to include some ameliorative measures to lighten the financial burden of the guardians due to the costly follow-up treatments.

What type of part a private social association can play is very well exemplified by the Work of the Students Health Association, Poona, since 1949. Appropriate financial support at proper stages of work and some legislative piece of enactment with proper ~~en~~ enforcing machinery will help to achieve better results most economically and speedily.

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---- End of part I ----

Table No. I.1 : NUMBER OF PUPILS (BOYS AND GIRLS) MEDICALLY EXAMINED DURING 1950 TO 1956 IN HIGH SCHOOLS IN POONA

Year	Number of High Schools	Total Number in High Schools			Total Number Medically Examined		
		Total	Boys	Girls	Total	Boys	Girls
1950	9	4,500	N.A.	N.A.	4,136	N.A.	N.A.
1951	14	6,700	N.A.	N.A.	6,136	N.A.	N.A.
1952	21	11,874	8,000	3,874	10,477	7,200	3,277
1953	25	16,023	N.A.	N.A.	15,027	10,770	4,257
1954	26	17,216	11,278	5,938	16,344	10,616	5,728
1955	29	19,305	12,928	6,377	18,358	12,229	6,129
1956	41	29,255	20,194	9,061	27,574	18,880	8,694

Table No. I.2 : DISTRIBUTION OF SELECTED MEDICAL EXAMINATION REPORTS OF BOYS AND GIRLS OF AGES 10 THROUGH 18 R STUDYING IN STANDARDS V TO XII DURING 1953-54 TO 1956-57 IN 20 SCHOOLS BY LOCALITIES (WARDS)

S.No.	Name of High School	Locality (Ward)	Cases included in this study	
			Boys	Girls
1.	Modern Girls High School	Shivajinagar		2,169
2.	Modern Boys High School	"	1,522	
3.	M.E.S. High School	Deccan Gymkhana	822	1,093
4.	New English School (Tilak Road)	Sadashiv Peth	1,482	
5.	M.E.S. (Boys) High School	"	2,456	
6.	" (Girls) High School	"		3,930
7.	Maharashtra High School (Anatha Vidyarthi Griha)	"	841	
8.	Patwardhan High School (Huzur Paga)*			4,790
9.	New English School (Raman Bag)	Shanwar	1,727	
10.	Ahilyadevi High School	"		3,152
11.	Bharat English High School	"	211	96
12.	Bharat High School	Raviwar	1,213	210
13.	R.C.M. (Gujarati) High School	"	428	468
14.	Raja Dhanaraj Girji High School	Nagesh	729	
15.	Rasta Peth High School	Somwar	558	222
16.	St. Ornella's High School	Nana	992	
17.	Camp Education Society's H.S.	Camp	816	135
18.	Dastur (Boys) High School	"	603	
19.	Angle-Urdu (Boys) High School	"	557	
20.	Angle-Urdu (Girls) High School	"		583
			14,957	16,828

Table No. I.3 : CASES OF BOYS AND GIRLS BY AGE AND STANDARD

Standard	No. of Pupils	Percent	Age	No. of pupils	Percent
<u>BOYS</u>					
V	1,912	12.78	10	1,276	8.53
VI	2,167	14.49	11	1,659	11.09
VII	2,318	15.50	12	1,783	11.92
VIII	2,978	19.91	13	2,020	13.51
IX	2,438	16.30	14	2,201	14.72
X	1,911	12.78	15	2,103	14.06
XI	1,233	8.24	16	1,912	12.78
			17	1,289	8.62
			18	714	4.77
	14,957	100.00		14,957	100.00
<u>GIRLS</u>					
V	1,992	11.84	10	1,629	9.68
VI	2,453	14.58	11	2,067	12.28
VII	2,581	15.34	12	2,194	13.04
VIII	3,172	18.85	13	2,398	14.25
IX	2,749	16.33	14	2,479	14.73
X	2,215	13.16	15	2,313	13.75
XI	1,666	9.90	16	1,995	11.86
			17	1,244	7.39
			18	509	3.02
	16,828	100.00		16,828	100.00

Table No. I.4 : STANDARD OF HEIGHT AND WEIGHT FOR VARIOUS HEIGHTS AT SPECIFIC AGES 10 TO 18 FOR BOYS AND GIRLS FOLLOWED BY THE STUDENTS HEALTH ASSOCIATION, POONA,

NOTE :- Height in ft. and in.; weight in lb., and age in years. Norms for the age are underlined.

10		11		12		13	
Height	Weight	Height	Weight	Height	Weight	Height	Weight
3- 8	49	3-10	53	3-11	56	4- 1	61
3- 9	51	3-11	55	4- 0	58	4- 2	64
3-10	53	4- 0	57	4- 1	60	4- 3	67
3-11	55	4- 1	60	4- 2	63	4- 4	70
4- 0	58	4- 2	63	4- 3	66	4- 5	72
4- 1	60	4- 3	67	4- 4	69	4- 6	75
4- 2	62	4- 4	70	4-5	71	4- 7	78
4- 3	64	4- 5	72	4- 6	74	4- 8	81
4- 4	67	4- 6	75	4- 7	76	4- 9	82
4- 5	71	4- 7	76	4- 8	80	4-10	86
4- 6	72	4- 8	78	4- 9	82	4-11	88
		4- 9	80	4-10	85		
				4-11	87		

14		15		16		17	
Height	Weight	Height	Weight	Height	Weight	Height	Weight
4- 3	69	4- 5	77	4- 7	85	4- 9	93
4- 4	72	4- 6	80	4- 8	88	4-10	96
4- 5	75	4- 7	83	4- 9	91	4-11	99
4- 6	78	4- 8	86	4-10	94	5- 0	102
4- 7	81	4- 9	89	4-11	97	5- 1	105
4- 8	84	4-10	92	5- 0	100	5- 2	108
4- 9	87	4-11	92 ⁵	5- 1	103	5- 3	111
4-10	86 ⁹⁰	5- 0	92 ⁸	5- 2	102 ⁶	5- 4	114
4-11	92	5- 1	100	5- 3	109	5- 5	117
5- 0	96	5- 2	102	5- 4	112	5- 6	120
5- 1	99	5- 3	105	5- 5	116	5- 7	123
				5- 6	118	5- 8	126
						5- 9	128

18		18		18		18	
Height	Weight	Height	Weight	Height	Weight	Height	Weight
4- 9	95	5- 0	104	5- 3	113	5- 6	122
4-10	98	5- 1	107	5- 4	116	5- 7	125
4-11	101	5- 2	110	5- 5	119		

Table No. I.5 : DISTRIBUTION OF BOYS AND GIRLS BY AGE AND HEALTH GRADE

NOTE:- Health Class A - upto 10 lb. below norm;

B - from 10 lb. to 25 lb. below norms and

C - others

Age	Total Number 100=	Percentage of boys in health class in			Total Number 100=	Percentage of Girls in health class in		
		A	B	C		A	B	C
10	1276	35.26	62.14	2.58	1229	31.36	62.43	6.20
11	1659	27.42	69.92	2.65	2067	31.30	62.40	6.28
12	1783	31.18	65.61	3.19	2194	29.39	62.75	7.83
13	2020	31.58	64.81	3.56	2398	38.03	55.46	6.50
14	2201	30.80	65.06	4.13	2479	42.92	51.23	5.84
15	2103	36.04	58.29	5.65	2313	47.38	47.64	4.97
16	1912	36.82	57.06	6.11	1995	46.66	48.57	4.76
17	1289	37.39	56.63	5.97	1244	38.74	55.46	5.78
18	714	39.35	56.30	4.84	509	39.89	53.83	7.07
	14957	33.44	62.27	4.29	16828	38.55	55.38	6.07

Table I.6 : DISTRIBUTION OF REPORTED CASES OF VACCINATION, B.C.G., etc. IN BOYS AND GIRLS BY AGE.

Age	Total No. of pupils	Non-reporting	No. reporting	P.V. No.	R.V. No.	B.C.G. No.	P.V. %	R.C. %	B.C.G. %
BOYS									
10	1276	50	1226	1218	854	757	99.34	69.65	61.74
11	1659	62	1597	1574	1192	1053	98.55	74.63	65.93
12	1783	79	1704	1680	1291	1172	98.59	75.76	68.77
13	2020	79	1941	1919	1498	1360	98.86	77.17	70.66
14	2201	103	2098	2060	1622	1487	98.18	77.31	70.87
15	2103	106	1997	1952	1536	1404	97.74	76.91	70.30
16	1912	105	1807	1753	1384	1259	97.01	71.05	69.67
17	1289	88	1201	1158	916	826	96.41	76.26	68.77
18	714	47	667	643	491	449	96.40	73.61	67.31
Total	13957	919	14238	13957	10784	9767	98.03	75.74	68.60
GIRLS									
10	1629	79	1550	1546	1311	970	99.74	84.58	62.58
11	2067	67	2000	1987	1732	1373	99.35	86.60	68.65
12	2194	81	2113	2102	1838	1511	99.47	86.98	71.50
13	2398	92	2306	2287	2006	1657	99.17	86.99	71.85
14	2479	91	2388	2367	2073	1696	99.12	86.80	71.02
15	2313	92	2221	2198	1929	1546	98.96	86.85	69.60
16	1995	99	1896	1874	1632	1248	98.83	86.07	65.82
17	1244	70	1174	1148	998	755	97.78	85.00	64.31
18	509	42	467	453	396	303	97.00	84.79	64.88
Total	16828	713	16115	15962	13915	11059	99.05	86.35	68.62

**Table No. 1.7 : DISTRIBUTION AGEWISE OF BOYS AND GIRLS CONSUMING
TEA, COFFEE, MILK, etc. OR NOTHING**

Age	Total =100	Tea only	Coffee only	Milk only	Tea+ Coffee	Tea+ milk	Coffee +milk	Tea+ Coffee+ Milk	Taking nil i.e. no drinks
<u>BOYS</u>									
10	1276	37.94	17.78	29.78	3.22	6.42	2.44	0.00	2.42
11	1659	41.66	15.25	26.94	3.55	6.88	2.29	.24	3.19
12	1783	48.34	12.80	23.85	2.64	6.78	1.73	.22	3.64
13	2020	51.33	11.73	20.94	2.47	6.59	1.48	.20	5.26
14	2201	52.66	12.35	19.09	2.49	5.95	1.05	.18	6.23
15	2103	55.03	11.34	16.11	2.43	6.22	1.42	.23	7.22
16	1912	57.11	10.82	14.76	2.35	5.44	1.89	.37	7.26
17	1289	57.57	8.99	15.12	2.49	5.74	1.62	.39	8.08
18	714	63.44	7.70	8.12	2.52	4.34	1.28	.28	12.32
Total	14957	51.32	12.24	19.88	2.66	6.15	1.66	.24	5.85
<u>GIRLS</u>									
10	1629	28.42	30.44	31.67	1.35	2.45	1.41	0.03	4.23
11	2067	35.60	9.02	27.12	.96	1.98	1.66	.04	3.62
12	2194	38.62	27.80	24.20	.86	1.64	1.64	.09	5.15
13	2398	38.36	26.39	25.43	.58	1.66	1.62	.04	5.92
14	2479	40.94	26.54	21.39	.68	1.89	1.45	0.02	7.09
15	2313	41.41	25.98	21.14	.51	2.22	.90	0.00	7.84
16	1995	43.15	25.86	19.04	.71	1.75	.92	0.00	8.57
17	1244	45.81	23.39	15.67	.64	2.27	.72	0.01	11.49
18	509	51.66	20.23	11.79	1.19	2.16	.39	0.00	12.58
Total	16828	39.42	26.79	23.00	.77	1.95	1.29	.02	6.76

Table No. I.8 : DISTRIBUTION AGEWISE OF BOYS AND GIRLS CONSUMING TEA, COFFEE, MILK, etc. OR NOTHING (IN DIFFERENT FORM)

Age	Total No.	Tea No.	Coffee No.	Milk No.	Nil No.	Tea %	Coffee %	Milk %	Nil %
BOYS									
10	1276	607	299	493	31	47.57	23.43	38.63	2.42
11	1659	868	354	603	53	52.32	21.33	36.34	3.19
12	1783	1034	310	581	65	57.99	17.38	32.58	3.64
13	2020	1224	321	590	106	60.59	15.89	29.20	5.24
14	2201	1349	354	578	137	61.29	16.08	26.26	6.22
15	2103	1344	324	505	152	63.90	15.40	24.01	7.22
16	1912	1248	295	429	139	62.27	15.42	22.43	7.26
17	1289	853	174	295	104	66.17	13.49	22.88	8.06
18	714	504	84	100	88	70.58	11.76	14.00	12.32
TOTAL	14957	9031	2515	4174	875	60.37	16.81	27.90	5.85
GIRLS									
10	1629	525	541	579	69	32.22	33.21	35.54	4.23
11	2067	798	655	636	75	38.66	31.68	30.76	3.62
12	2194	904	667	605	113	41.20	30.44	27.57	5.15
13	2398	974	686	690	142	40.61	28.60	28.77	5.92
14	2479	1079	711	613	176	43.52	28.68	24.72	7.09
15	2313	1021	634	561	181	44.14	27.41	24.25	7.82
16	1995	910	548	433	171	45.61	27.46	21.70	8.57
17	1244	606	308	232	143	48.07	24.75	18.64	11.49
18	509	280	111	73	64	55.00	21.80	14.34	12.57
TOTAL	16828	7097	4861	4422	1134	42.17	28.88	26.27	6.73

Table No. I.9 : DISTRIBUTION OF BOYS AND GIRLS CONSUMING TEA, COFFEE, MILK, etc. or NOTHING

BOYS

General Health	Total =100	Consumption of Tea, Coffee and Milk in %							
		Tea only	Coffee only	Milk only	Tea and Coffee	Tea and milk	Coffee and milk	Tea Coffee and milk etc.	Blank
A	5002	45.42	11.89	24.25	3.01	7.77	1.80	0.23	5.63
B	9314	53.68	12.52	18.16	2.38	5.28	1.66	0.26	6.06
C	641	63.18	11.08	10.30	3.90	6.24	0.78	0.16	4.36
Total	14957	51.32	12.25	19.86	2.66	6.16	1.66	0.23	5.86

GIRLS

A	6487	38.44	25.56	24.41	0.68	1.70	1.17	0.32	7.72
B	9319	39.75	27.14	22.45	0.80	2.12	1.35	0.29	6.10
C	1022	42.66	26.81	19.18	1.08	2.15	1.57	0.29	6.26
Total	16828	39.41	26.51	23.01	0.79	1.95	1.29	0.31	6.73

**Table No. I.10 : HISTORY OF DISEASES : MEASLES, CHICKEN POX,
etc. (BOYS AND GIRLS)**

Name of disease	Boys		Girls	
	No.	Percent	No.	Percent
1. Measles	5365	20.17	8885	26.13
2. Chicken pox	3773	14.18	6423	18.89
3. Whooping Cough	2638	9.92	4275	12.56
4. Mumps	1541	5.79	2423	7.12
5. Small pox	798	3.00	527	1.55
6. Typhoid	1455	5.47	1802	5.30
7. Pneumonia	732	2.75	899	2.64
8. Diptheria	195	.73	276	.87
9. Dysentery	851	3.20	1029	3.02
10. Jaundice	39	.15	75	.22
11. All rest together	2525	9.49	2277	6.69
12. Normal	6692	25.15	5106	15.01
Total No.	26604	100.00	33997	100.00

Table No. I.11 : HISTORY OF DISEASES : MEASELS, CHICKEN POX,
etc. (ANOTHER FORM)

Name of diseases	No.	Boys %	No.	Girls %
<u>1. Virus Diseases</u>				
a. Measles	5365	20.17	8885	26.13
b. Chicken pox	3773	14.18	6423	18.89
c. Mumps	1541	5.79	2423	7.12
d. Small pox	798	3.00	527	1.55
e. Jaundice	39	.15	75	.22
Total and percentage of totals	11516	43.29	18333	53.91
<u>2. Bacterial diseases</u>				
a. Pneumonia	732	2.75	899	2.64
b. Tyhpoid	1455	5.47	1802	5.30
c. Diptheria	195	.73	276	.87
d. Dysentery	851	3.20	1029	3.02
Total and their percentage	3233	12.15	4006	11.83
3. Whooping cough	2638	9.92	4275	12.56
4. All others	2525	9.49	2277	6.69
5. Air-borne	-	-	-	-
6. Normal	6692	25.15	5106	15.01
		100/-		100/-

Table No. 1.12 : DISTRIBUTION OF CASES OF BOYS AND GIRLS WITH DIGESTIVE DISEASES BY AGE

Age	Total No.	Percent						
		Diges- tive D.	Age- wise percent- -age	Boys Totalwise percent- -age	Total No.	Diges- tive D.	Age- wise percent- -tage	Total- wise per- centage
10	1276	42	3.29	.28	1629	70	4.29	.04
11	1659	57	3.43	.38	2667	79	3.82	.46
12	1783	40	2.24	2.27	2194	66	3.00	.39
13	2020	60	2.97	.40	2398	54	2.25	.32
14	2201	45	2.04	.30	2479	58	2.33	.34
15	2103	50	2.37	.33	2313	44	1.90	.26
16	1912	33	1.72	.22	1995	42	2.10	.24
17	1289	32	2.48	.21	1244	17	1.36	.10
18	714	22	3.08	.15	507	14	2.75	.08
Total	14957	381	2.63	2.54	16828	444	2.64	2.23

Table No. I.13 : DISTRIBUTION OF CASES OF BOYS AND GIRLS WITH DISEASES AND DEFECTS OF HEART BY AGE

Age	Boys		Girls	
	No. examined	Disease %	No. examined	Disease %
10	1270	.86	1600	1.25
11	1655	1.26	2041	1.71
12	1774	2.02	2170	2.07
13	2014	1.78	2377	2.10
14	2192	2.09	2452	2.65
15	2094	2.14	2293	2.79
16	1909	2.25	1975	2.63
17	1287	2.02	1236	1.77
18	711	3.09	503	2.18
Total	14906	1.91	16647	2.18

Table No. I.14 : DISTRIBUTION OF CASES OF BOYS AND GIRLS BY AGE AND PULSE RATE

Age	Percent								Total =100
	Less than 70	70- 79	80- 89	Pulse rate		110- 119	120- 129	130 or more	
				90- 99	100- 109				
BOYS									
10	.07	3.82	34.56	34.48	16.61	5.51	4.48	.47	1270
11	.00	3.98	34.74	35.95	16.63	4.16	3.92	.62	1655
12	.28	5.52	34.89	37.09	14.43	4.19	2.93	.67	1774
13	.26	7.99	37.38	34.23	14.20	3.47	2.18	.29	2014
14	.36	10.09	39.34	33.21	11.72	2.73	2.14	.41	2192
15	.76	12.79	42.07	28.31	10.89	2.88	1.88	.42	2094
16	.99	15.40	42.33	27.77	8.85	2.51	1.88	.27	1909
17	1.03	19.27	45.14	21.36	8.31	2.17	2.49	.23	1287
18	.98	21.23	42.06	23.77	6.89	2.82	1.68	.57	711
Total 14906	.49	10.44	39.02	31.36	12.34	3.35	2.58	.42	14906
GIRLS									
10	.12	2.63	31.25	35.50	19.25	6.18	4.25	.82	1600
11	.05	3.23	31.61	36.50	18.28	5.49	4.16	.68	2041
12	.18	2.49	33.77	34.66	18.75	6.03	3.43	.69	2170
13	.09	3.36	33.07	35.51	17.58	5.52	4.08	.79	2377
14	.24	4.56	33.31	35.35	17.47	4.07	4.34	.66	2452
15	.13	4.32	35.37	34.19	14.58	5.54	5.05	.82	2293
16	.26	6.58	35.64	32.51	14.68	5.01	4.71	.61	1975
17	.08	7.92	40.70	26.94	14.33	4.44	4.61	.08	1236
18	.01	9.76	39.36	29.62	13.32	3.97	3.77	.19	503
Total 16647	.14	4.38	34.23	34.14	16.84	5.25	4.29	.73	16647

Table No. I.16 : DISTRIBUTION OF CASES OF BOYS AND GIRLS WITH DEFECTIVE VISION, EYE DISEASES AND TRACHOMA BY AGE

Age	No. studying (=100)	Percent							
		6/6	6/9	6/12	6/18	6/24	6/36	6/60	Trachoma
<u>BOYS</u>									
10	1276	35.9	37.7	11.8	5.4	1.8	1.3	.8	3.9
11	1659	38.8	34.9	10.9	5.1	1.9	1.8	1.6	3.7
12	1783	42.7	30.6	8.9	5.8	1.8	1.4	.5	3.3
13	2020	44.1	29.8	9.1	5.1	2.3	1.1	.5	3.3
14	2201	46.7	25.7	11.3	4.2	2.3	1.1	.5	2.5
15	2103	47.9	29.4	8.6	4.6	2.3	1.2	.95	2.2
16	1912	46.1	25.1	9.2	5.1	2.7	1.6	.5	1.6
17	1289	46.1	24.1	9.5	5.4	2.2	1.8	1.09	1.4
18	714	47.6	24.6	8.9	5.3	2.5	0.7	1.5	1.9
<u>GIRLS</u>									
10	1629	35.3	35.03	9.3	4.17	3.0	.9	.7	9.2
11	2067	29.2	31.4	9.6	3.9	1.6	1.7	.8	8.9
12	2194	41.13	25.2	9.9	3.9	2.1	2.1	.91	9.9
13	2398	32.6	23.1	7.5	3.9	2.3	2.2	1.1	8.99
14	2479	31.1	22.5	7.2	4.8	2.4	1.8	1.2	8.35
15	2313	32.8	20.0	7.3	5.2	2.8	1.9	.95	7.56
16	1995	33.1	22.8	7.7	4.1	3.1	2.3	1.05	6.9
17	1244	33.7	21.7	5.7	3.9	3.1	2.2	1.5	6.77
18	509	32.2	23.5	6.4	3.7	5.6	2.5	1.3	4.51

Table No. I.17 : DISTRIBUTION OF CASES OF BOYS AND GIRLS WITH E.N.T. (EAR, NOSE AND THROAT) AND TEETH DISEASES BY AGE

Age	Total No.	Ear disease %	Nose disease %	Throat disease %	Teeth %	Normal %
BOYS						
10	1276	1.01	1.33	.31	41.45	57.05
11	1659	.78	1.44	.24	35.26	63.11
12	1783	.50	1.06	.11	26.52	72.22
13	2020	.99	1.33	.29	20.39	77.42
14	2201	1.22	1.45	.09	14.44	83.50
15	2103	.66	1.18	.09	14.21	84.07
16	1912	.78	1.09	.31	13.91	84.30
17	1889	.77	1.62	.31	12.89	86.19
18	714	1.12	.84	.84	13.44	84.59
Total	14957	.85	1.18	.23	20.86	81.04 76.84
GIRLS						
10	1629	.85	.24	.12	29.03	70.22
11	2067	1.01	.33	.04	24.96	74.11
12	2194	1.04	.50	.04	20.96	77.71
13	2398	.66	.37	.04	16.80	82.19
14	2479	.72	.60	.12	14.88	83.86
15	2313	.60	.17	.17	14.78	84.95
16	1995	1.35	.35	.05	14.23	85.16
17	1244	.40	.64	.16	14.71	84.48
18	509	.00	.98	.00	14.73	84.47
Total	16828	.69	.41	.08	18.40	81.03 80.39

Table No. 18 : DISTRIBUTION OF CASES OF BOYS AND GIRLS WITH
TEETH DISEASES BY HEALTH GRADE.

General health	Teeth Condition					
	Boys			Girls		
	Defective teeth %	No defect %	Total (=100)	Defective teeth %	No defect %	Total (=100)
A	19.63	80.37	5002	16.24	83.76	6487
B	21.77	78.23	9314	19.80	80.20	9319
C	20.12	79.58	641	20.06	79.94	1022
Total	20.99	79.01	14957	18.45	81.55	16828

Table No. I.19 : DISTRIBUTION OF CASES OF BOYS AND GIRLS WITH TONSILS ENLARGED OR REMOVED BY AGE

Agea	Total	Normal	Per cent			
			Enlargement			Removed
			a	b	c	
<u>BOYS</u>						
10	1276	62.95	11.67	11.44	3.60	10.34
11	1659	66.18	9.36	11.03	3.73	9.70
12	1783	67.07	10.04	10.09	3.48	9.32
13	2020	69.56	7.52	9.12	4.45	9.35
14	2201	70.42	6.77	10.04	3.92	8.85
15	2103	72.98	6.99	7.84	3.09	9.10
16	1912	77.32	5.96	5.59	2.24	8.89
17	1289	82.63	3.73	3.26	1.39	8.99
18	714	84.88	3.78	4.06	.98	6.30
						11.63
Total	14957	71.77	7.49	8.39	3.21	9.11
<u>GIRLS</u>						
10	1629	74.84	6.32	5.27	2.82	10.75
11	2067	74.66	6.43	5.52	2.32	11.07
12	2194	73.01	7.53	5.42	2.18	11.86
13	2398	74.30	5.58	5.62	1.51	12.92
14	2479	75.79	5.24	4.25	1.31	13.21
15	2313	78.61	4.10	3.30	.77	13.22
16	1995	80.35	4.17	2.10	.55	12.82
17	1244	81.10	3.05	2.65	.48	12.72
18	509	84.18	3.96	1.39	.38	10.07
						11.2
Total	16828	76.55	5.36	4.28	1.49	12.32

Table No.I.20 : DISTRIBUTION OF CASES OF BOYS AND GIRLS WITH TONSILS ENLARGED OR REMOVED BY HEALTH GRADE

BOYS

General Health	Total = 100	Normal	Tonsils condition in %			Removed
			Enlargement *			
			a	b	c	
A	5002	72.82	7.29	7.89	2.92	9.08
B	9314	71.07	7.64	8.76	3.39	9.14
C	641	74.26	5.15	5.93	5.77	8.89
Total	14957	71.75	7.41	8.35	3.38	9.01

* Refer text.

GIRLS

A	6487	77.87	4.50	4.10	1.31	12.22
B	9319	75.76	5.98	4.52	1.67	12.07
C	1022	74.95	5.19	3.23	1.27	15.36
Total	16828	76.54	5.36	4.27	1.49	12.44

Table No. I.21 : DISTRIBUTION OF CASES OF GIRLS BY AGE AT MENARCHE AND AGE AT HEALTH DA

Age	Age at menarche							16	17
	10	11	12	13	14	15	16		
10	-	5	40	111	78	-	-	-	-
11	-	10	65	231	228	50	-	-	-
12	-	17	81	363	404	140	10	-	-
13	-	10	91	490	607	295	45	5	5
14	1	6	84	459	823	452	100	10	10
15	-	2	68	388	826	603	148	19	19
16	-	3	53	296	691	599	212	26	26
17	-	2	31	153	435	378	164	40	40
18	-	-	10	56	154	171	87	19	19
Total	1	55	523	2,547	4,246	2,688	766	119	119
Above total schedule per- taining to individuals	1	27	217	924	1,607	1,085	335	53	53

Table No. I.22 : DISTRIBUTION OF MENARCHAL GIRLS BY MONTHLY COURSE INTERVAL DAYS AND BY AGE IRRESPECTIVE OF MENARCHE AGE.

Age	Total No. who supplied information (=100)	Interval days in per cent				
		20 days or less	21 to 24 days	25 to 27 days	28 and 29 days	30 or more days
10	0	-	-	-	-	-
11	3	-	-	-	-	100.00
12	37	-	2.70	2.70	8.10	86.50
13	311	0.96	0.32	-	3.54	95.18
14	974	0.41	1.13	0.51	3.59	94.36
15	1564	0.32	0.64	0.51	3.39	95.14
16	1728	0.17	0.98	0.29	3.36	95.20
17	1163	0.09	0.54	0.18	2.70	96.49
18	497	-	0.60	-	2.41	96.99
Total	6277	0.25	0.78	0.33	3.22	95.42

Table No. I.23 : DISTRIBUTION OF MENARCHAL GIRLS BY MONTHLY COURSE INTERVAL DAYS AND BY MENARCHAL AGE

Age at Menarche	Total No. (= 100) who supplied information	Interval days in per cent.				
		20 days or less	21-24 days	25-27 days	28 and 29	30 or more
10	1	-	-	-	-	100.00
11	30	-	-	-	10.00	90.00
12	335	0.29	1.19	0.29	3.58	94.65
13	1501	0.67	1.00	0.47	4.12	93.84
14	2499	0.08	0.80	0.40	2.92	95.80
15	1467	0.14	0.41	0.14	2.87	96.44
16	386	0.26	0.26 ^{1.04}	0.26	1.81	96.63
17	50	-	-	-	4.00	96.00
18	8	-	-	-	-	100.00
Total	6277	0.25	0.78	0.33	3.22	95.42

Table No. I.24 : DISTRIBUTION OF MENARCHAL GIRLS BY MONTHLY COURSE INTERVAL DAYS, BY HEALTH DATA NOTED.

Interval Group	Age					
	10½	11½	12½	13½	14½	15½
				Menarche Age 10* (1) Menarche Age 11* (30)		
IV			<u>6.66</u>			
V		<u>10.00</u>	<u>16.66</u>	<u>9</u> 23.33	<u>100.0</u> 20.0	<u>6.66</u>
				Menarche Age 12* (335) Menarche Age 13* (1501)		
I				<u>.19</u>	<u>.19</u>	<u>.19</u>
II			<u>.29</u>	<u>.06</u>	<u>.29</u>	<u>.19</u>
III			<u>.29</u>		<u>.13</u>	<u>.26</u>
IV			<u>.29</u>	<u>.59</u>	<u>.89</u>	<u>.89</u>
V			<u>8.05</u>	<u>.59</u> 19.70 <u>14.85</u>	<u>1.06</u> 22.98 <u>25.18</u>	<u>.93</u> 18.20 <u>22.91</u>
				Menarche Age 14* (2499) Menarche Age 15* (1467)		
I					<u>.04</u>	<u>.04</u> <u>.06</u>
II					<u>.28</u>	<u>.20</u> <u>.13</u>
III					<u>.12</u>	<u>.08</u> <u>.13</u>

Contin

Table No. I.24 : continued.

IV	<u>.64</u>	<u>.92</u>
		.88
V	<u>18.28</u>	<u>29.25</u>
		23.85

Menarche Age 16* (386)
 Menarche Age 17* (50)

I
 II
 III
 IV

V

Menarche Age 18* (8)

V

* Figure in bracket is the number of cases/1s^{which} equal to 100.

Table No. I.25 : DISTRIBUTION OF MENARCHAL GIRLS BY MONTHLY COURSE DURATION IN DAYS AND AGE.

Age	Days								Total =100
	1	2	3	4	5	6	7	8 or more	
10									
11	-	-	-	33.33	33.33	-	-	33.33	3
12	-	-	15.38	41.03	15.38	12.82	10.26	5.13	39
13	0.31	0.23	11.11	43.52	24.38	11.42	5.86	2.17	324
14	0.10	0.70	12.11	45.21	24.02	9.08	5.55	3.23	991
15	0.19	0.95	10.73	47.89	24.04	8.45	4.35	3.40	1585
16	0.06	0.80	9.87	47.35	25.74	8.84	3.95	3.39	1741
17	0.26	0.51	10.18	48.16	24.64	9.32	3.59	3.34	1169
18	-	0.40	10.96	48.60	21.12	22.55	3.58	2.79	502
Total	0.14	0.75	10.67	47.18	24.34	9.31	4.34	3.27	6354

Table No. I.26 : DISTRIBUTION OF MENARCHAL GIRLS WITH GYNAEYC DISEASES BY MENARCHE AGE

Menarche age	Total No. (=100)	No. with disease	% of with disease	No. with no disease	% of with no disease
10	1	0	0%	1	100%
11	55	3	5.45%	52	94.55%
12	523	28	5.35%	495	94.65%
13	2547	103	4.04%	2444	95.96%
14	4246	143	3.36%	4103	96.64%
15	2688	73	2.71%	2615	97.29%
16	766	33	4.30%	733	95.70%
17	119	3	2.52%	116	97.48%
18	10964	0	0%	19	100.00%
Total	10964	386	3.52%	10578	96.48%

Table No. I.27 : DISTRIBUTION OF MENARCHAL GIRLS WITH GYNAECIC DISEASES BY AGE

Name of disease	Total No.	years								
		10	11	12	13	14	15	16	17	18
Menorrhagia	58	-	-	2	7	10	12	10	10	7
Dysmenorrhoea	269	-	-	2	15	31	63	65	64	29
Meno+Dysmen.	18	-	-	-	2	3	6	4	1	2
Amenorrhoea	13	-	-	-	1	3	4	2	3	-
Other diseases combined	28	-	-	-	-	7	5	7	6	3
Total	386	-	-	4	25	54	90	88	84	41

Table No. I.28 : AVERAGE HEIGHT, AVERAGE WEIGHT AND AVERAGE CHEST EXPIRATION IN EXAMINED BOYS BY AGE.

Age	Students	Average height inches	Average weight lbs.	Average Expiration inches.
10	1276	52.19	56.76	23.01
11	1658	54.15	63.56	24.39
12	1782	56.13	67.95	24.67
13	2020	56.57	76.15	25.78
14	2200	58.09	77.60	25.96
15	2102	60.21	87.28	27.17
16	1912	59.92	90. ⁴ 98	27.66
17	1289	61.65	100.08	28.82
18	714	63.11	102.21	29.24

Table No. I.29 : AVERAGE HEIGHT, AVERAGE WEIGHT AND AVERAGE CHEST EXPIRATION IN EXAMINED GIRLS BY AGE AND BY MENARCHE AGE

Age	Average			Average at Menarche age		
	Height inches	Weight lbs.	Chest exp. inches	Height inches	Weight lbs.	Chest exp. inches.
10	51.19	57.42	22.72	-	-	-
11	53.07	60.60	23.43	55.9	74.5	26.1
12	54.71	67.00	24.61	57.3	79.0	26.7
13	56.72	73.45	25.81	58.4	82.4	27.0
14	57.92	77.40	26.14	59.0	84.8	27.3
15	57.79	84.88	26.96	59.4	86.3	27.5
16	58.20	88.76	28.29	59.5	86.7	27.8
17	60.32	94.06	28.60	59.5	91.1	28.4
18	59.82	92.33	28.72	60.4	93.0	28.5

**Table No. I.30 : AVERAGE HEIGHT, AVERAGE WEIGHT AND AVERAGE CHEST EXPEIRATION IN EXAMI
(OF MENARCHAL GIRLS FOR EACH CELL WITH FREQUENCY)**

(Note:— H— Height (in.) ; W— weight (lb.) ; C— chest expiration (in.) .)

Age	Normal Average			10				11					
	No.	H.	W.	C.	No.	H.	W.	C.	No.	H.	W.	C.	No.
10	1623	51.19	57.42	22.72					5	52.2	61.6	24.0	40
11	2063	53.07	60.60	23.43					10	55.9	74.5	26.1	65
12	2192	54.71 57.0	67.00 64.61	24.61					17	58.0	86.8	28.0	81
13	2393	56.72	73.45	25.81					10	59.9	96.2	28.6	9
14	2475	57.92	77.40	26.14	1	59.0	99.0	30.0	6	60.7	94.7 ^{2.2}	27.5	84
15	2310	57.79	84.88	26.96					2	60.5	94.5	29.0	6
16	1990	58.20	88.76	28.29					3	59.7	98.0	28.8	5
17	1243	60.32	94.06	28.60					2	62.2	112.5	31.0	3
18	509	59.82	92.33	28.72					-				1
					1				55				5

Table No. I.30 : continued.

Age	Normal average			No.	15	W.	C.	No.	16	V.	C.	No.	
	No.	H.	W.										H.
	78	50.4	51.4	22.4									
	228	52.4	57.7	23.1	50	52.1	55.9	22.8					
	404	54.8	65.0	24.3	140	53.9	62.0	22.6	10	53.7	9.3	23.8	
	607	57.3	75.8	25.9	295	56.4	70.1	24.8	45	55.1	4.8	24.2	5
	823	59.0	84.8	27.3	452	58.2	80.4	26.5	100	56.8	1.4	25.2	10
	826	59.7	90.3	27.9	603	59.4	86.3	27.5	148	58.2	8.8	26.3	19
	691	59.8	93.4	28.6	599	59.8	90.5	28.1	212	59.5	6.7	27.8	26
	435	60.1	94.6	28.8	378	59.9	92.7	28.3	164	60.0	2.8	27.5	40
	154	60.3	98.7	28.5	171	60.1	94.1	28.5	87	59.8	0.9	28.7	19
	4246				2688				766				119

Table No. I.31 : DISTRIBUTION OF BOYS AND GIRLS BY INCREASE IN HEIGHT DURING THE LAST YEAR AND AGE

Age	No. of students	Increase in height (inches)						
		Nil	1/2"	1"	1-1/2"	2"	2-1/2"	More than 2-1/2"
BOYS								
10	155	-	.64	14.83	25.80	29.03	17.41	12.25
11	824	1.21	5.82	13.82	25.97	24.27	13.34	15.53
12	1065	1.22	4.88	14.17	21.40	22.91	14.64	20.75
13	1186	1.34	4.38	13.06	20.32	19.39	15.17	26.30
14	1344	1.48	3.49	9.07	11.97	15.10	15.84	43.01
15	1342	2.38	3.94	6.85	9.76	13.63	16.31	47.09
16	1223	4.90	7.84	10.87	13.00	15.61	14.47	33.27
17	852	13.14	13.49	14.82	14.08	14.08	11.15	19.24
18	461	30.36	19.95	16.26	9.76	7.59	5.20	10.84
Total	8452	4.76	6.57	11.72	15.84	17.16	14.20	29.70
GIRLS								
10	246	0.00	.83	3.65	16.66	32.92	19.91	26.01
11	1094	1.18	.73	5.04	14.64	26.48	22.30	29.61
12	1399	1.28	1.07	4.00	10.00	20.87	25.44	37.31
13	1552	3.09	2.54	6.44	11.72	18.68	19.39	37.11
14	1672	7.59	10.70	15.07	15.49	17.34	16.02	17.76
15	1643	16.92	21.11	21.30	15.58	10.77	7.54	6.75
16	1430	29.65	29.02	22.86	9.51	5.17	1.95	1.81
17	890	38.31	32.80	18.43	6.85	2.24	.44	.89
18	350	47.71	34.57	12.85	3.42	.85	.28	.28
Total	10276	13.77	13.95	13.26	12.10	14.74	13.38	18.77

Table No. I.32 : DISTRIBUTION OF BOYS AND GIRLS BY INCREASE OR DECREASE IN WEIGHT DURING
LAST YEAR AND AGE -BOYS

Age	No. of students (=100)	Increase in weight (lb.) per cent						No decrease
		1 - 3	4 - 6	7 - 9	10 - 12	13 - 15	16 and above	
10	147	29.91	31.29	15.64	13.60	2.04	2.04	-
11	825	22.54	34.06	16.36	11.51	4.24	1.93	5.45
12	1047	24.4 20.43	29.03	20.91	13.94	3.62	6.49	2.20
13	1189	13.87	24.05	19.84	17.32	6.89	10.00	3.78
14	1341	9.39	15.13	19.23	20.87	13.94	17.44	2.01
15	1338	6.35	14.20	16.14	22.34	15.84	20.10	2.10
16	1299	6.62	14.24	16.08	18.70	13.85	18.24	3.23
17	845	12.18	17.75	19.40	17.15	10.41	12.18	5.68
18	469	15.35	17.91	20.89	14.07	6.39	7.03	7.67
Total	8420	12.83	20.54	18.50	17.81	10.15	12.85	3.49
		Decrease in weight (lb.)						
		1-3	4-6	7-9	10-12	13-15	16 & above	
10		4.08	1.36	-	-	-	-	
11		3.15	.72	-	-	-	-	
12		2.67	.57	.19	-	-	-	
13		3.02	1.00	.08	-	-	.08	
14		1.26	.44	.22	-	-	-	
15		2.09	.29	.22	.07	.07	.14	
16		1.77	.69	.15	.07	.07	.07	
17		2.84	1.18	.59	2.36	-	2.36	
18		5.97	3.19	.85	.42	-	.21	
Total		2.55	.83	.23	.07	.02	.08	

Table No. I.32 : continued.

GIRLS

Age	No. of students	Increase in weight (lb.) per cent						No decrease
		1-3	4-6	7-9	10-12	13-15	16 and above	
10	241	11.61	36.51	26.14	15.35	4.56	2.48	-
11	1095	12.69	29.40	22.38	16.62	6.84	5.57	2.92
12	1399	8.43	22.73	21.80	20.87	10.15	10.22	3.00
13	1554	6.43	16.15	17.69	25.22	13.83	14.54	3.04
14	1676	8.71	16.70	20.94	21.30	12.76	12.76	3.46
15	1649	13.34	20.67	18.92	18.61	8.48	7.58	4.97
16	1441	19.08	24.14	17.97	11.72	4.64	3.26	7.49
17	901	24.86	21.42	12.31	9.10	2.77	2.21	7.88
18	358	20.11	23.18	13.68	6.42	3.91	1.30	9.21
Total	10314	12.81	21.56	19.10	17.94	8.75	8.20	4.60
		Decrease in weight (lb.)						
10		2.09	.82	-	-	-	-	-
11		1.91	.45	.18	.09	.09	-	-
12		1.71	.71	.21	.07	.07	-	-
13		2.18	.57	.19	.06	-	-	-
14		2.08	1.01	.11	.11	-	-	-
15		4.36	2.00	.73	.30	-	-	-
16		7.28	3.33	.90	.06	.06	-	-
17		11.98	4.99	1.55	.66	-	.22	-
18		10.89	6.70	3.07	.83	.27	.27	-
Total		4.29	1.87	.58	.20	.03	.02	-

Table No. I.33 : DISTRIBUTION OF BOYS AND GIRLS BY DIFFERENCE IN CHEST INSPIRATION AND EXPIRATION AND BY AGE

Age	No. re- porting	1/2"	1"	1-1/2"	2"	2-1/2"	More than 2-1/2"
BOYS							
10	1276	.86	23.19	34.16	32.75	6.03	2.97
11	1659	.66	19.46	31.22	34.90	8.80	4.94
12	1779	.84	15.45	28.94	38.56	8.88	7.30
13	2017	.94	12.89	25.08	39.61	11.45	10.01
14	2197	.45	11.01	23.35	39.96	11.51	13.70
15	2099	.42	9.09	19.00	38.54	13.91	19.00
16	1911	.20	7.95	17.00	40.86	13.71	20.25
17	1287	.31	6.91	16.62	38.38	15.92	21.83
18	714	.27	6.44	14.28	41.17	14.00	23.80
Total	14939	.56	12.54	23.61	38.40	11.54	13.32
GIRLS							
10	1624	2.46	12.50	34.42	34.11	7.45	9.05
11	2062	1.89	11.34	32.78	35.30	8.82	9.84
12	2192	1.64	13.32	30.79	37.08	8.34	8.80
13	2390	2.00	12.34	32.67	36.02	7.78	9.16
14	2468	3.20	14.22	32.05	37.64	6.32	6.56
15	2298	3.56	15.75	32.63	36.29	6.13	5.61
16	1991	4.36	17.42	31.59	36.11	5.12	5.37
17	1236	3.15	15.69	36.97	35.03	5.33	3.80
18	505	3.16	18.81	29.30	39.00	5.14	4.55
Total	16766	2.77	14.15	32.60	36.19	6.93	7.33

Table No. I.34 : AVERAGE SCORES SECURED BY BOYS AND GIRLS AT SPECIFIC AGES ACCORDING TO DR. BHUSRATH'S NUTRITION INDEX AND TO P.T. STANDARD TABLE.

Age	Students number	Marks for height	Marks for age	Marks for weight	Total weight +age+ weight marks	P.T. class obtained	Nutrition Index as per Dr. Bhusrath
BOYS							
10	1276	2	1	0	3	A	10.85
11	1658	4	3	1	8	A	11.74
12	1782	6	5	2	13	B	12.03
13	2020	6	7	4	17	C	13.50
14	2200	8	9	4	21	C	13.33
15	2102	10	11	6	27	D	14.54
16	1912	10	13	7	30	D	15.16
17	1289	12	15	9	36	E	16.29
18	714	13	17	9	39	E	16.22
Total	14953	71	81	42	<u>194</u> by 9 items Av. 21.56		
GIRLS							
10	1623	1	1	0	2	A	11.26
11	2063	3	3	1	7	A	11.40
12	2191	4	5	2	11	B	12.18
13	2393	6	7	3	16	C	12.98
14	2475	8	9	4	21	C	13.44
15	2310	8	11	5	24	C	14.65
16	1990	8	13	6	27	D	15.21
17	1243	10	15	17	32	D	15.70
18	509	10	17	7	34	D	15.50
Total	16797	58	81	45	174 divided by 9 = Av.Total No.19.33		

Table No. I.35 : PHYSICAL TRAINING STANDARD TABLE FOR SCORING MARKS

Marks	Height inches	Age in years and months	Weight in lbs.
-2	Below 46	Below 9 years	Below 50
-1	46 to 47	9.0 to 9.5	50 to 55
0	48 - 49	9.5 - 9.11	56 - 59
1	50-51	10.0 - 10.5	60 - 65
2	52 - 53	10.6 - 10.11	66- 70
3		11.0 - 11.5	71 - 75.
4	54 - 55	11.6 - 11.11	76 - 80
5		12.0 - 12.5	81 - 85
6	56 - 57	12.6 - 12.11	86 - 90
7		13.0 - 13.5	91 - 95
8	58 - 59	13.6 - 13.11	96 - 100
9		14.0 - 14.5	101 - 105.
10	60 - 61	14.6 - 14.11	106 - 110
11		15.0 - 15.5	111 - 115
12	62 - 63	15.6 - 15.11	116 - 120
13		16.0 - 16.5	121 - 125
14	64- 65 64- 65	16.6 - 16.11	126 - 130
15	66 - 67	17.0 - 17.5	131 - 133
16	68	17.6 - 17.11	134 - 136
17	69 and over	18 and over	137 and over

Note:- Kindly supplied by Shri D.G.Wakharkar, State Inspector for P.E.I., Bombay State.

Table No. I.36 : P.T. SCORE GROUPINGS

Sum of marks	Group
9 and below	Elementary - A
10 to 14	Sub-junior - B
15 to 24	Junior - C
25 to 34	Sub-senior - D
35 to over	Senior - E

Table No. I.37 : DAILY AVERAGE EXERCISE IN MINUTES TAKEN BY BOYS AND GIRLS BY AGE

Age	Boys		Girls	
	No. of students	Exercise taken daily Av. minutes	No. of students	Exercise taken daily. Av. minutes.
10	1407	32.5	757	28.5
11	1796	29.0	908	27.5
12	1936	28.5	999	29.75
13	2110	23.75	1051	26.5
14	2523	25	1084	26.5
15	2482	22.25	1609	20.5
16	2546	19.25	1037	18.75
17	1878	17.5	738	16.75
18	1126	16.25	379	16.75

**Report of the Statistical Analysis of the Health
of Pupils in Poona between the ages 10 and
18 with special reference to their Height
and Weight, and Menarche in case of Girls.**

PART II: - Statistical -

B Y

Dr. (Mrs.) Kamalabai Chitale.

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Questionnaire, revised in the light of previous experience.

...

SECTION I:

Historical Resume* and Introduction:

1. Special importance of this age period - years of ages 10 to 18.

The rate of growth of the body, measured by weight and stature (i.e. height) increases very rapidly until the fifth month of the foetal life. From this time on the rate of growth decreases, first rapidly, then more slowly, until about four years before the age of puberty i.e. about the age between 9 and 11. During ADOLESCENCE the rate of growth is considerably accelerated, and decreases again rapidly after sexual maturity has been reached. Thus a curve of growth represents a line which possesses a very high maximum at about the fifth month of foetal life. It decreases rapidly and has a second although much lower maximum shortly before sexual maturity is reached, and long afterwards reaches the zero point. The increase in bulk of the body i.e. weight continues much longer than that of length. In the beginning the rates of growth of the two sexes are about equal, that of male probably exceeding slightly that of the female. Since however sexual maturity begins to develop earlier in the female than in the male, the concomitant acceleration also sets in at an earlier time, with

* Among other references Beas (1932 & 1940) & Flemming (1949) have been liberally used.

the result that for a few years girls have a large bulk of body than boys. Not all individuals pass through these stages of development with equal rapidity.

Striking physical and emotional changes announce the onset of puberty. The straight, compact, childish body of the individual lengthens and becomes heavier, the shoulders and the chest of the boy broadens, the girls figure become rounded. Primary and secondary characteristics develop. The features lose their childish chubbiness and begin to take on contours of an adults. The changing body is accompanied by a quickening of the entire tempo of life, an intensification of feeling responses even to sensory stimuli, and the appearance of strange and disturbing erotic sensations.

Importance of this period was recognised since early times. This period is more transitory and less definite than the long period of childhood of relative dependency and the still longer period of adulthood of self-sufficiency. The beginning of adolescence is fairly well recognised but the end is left vague. Many societies signalise the beginning of adolescence by elaborate puberty ceremonies as performances of traditional ritual acts. In Western countries this group started receiving investigational status during the latter half of the nineteenth century in the course of the study of human biological functioning, the health of civil and military students, and inmates of peer asylums, and delinquents in society.

2. Limitations and findings of published reports of investigations.

Fifty years ago the results of the investigations, including those of large numbers of different boys and girls at various ages, were presented in the form of averages without any indication as to the variations and an illusionary impression of regularity of growth was conveyed by the graphs which portrayed the findings of such measurements for different groups. When, for example, graphs were constructed which showed the average heights of groups of boys and girls at different ages from one year to twenty, there was a temptation to forget that an average represents merely the central tendency of a set of findings and that there are necessarily many normal girls and boys whose actual dimensions differ very considerably from those of the average of their group. Observation of the groups showed marked acceleration at certain ages and statements were made which implied an expectation of the uniform appearance of increased growth at these periods - about the age 10-1/2 for girls and 12-1/2 for boys. There was a tendency to label as abnormal the development of those boys and girls in whom it failed to appear and also a tendency to exaggerate the extent of differences between all members of the groups of girls and boys. Older reports tended, by their method of presentation, to over-emphasise the sameness of this sequence. If, however, a calculation is made of the extent of variation from the mean of these measurements at each age, it is more easy to realise both the degree of overlapping in

actual dimensions from one year to another and the wide differences at each age between the most fully developed child and the least mature. The recognition of this overlapping and the differences is probably the most important finding of the second quarter of this century, predominantly due to the statistical work of Karl Pearson and others.

So one method of analysis of these data was to calculate averages and the variations at each age for boys and girls separately. Another type of analysis of such data was in terms of average yearly increments in growth. When this was done it was shown, in the case of height for example, that the average height (length) of boys is somewhat greater than that of girls at birth, that it increases approximately at the same rate to about the age eight, that the rate of girls then begins to exceed that of boys and that this relatively larger increase maintains itself for approximately five yearly measurements. About the age of ten therefore the average height of girls equals that of boys. From the ages of 11 to 14 their yearly increment is greater than that of the boys, but from ages thirteen to nineteen their annual increment decreases steadily to such an extent that by the age of 15 the boys on the average have again become somewhat taller. An even more spectacular difference in the relative increment of growth is reported in the girls' increase in weight about the age of 11 and the boys' spurt about the age of 14.

In recent long term studies which report data obtained from successive measurements of same individuals over a

period of years it has been revealed very clearly that (i) all adolescents do not experience their period of maximum growth at the same age; (ii) so the pronouncements upon the physical attributes of adolescents in terms of group averages and comparison of individuals with the average measurements of their contemporaries are more hazardous and misleading than is such a use of averages in early childhood (upto the age of 8 or 9 or earlier) or in adult life (age of 19 or 20 and over); (iii) the nature of the degree of variability in the development of boys and girls is such that each seems to follow his own pattern of growth in relation to the average of the group; (iv) there exist other differences between early and late maturing adolescents.

Development rate is not uniform in all bodily organs. The origin and extent of such discrepancies have been the subject of extensive studies in recent times. There has in consequence been a considerable increase in knowledge of the endocrine changes which are believed to be involved in growth and development such that premature sexual development is followed by premature cessation of bodily growth, on the other hand, in cases where sexual development is too long delayed, the growth of the limbs continues to disproportionate extent.

3. References to some recent studies.

Results of one of the most comprehensive studies of some 2,000 pupils of the Psycho-Educational Clinic of the

Harvard Graduate School of Education with semi-annual observations for a continuous period of 12 years, relating to physical measurements, intelligence tests (both verbal and non-verbal), scholastic achievements, personal attributes and family history are given in Dearborn*. Contributions of others which are not so comprehensive are also referred (Flemming 1949). Mention has to be made of the series of articles entitled "Studies in Growth" by Franz Boas in the early volumes of Human Biology (1932-35).

4. Criteria of Maturity.

It is not, of course, easy to determine the most satisfactory criteria of physical maturity. The frequent irregularity of menstruation in the first few years after its appearance and the fact that this overt criterion is not useful for boys make it less useful than other criteria such as skeletal age (determinable from X-ray photographs of the growing areas of bones in the hand or the knee) or the simpler measure obtainable from recording the period (yearly or six-monthly) in which a child shows the most rapid growth in bodily size. There are secondary and tertiary characteristics of maturity e.g. change in pulse rate and blood pressure, swelling of the breasts in girls (and occasionally in boys), the appearance of pigmented pubic hair and later of hair under the arm-pits

* Dearborn W.F. and Rotheney J.W.M: Predicting the child's Development. 1941.

in both boys and girls, voice changes and more or less sturdy growth of facial hair in boys (and sometimes in girls). There are so many individual variations in the rate of development of each and each other secondary characteristics that no two of the normal group of adolescents may prove to be experiencing quite the same rate or incidence of growth. Thus overtly and easily accessible criteria of maturity - according to which individuals can be grouped for fruitful statistical analysis of age-wise physical characteristics such as height, weight, chest circumference, etc. separately as well as jointly - would be the period of rapid growth for both boys and girls. In the case of girls, however, the age at the first menstruation gives a good criteria. In the former case long series of observations for nearly ten years beginning with the age 10 for a sufficiently large group of same individual would be necessary with preferably semi-annual, interval of consecutive measurements.

5. Limitations of the present study.

Any acceptable criterion of segregation is not so easy a problem as initiation of primary and secondary apparent effects of puberty is spread over a longer interval over the age-continuum. In the case of girls, the overt recognizable fact of the first menstrual course may broadly be taken as heralding the well past occurrence of the pubertal spurt. Segregation of the girls into groups having first menstruation in the same age interval is one of the

available methods of study. Only draw-back in its use, if at all it is to be called a draw-back, is the non-availability of so simple a criterion for segregating boys. Nevertheless it appears that this will be useful for the study of the relation of menarche with somatic and psychological developments during adolescence. Stature and weight are the important somatic characteristics and these will be studied in detail with the pubertal age segregation of girls in the following sections.

Another criterion of segregation, which was largely used in many of the recent Western investigations, was of grouping individuals according to maximum rate of growth, more particularly in stature. One main hazard for this is the necessity of having continuous observational data of the same individuals for longer period at short interval, say six-monthly. This is applicable for both boys and girls and will yield comparable pointers almost on all pertinent issues. Our present data fell short in that the period of continuous recording was of only four years annual data of individuals with latest age at report being any one from 13 to 18. To exactly locate the interval of maximum increment is extremely hazardous as there should at least be three to four years data on either side of the period of the maximum rate of growth. However, an attempt is made to utilise this type of available information.

The tempo of development of the body during adolescence varies along the different traits of the body,

stature reaches its high limit at round about the beginning of adulthood. Increase in bulk of the body (weight) goes on longer. Though both these characters depend, on heredity and the individual physiognomy, the environmental factor bears some influence on the shaping of the bulk of the body.

6. Comparability of certain generalisations with the aid of our data.

With the limitations of our data, we will be in a limited position to verify more exhaustively the pattern of growth in girls. But it would not be possible to do much by way of either comparison or special deductions in the case of boys except presenting the averages with standard deviations, and correlation between physical characters at each of the ages 10 to 18.

The nature of such generalisations in case of girls would be:

- i) In the interval of rapid growth, the correlation coefficient would also be maximum;
- ii) Earlier the menarche occurrence, stunted the growth and larger the bulk of body in later years;
- iii) Tall girls get menarche earlier;
- iv) Small variability amongst segregated series in comparison with that in the total pooled series for the same years.

7. Social and Community importance of such studies.

When physical measurement studies are supplemented by psycho-analytical ones e.g. administering of intelligence tests, results and deductions will prove useful in vocational, dietic and hygeinical planning for the future. "Efforts to produce greater similarity by organised exercise or additional feeding are in most cases foredoomed to failure and merely increase the difficulties of the adolescents who are already sufficiently burdened with the complications attendant upon their endeavour to adjust their ways of living to their own changes in bodily structure." (Flemming 1949 p.11)

8. Outline of the analysis presented.

Data used for the statistical analysis here was collected as a part of the general annual medical check-up of high school pupils in Poona. Detailed analytical treatment is confined to only two of the physical characteristics i.e. height and weight separately and jointly at each of the ages 10 to 18 for boys, for girls and for each of the segregated group of girls by menarchal age 11 & 12, 13 to 16 and 17 & 18. Similar agewise presentation is also carried out for the physical measurement of chest expiration. Tables of averages, variabilities, and the rate of growth as measured by the difference between the consecutive averages relating to Stature and Chest Expiration are discussed in Section II and those relating to Weight in Section III. Similar treatment of correlation between height and weight will be found in Section IV. The

menarchal peculiarities will be brought together and the accumulation graph and table relating to the menarchal incidence by age in the population will form the Section V.

In Section VI are given the linear relationships of height and weight for specific ages and also is given in a tabular form the calculated statistical constants i.e. correlation coefficient, average height, average log-weight, the first with the standard error and the other two with their standard deviations - and then the linear regression equation. There will be eight such tables. An equal number of such tables which will have the heading - Weight (in Lb.) for each inch of Height: Girls with Menarchal Age - (say 15) at ages 10 through 18, will follow. The last Section VII will be devoted for concluding remarks as such.

9. Definitions and some explanations.

Age: All throughout this part, as in the previous one, the age is noted in years and when the word 'age' is unqualified or not it means the age in completed years of the pupil at the time of the medical examination. This usage is uniformly adopted in tables and the report.

Log_e Values: All logarithms are with the base 10.

Variability: This is often used as synonymous with the well known statistical term standard deviation usually abbreviated as s.d.

Case or Schedule: A separate set of data relating to a pupil forms a case or schedule. So maximum number of

- 12 -

schedules pertaining to one pupil included in this report would be four. Frequencies are given in Table No. II.1.

Mode of taking measurements; Detailed explanation relating to the measurements of stature and weight is noted in the Section VI - Statistical Note.

...

:SECTION II:

Stature by Sex and Age:

1. Uniqueness of stature.

Of all the bodily measurements stature received predominant attention at the hands of the investigators and research workers since long time. Its unique character can best be gauged by the absence of any invented accelerators and regulators excepting the recent experimental stage of Hormone therapy for the treatment of individual height. So the representative character stays unique in addition to its amenability to simple measurement. Another characteristic of this measurement is that the increase in height comes to an end some time in the beginning of adulthood. Even though of common place occurrence is the dependence of height on age in cases of children and teen-agers with the peculiarity that knowing of age is not sufficient to guess height accurately as heights are scattered over an appreciably large range in a frequency distribution, characteristic of that age. But the mean, one of the features of the distribution, will be a continuous function of age.

2. Average Height By Age (Both Sexes):

Average height for each age in the range 10 to 18 for total boys and for total girls as well as for menarche-segregated series is shown in Table II - 2. Average stature of total boys and total girls at age 14 was a little less than 59" and below this age girls were found to be

taller than boys and above, the position was reverse i.e. boys taller than girls. The higher limit of the average height for girls was observed to be 60". Considering this in relation to the menarche-segregated series of girls it would be clearly brought out that this high limit was attained at the age about 14 to 15 in the series of those who had menarche at the age 14 or below, and at the age 17-18 by those who had menarche at the age 15 or later. Giving due allowance for the short continuity of this data it was clearly observable that the early menarche had nothing to do with stunted growth.

3. Annual Increments in Height:

These are given in Table No. II - 4. These were simply obtained by taking the difference between average values at successive ages. In each series there would be a high figure of increment sloping downwards on both sides as successive ages. In the series of total girls it was between the ages 12 and 13; and a little less high at the age 11-12. It went on diminishing till it was nearly zero at age 17-18. In the series of total boys the high was placed at the ages 13-14 and 14-15, with the gradual decline at upper ages and would reach the value zero at an age beyond the age 18.

The location of the high increment in the menarch-segregated series would be observed to have taken place at an age about one or rather one and half years earlier than the

menarche age. The occurrence of spurt and its time lag in relation to the menarche age was obscured in the information given by the total girls-series.

The rate of growth in stature is recommended as a criterion to be used in the segregation of the data of boys and girls, to utilise such procedure needs data continuous over longer duration, say from age 10 to at least age 20, having successive measurements at shorter intervals, at least half-yearly, in order to enclose in the right moment of the occurrence of spurt. In the absence of the availability of this procedure recourse was taken to the readily available information relating to the menarche age in the case of girls. Some such procedure could not be utilised for the case of boys and so the information was presented for all the boys group.

4. Variability:

Similar to the table of average stature, the corresponding standard deviations are presented in a separate table (Table No. II - 3). This was done for the simple reason of readily available comparability. It is well-known that nearly two-thirds of the total frequency is found to be distributed in the interval plus and minus the standard deviation round the average, and only 5% are beyond the range of plus and minus twice the standard deviation.

Variability among total boys was found to be wide as compared to total girls from age twelve and onwards. The wideness of the variability suggests the necessity of

segregating. This will become apparent from observing the effects of menarche-segregation for girls. The variability amongst any of the menarch-segregated series will be found to be less than that for the total girls at all ages. In short the variability gets narrowed down, a sign of a relatively homogeneous grouping.

SECTION III:

Weight by age and sex:

1. Introductory.

Throughout the discussion of weight it is to be borne in mind that weight of the individual, particularly in the growing stage, largely depends on the economic living conditions at home, the other contributory factors being heredity, environmental conditions, etc. In the course of the study height is the only related factor with which weight has been correlated exhaustively. What has been said regarding height and age is generally so with reference to weight and age with the difference that there cannot be any postulated upper limit to the growth in weight during the period under study or even afterwards more due to the availability of weight *baseline*. The trend simply depicts the existing situation.

2. Average Weight by age and sex.

The averages given in Table No. II - 5 are geometric. These were obtained in the course of fitting linear regressions ~~in-the-course~~ between height and weight for various ages. Adoption of the logarithmic value of weight instead of absolute one is explained in the Statistical Note later. Geometric mean is always lower than the arithmetic average but at the same time it (the geometric mean) possesses an additional important feature of being less affected by the extreme values in the series. It is interesting to compare figures of this table with appropriate ones in Table Nos.

I - 28 to I - 30. For the series of total boys and of total girls the arithmetic means are greater than the corresponding geometric means. The similar pattern would be observed in those of menarche with the difference that the narrower differences in the types of averages might be most likely due to the more homogeneous assembly of the data due to segregation.

All the points regarding the trend and agewise peculiarities made out in the previous Section, regarding average height more or less equally hold good in the case of average weight and so will not be duplicated.

3. Annual increments in weight.

Similarly it would be found to be true in the case of annual increments in weight. The annual increments in weight are presented in Table No. II - 6.

SECTION IV: Correlation between Height, Weight and Age:

1. Introductory.

Correlation coefficient itself is void of scale utility still it possesses the utility value due to its being an indicator of degree of association between the two observations under study. In the present study we are concerned with the correlatory relation between weight and height in connection with age separately as well as jointly. In the derivation of the correlation coefficients logarithm of weight were used throughout for reasons explained earlier and later.

2. Correlation Coefficients.

Correlation coefficients at observed ages 10 through 18 between log. Weight and Height for the series of total boys, of total girls, and 8 menarche-segregated girls are shown in Table No. II - 8. All these were found to be significant at 0.10 level. Many of these indicated very high significance. Similarly high significant value of the correlation between age and height for total boys series was 0.80 and between age and log. weight was 0.79. Nearly the same values were in the case of total girls series. The high amongst the values of correlation coefficients for the total boys series was 0.83 at the age 15 gradually lowering down on the left to 0.75 at age 12 and steeply coming down on the right to 0.58 at age 17. More or less the similar pattern of relative placings was observable for the total girls series the high of 0.79 being at age 12 and for menarche segregated series it would be found to be at an age one or one-and-half years earlier to the menarche age.

:SECTION V:

Menarche and its influence on
Weight & Height:

1. Preliminary.

In Section III (Menarche) of Part I of this report, it was made clear that menarche simply means, for the purpose of this study, the on-set of first monthly course without going into the merits of the controversial aspects of the definition of puberty, menarche, etc. Menarchal period was simply used as a readily available indicator for segregation and thus try to study the location of the pubertal spurt in relation to the occurrence of the first monthly course. Some such overt and simple criterion was not available for partitioning boys. We had at our disposal the period of menarche in annual intervals. It needs to be remembered that at the time of the medical examination it was not possible to narrow down this period of occurrence to even a particular month. This rather long annual interval would have been one of the reasons of over-lapping and erroneous mixing of individuals of adjacent ages in segregating, the relative position in the short period of continuity remaining unchanged.

2. Menarche with its relation to height and weight.

Average menarchal age was found to be 14.120 with s.d. plus minus 1.089 (See Table No. I - 21). Menarchal occurrence was found to be preceded by pubertal spurt by nearly one or one-and-half years. This became quite clear in

relation to height as well as weight in the earlier sections. Prior and after the spurt the annual increases in height and also in weight went on lowering year after year more rapidly on the right than on the left.

3. Accumulation Curve.

In order to throw light on the pattern of menarche in girls, the adoption of the common cumulative-frequency curve, generally known as Ogive, will be of very little use. This curve is satisfactory only when the property under consideration has been experienced by the cent percent of the population and there is no place for those who have not experienced this. On the contrary this technique is unapplicable when only a part of the population is eligible for experience in each age group. A satisfactory statistical tool, styled as Accumulative Curve (Kinsey, et al. 1948) will be useful to show the number of experienced in the age group in relation to the total number in that group. The only draw-back in such a curve is that it is less accurate near its end as the population which establish the successive points on the curve become smaller at the upper age levels. Such a curve is useful in visualising at a glance the per cent of the population which have had the experience by the given age. Another usefulness of such a curve is that it furnishes a good base for predicting what percentage of the population of any group will ever be with the experience, care being taken that the attached meaning should not too much be stretched.

4. Accumulative Menarche-Incidence Curve.

The experience of menarche at particular age for girls during the ages 10 through 18 is suitable for such type of presentation. This is presented in Table No. II - 9. The column headings in this table are self explanatory. Still the implied meanings are: (1) age at menarche; (2) summation of Col. 1. This is the Ogive; (3) ages at reporting, of experienced individuals; (4) Summation of Col. 3, one step in advance. This represents the ages which the experienced individuals had not yet reached at the time they were examined; (5) Substraction of Col. 4 from Col. 2. This represents the years actually lived by the experienced individuals; (6) ages at the time of medical examination, of inexperienced individuals; (7) addition of Cols. 3 & 6. This is the age distribution of all the subjects (both experienced and inexperienced) at the time of medical examination; (8) Summation of Col. 7, in reverse. This is the basic population for incidence calculations at each age; (9) Division of Col. 5 by Col. 8. This is the percent of the population at each age with the experience in that year, or in any previous years.

From this table it will be clear that nearly 99.2 percent of the girl population experience menarche by the age 18 or earlier.

SECTION VI:

Statistical Note relating to linear regression of
Weight (Logarithm of) on Height:

1. Preliminary.

The data used for this analysis was obtained in the course of the medical examination of the pupils of the Secondary Schools in Peona, of ages 10 through 18 studying in Standards V to XI during the years 1953-54 to 1956-57. Height was measured correct to a quarter inch when the individual was in a position standing erect against the vertical scale with eyes straight in front with footwear (along with the socks, rather rarely in use,) removed. Weight was recorded in whole pounds when the individual stood straight on the platform of the weighing machine with eyes in front without foot-wear but with outdoor conventional routine wearing apparels on; five-yard Sari with skirt and blouse by almost all girls; and shirt and short of stiff cloth or white pyjamas by boys invariably. Total apparel weight would come to about two to five pounds for both boys and girls. Weigh-scale dials were graduated for stone and pound.

2. Weight-Height Relationship.

Frequency tables of weight and height for each age from 10 to 16 were prepared. For the purpose of this analysis heights were pooled into one inch interval groups to remove observational bias. Strong bias for even figures

was observed in recorded weights. Convenient method of smoothing adopted was to half the frequency of old weights and to add these in the adjacent even ones in each of unit interval height. These modes of smoothing were uniformly adopted in finalising the form of weight-height bivariate distribution tables used for this analysis. Preliminary calculations of the correlatory analysis were worked out before finalising the uniform procedure, in the cases of five finalised tables. It was revealed that the standard deviations of actual weight for each inch of height went on increasing as height increased and the corresponding coefficients of variations were observed to be very nearly the same. This plainly pointed out the use of semi-logarithmic relation between weight and height. (Kenney & Keeping, 1952, Part II p. 210). The analysis of variance also showed the significant effect of linear regression of weight on height.

Finally corrected for bias i.e. the smoothed frequency tables of height and logarithm of weight instead of actual weight were used in computing by standard procedures the necessary statistics means, standard deviations, and covariances needed for the correlation analysis and subsequently for calculating the regression constants. These were obtained for each age from 10 to 18 for total boys series, total girls series, and for each of the menarche-segregated series.

The correlation coefficients, regression equations, and standard errors of estimate are given in Table Nos. II - 10 to 17.

3. Weight-Height Standard Tables by Age and Sex.

Substituting in these regression equations of logarithm of weight (lb) on height (inches) for the age the serial values of height in whole inches incorporated in the range 10 inches on either side of the rounded integral value of the average height, corresponding expected mean values of weight were calculated. Adding to and subtracting from the mean weight, twice the standard error of estimate, the upper and lower limits were obtained which between themselves would cover 95 per cent of the individuals of that height and age. In all these conversion by use of anti-logarithm tables was effected at the last stage. These weight values are presented in Table Nos. II - 18 to 25.

4. Weight-Height-Age Relationship.

Regression equations referred in para 2 of this Section relate to weight and height only for each specific age. An attempt was made to introduce age as an additional variable in the regression equations for the two series of total boys and total girls. The partial correlation coefficients were found to be highly significant and the multiple correlation coefficient was also found to be high. All the relevant coefficients together with the equation are noted

down in Table Nos. II - 26 & 27 for the series of total boys and of total girls respectively. Using these equations standard mean weights with lower and upper limit values for the mere purpose of illustration, were calculated for heights at quinquennial intervals starting at 40" for age 10 to 18.

5. Remarks on Weight-Height Tables.

It would be observed that in these tables depressive values show their presence in case of series of weights which should generally be increasing for the same height at increasing ages i.e. Table No. II - 21 height 54" and age 17. To reason out this occurrence satisfactorily was rather found to be difficult. But a suggested course in such a situation would be to adjust the depressed value in alignment with the trend traced by weight values for pre- and post-ages at the particular height in question. Computed figures in these tables are presented without any adjustment.

Occurrence of such a phenomenon in menarche-segregated series of tables might be due, amongst other things which remain unexplainable, to relative smallness of the frequencies in the available data. Adjustment suggested in the previous para might be resorted to, when the use of these tables would be contemplated. Chief object in presenting these weight-height for menarche-segregated series had been to show the lay-of-the-land in order to suggest usefulness in actual practice.

6. Comparison of various standards relating to weight by age and height presented in this report.

For the purpose of ready comparison the table No. II - 28 is constructed by bringing together the calculated weights for average or for nearby average height for each of the ages 10 to 18 for both total series of boys and of girls, presented in both parts of the study. We do not know of similar other material, otherwise it would have been placed along with this to facilitate comparison.

Standards of weight and height by age (Table No. I - 4) as devised by the Students Health Association, Poona, in 1953 and later on used to grade pupils in health classes in subsequent examinations are noted in the first row (a) of the table. This is followed by (b) direct averages from Table Nos. I - 28 and 29; by (c) geometric mean weights and average heights at each age, as obtained along with the computations of correlation coefficients and presented in Table Nos. II - 2 and 5, by (d) the value of weight against the average height for the age from the computed standards with two variable regression (Table Nos. 18 and 19) and in the last row (e) with three variable relation (Table Nos. 26 and 27).

This clearly shows that the SHA 1953-standard weights are comparatively high on the average. The two variable regression affords a good means for computing standards. The three variable regression also gives values representing a realist picture round about and rather tending

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towards unrealistic for points away from the average values of the variables. This limits its use for the calculation of the standard weights for heights and ages.

SECTION VII:

C o n c l u s i o n :

The object of the statistical analysis of weight and height in relation to age by sex was to fill out a gap relating to the availability of a type of standard tables pertaining to our conditions. Upto this time the standard weight-height tables were those found in medical textbooks, predominantly foreign relating to foreign situations. Only experience would prove their utility and confirm the success attained in the fulfillment of the objective.

A c k n o w l e d g e m e n t :

And lastly, I have to express my great indebtedness and heartfelt thanks to the authorities, Shri. P.N.Mathur and Shri. D.V.Deodhar, of the Gokhale Institute of Politics and Economics, Poona 4, for carrying out to completion with active participation the statistical analytical part, presented as Part II of this Survey Report. The latter, in particular, rendered great help and took great pains in preparing drafts and finalisation of the Report.

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TABLE NO. II.1: Frequency at ages 10 to 18 for all boys, all girls, and menarche-segregated series.

Age	Age at Menarche						(No.)	
	11 & 12	13	14	15	16	17 & 18	All Girls	All Boys
10	45	109	78	-	-	-	1622	1275
11	75	231	227	50	-	-	2063	1658
12	97	362	404	140	10	-	2191	1781
13	101	488	606	294	45	5	2392	2018
14	91	459	822	451	99	10	2475	2196
15	69	386	825	603	147	22	2308	2085
16	56	295	688	599	210	29	1988	1897
17	33	153	435	377	164	45	1243	1278
18	10	56	154	171	87	26	504	707

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TABLE NO. II.2: Average Height at ages 10 to 18 for all boys, all girls and menarche-segregated series (In.)

(In.)

Age	- Age at Menarche -						All Girls	All Boys
	11 & 12	13	14	15	16	17 & 18		
10	52.74	51.72	50.70	-	-	-	50.82	50.86
11	55.53	54.00	52.64	52.40	-	-	52.81	52.52
12	57.86	56.66	55.07	54.06	54.00	-	55.03	54.44
13	59.16	58.72	57.62	56.65	55.37	52.30	57.27	56.47
14	59.59	59.62	59.24	58.53	57.28	55.80	58.74	58.85
15	60.30	60.17	59.96	59.64	58.66	56.91	59.64	61.10
16	60.07	60.32	60.16	60.09	59.91	58.43	60.04	62.68
17	59.71	60.37	60.32	60.21	60.22	59.85	60.22	63.83
18	59.50	60.37	60.49	60.36	60.07	60.19	60.33	64.49

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TABLE NO. 11.3: Variability in height at ages 10 to 18 for all boys, all girls, and menarche-segregated series (In.)

							(In.)	
- Age at Menarche -							All	All
Age	11&12	13	14	15	16	17&18	Girls	Boys
10	2.61	2.10	2.49	-	-	-	2.53	2.53
11	2.62	2.73	2.30	2.17	-	-	2.82	2.74
12	2.52	2.73	2.38	2.54	1.43	-	2.88	3.02
13	2.55	2.37	2.36	2.68	2.50	3.49	2.81	3.31
14	2.21	2.17	2.30	2.38	2.41	3.25	2.53	3.48
15	2.27	2.08	2.21	2.22	2.33	2.55	2.31	3.52
16	2.36	2.04	2.17	2.16	2.19	2.76	2.19	3.30
17	2.32	1.85	2.16	2.01	2.08	2.50	2.11	3.06
18	2.41	1.74	2.13	2.05	2.17	3.91	2.21	2.53

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TABLE NO. II.4: Annual rate of growth of height by the age from 11 to 18 for all boys, all girls and menarche segregated series. (In.)

Note: Average heights at the initial age are bracketed. (In.)

Age	Age at Menarche						All Girls	All Boys
	11&12	13	14	15	16	17&18		
10	(52.74)	(51.72)	(50.70)	-	-	-	(50.82)	(50.86)
11	2.79	2.28	1.94	(52.40)	-	-	1.99	1.66
12	2.33	2.66	2.43	1.66	(54.00)	-	2.22	1.92
13	1.30	2.06	2.55	2.59	1.37	(52.30)	2.24	2.03
14	0.43	0.90	1.62	1.88	1.91	3.50	2.52 1.47	2.38
15	0.71	0.45	0.72	1.11	1.38	1.11	0.90	2.25
16	-0.23	0.25	0.20	0.45	1.25	1.52	0.40	1.78
17	-0.36	0.05	0.16	0.12	0.31	1.42	0.18	1.15
18	-0.21	0.00	0.17	0.15	-0.15	0.34	0.11	0.66

TABLE NO. II.5: Average weight at ages 10 to 18 for all boys, all girls and menarche-segregated series (Lb.)

(Lb.)

Age	Age at Menarche						All Girls	All Boys
	11&12	13	14	15	16	17&18		
10	58.81	53.97	50.96	-	-	-	51.47	51.86
11	68.17	61.14	57.17	55.38	-	-	57.06	56.05
12	79.75	71.31	64.24	60.87	59.15	-	64.37	61.50
13	86.60	82.55	74.97	69.28	64.04	54.09	73.41	67.87
14	92.16	89.37	84.24	78.23	70.69	71.31	81.16	76.47
15	95.44	93.48	89.60	85.60	77.96	73.47	86.44	85.12
16	94.28	95.17	92.57	89.98	86.02	81.92	90.83	92.44
17	90.61	95.13	93.75	92.57	89.72	90.03	92.67	98.34
18	89.74	96.92	95.15	93.75	91.93	91.40	94.00	102.47

TABLE NO. II.6: Annual rate of increase in weight by the age from 11 to 18 for all boys, all girls and menarche-segregated series (Lb.)

Note: Average weights at initial age are bracketed. (Lb.)

Age	Age at Menarche						All Girls	All Boys
	11&12	13	14	15	16	17&18		
10	(58.81)	(53.97)	(50.96)	-	-	-	(51.47)	(51.86)
11	9.36	7.17	6.21	(55.38)	-	-	5.59	4.19
12	11.58	10.17	7.07	5.49	(59.15)	-	7.31	5.45
13	6.85	11.24	10.73	8.41	4.89	(54.09)	9.04	6.37
14	5.56	6.82	9.27	8.95	6.65	7.22	7.75	8.60
15	3.28	4.11	5.36	7.37	2.12 7.27	2.16 2.16	5.28	8.65
16	-1.16	1.69	2.97	4.38	8.06	8.45	4.39	7.32
17	-2.67	-0.04	1.18	2.59	3.70	8.11	1.84	5.90
18	-1.87	1.79	#1.40	1.18	2.21	1.37	1.33	4.13

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TABLE NO. II.7: Variability (logarithm of) in weight at ages 10 to 18 for all boys, all girls and menarche-segregated series.

Age	Age at Menarche						All Girls	All Boys
	11&12	13	14	15	16	17&18		
10	0.092	0.066	0.049	-	-	-	0.069	0.065
11	0.084	0.076	0.061	0.059	-	-	0.076	0.069
12	0.069	0.075	0.066	0.072	0.031	-	0.080	0.076
13	0.068	0.068	0.069	0.072	0.068	0.097	0.082	0.080
14	0.060	0.062	0.066	0.068	0.070	0.097	0.076	0.084
15	0.060	0.056	0.060	0.059	0.064	0.096	0.065	0.081
16	0.054	0.054	0.058	0.054	0.063	0.076	0.059	0.075
17	0.058	0.059	0.063	0.058	0.057	0.067	0.061	0.092
18	0.081	0.018	0.056	0.058	0.054	0.071	0.061	0.057

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TABLE NO. II.8: Correlation between weight and height at ages 10 to 18 for all boys, all girls and menarche-segregated series.

Age	Age at Menarche						All Girls	All Boys
	11&12	13	14	15	16	17&18		
10	0.79	0.70	0.40	-	-	-	0.74	0.77
11	0.73	0.58	0.68	0.76	-	-	0.75	0.78
12	0.71	0.72	0.68	0.72	0.55	-	0.79	0.75
13	0.54	0.59	0.65	0.71	0.77	0.93	0.72	0.78
14	0.41	0.47	0.58	0.62	0.73	0.84	0.66	0.82
15	0.65	0.45	0.54	0.45	0.65	0.75	0.52	0.83
16	0.56	0.35	0.49	0.51	0.48	0.69	0.50	0.68
17	0.54	0.31	0.47	0.40	0.52	0.52	0.44	0.58
18	0.59	0.29	0.49	0.48	0.58	0.77	0.52	0.57

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TABLE NO. II.9: Accumulative-menarche-incidence: Columnar calculations in a tabular form.

Note:- (1) Based on data contained in the latest year information card. Each case occurs once only.

(2) See text for fuller explanation.

Age	No. of Menar- che cases	(Sigma) of (1)	Age at Report (Cases of on set of Menar- che only)	(Sigma) of (3) Age not reach- ed	(2)minus (4) Frequen- cy	Age at Report ne on- set of Menar- che	(3)plus (6) All girls	(Sigma) of 7 up years involved	5 + 8 Curve %	Incre- ment
	1	2	3	4	5	6	7	8	9	10
10	1	1	-	-	1	589	589	7371	0.01	-
11	27	28	18	-	28	730	748	6782	0.41	0.40
12	217	245	113	18	227	625	738	6034	3.76	3.35
13	924	1169	318	131	1038	504	822	5296	19.60	15.84
14	1607	2776	584	449	2327	365	949	4474	52.01	32.41
15	1085	3861	783	1033	2828	173	956	3525	80.23	28.22
16	335	4196	1066	1816	2380	88	1154	2569	92.64	12.41
17	53	4249	873	2882	1367	34	907	1415	96.61	3.97
18	10	4259	504	3755	504	4	508	508	99.21	2.60
TOTAL:4259			4259	4259		3112	7371			

TABLE NO. II.10: Coefficients of correlation, regression equations and standard errors of estimates of weight (W) on height (H) at ages 10 to 18 for all boys.

Age	Correlation Coefficient	Regression Equation $\log_{10} W = a + bH$	Standard error of $\log (W)$
1	2	3	4
10	0.76798	0.87176 + 0.01764H	0.04792
11	0.77671	0.72491 + 0.01949H	0.04306
12	0.75597	0.74688 + 0.01914H	0.04970
13	0.78077	0.75427 + 0.01908H	0.05055
14	0.81637	0.72119 + 0.01975H	0.04856
15	0.82850	0.76491 + 0.01907H	0.04540
16	0.67852	1.01004 + 0.01525H	0.05499
17	0.58020	1.20125 + 0.01240H	0.07508
18	0.57250	1.18124 + 0.01286H	0.04655

TABLE NO. II.11: Coefficients of correlation, regression equations and standard errors of estimates of weight (W) on height (H) at ages 10 to 18 for all girls.

Age	Correlation Coefficient	Regression Equation $\log_{10} W = a + bH$	Standard error of log (W)
1	2	3	4
10	0.73655	0.68708 + .020161H	0.04690
11	0.75479	0.68275 + 0.02033H	0.04991
12	0.78623	0.60567 + 0.02186H	0.04950
13	0.72518	0.65102 + 0.02121H	0.05666
14	0.66500	0.73521 + 0.01999H	0.06198
15	0.52296	1.05498 + 0.01484H	0.05582
16	0.50291	1.14001 + 0.01362H	0.05143
17	0.44543	1.19314 + 0.01285H	0.05461
18	0.52115	1.10018 + 0.01447H	0.05247

TABLE NO. II.12:

Coefficients of correlation, regression equations and standard errors of estimates of weight (W) on height (H) at ages 10 to 18 for menarche-segregated age 11 and 12 together.

Age	Correlation Coefficient	Regression Equation $\log_{10} W = a + bH$		Standard error of $\log (W)$
1	2	3		4
10	0.79233	0.29207 +	.028009H	0.07309
11	0.73032	0.53649 +	.023363H	0.061312
12	0.71134	0.75030 +	.019897H	0.04928
13	0.54250	1.07491 +	.01458 H	0.05753
14	0.41410	1.29954 +	0.011157H	0.054681
15	0.64803	0.95086 +	.01703 H	0.01435
16	0.55979	1.19649 +	0.01298 H	0.04518
17	0.53971	1.15047 +	0.01359 H	0.04917
18	0.59468	0.53507 +	0.02384 H	0.06516

TABLE NO. II.13: Coefficients of correlation, regression equations and standard errors of estimates of weight (W) on height (H) at ages 10 to 18 for menarche-segregated age 13.

Age	Correlation Coefficient	Regression Equation $\log_{10} W = a + bH$	Standard error of $\log (W)$
1	2	3	4
10	0.70 ⁵ 01	0.57980 + 0.02228H	0.04706
11	0.57639	0.70249 + 0.02007H	0.06171
12	0.71961	0.73240 + 0.01978H	0.05206
13	0.58690	0.93255 + 0.01676H	0.03985
14	0.47383	1.14274 + 0.01356H	0.05478
15	0.45017	1.24117 + 0.01212H	0.04995
16	0.34604	1.42735 + 0.00914H	0.05052
17	0.30913	1.34326 + 0.01052H	0.05612
18	0.29554	1.39536 + 0.00979H	0.01744

TABLE NO. II.14: Coefficients of correlation, regression equations and standard errors of estimates of weight (W) on height (H) at ages 10 to 18 for menarche-segregated age 14.

Age	Correlation Coefficient	Regression Equation $\log_{10} W = a + bH$	Standard error of log (W)
1	2	3	4
10	0.39954	1.27826 + 0.00846H	0.04466
11	0.67745	0.80797 + 0.01803H	0.04510
12	0.67628	0.76913 + 0.018858H	0.048824
13	0.64689	0.78936 + 0.01884H	0.05250
14	0.576617	0.93669 + .016698H	0.05434
15	0.54012	1.07153 + 0.01469H	0.05049
16	0.49043	1.17481 + 0.01316H	0.05074
17	0.47017	1.14680 + 0.01368H	0.05548
18	0.49062	1.19138 + 0.01301H	0.04914

TABLE NO. II.15: Coefficients of correlation, regression equations and standard errors of estimates of weight (W) on height (H) at ages 11 to 18 for menarche-segregated age 15.

Age	Correlation Coefficient	Regression Equation $\log_{10} W = a + bH$	Standard error of $\log (W)$
1	2	3	4
10	-	-	-
11	0.75602	0.66864 + 0.02051H	0.03861
12	0.71834	0.69069 + 0.02023H	0.05018
13	0.71052	0.76207 + 0.01904H	0.05484
14	0.62757	0.84391 + 0.01793H	0.05301
15	0.45015	1.22279 + 0.01190H	0.05245
16	0.51189	1.18436 + 0.01281H	0.04646
17	0.40219	1.26868 + 0.01159H	0.05307
18	0.48819	1.13115 + 0.01393H	0.05112

TABLE NO. II.16: Coefficients of correlation, regression equations and standard errors of estimates of weight (W) on height (H) at ages 12 to 18 for menarche-segregated age 16.

Age	Correlation Coefficient	Regression Equation $\log_{10} W = a + bH$	Standard error of $\log (W)$
1	2	3	4
10	-	-	-
11	-	-	-
12	0.55112	1.12664 + 0.01195H	0.2585
13	0.77496	0.63599 + 0.02114H	0.04309
14	0.73165	0.63391 + 0.02122H	0.04772
15	0.65157	0.83533 + 0.01801H	0.04886
16	0.48382	1.10064 + 0.01391H	0.05514
17	0.52482	1.08512 + 0.01441H	0.04867
18	0.58419	0.88030 + 0.01803H	0.05447

TABLE NO. II.17: Coefficients of correlation, regression equations and standard errors of estimates of weight (W) on height (H) at ages 13 to 18 for menarche-segregated age 17 and 18 together.

Age	Correlation Coefficient	Regression Equation $\log_{10} W = a + bH$	Standard error of $\log (W)$
1	2	3	4
10	-	-	-
11	-	-	-
12	-	-	-
13	0.93471	$0.37016 + 0.02606H$	-
14	0.83706	$0.46040 + 0.02496H$	-
15	0.74805	$0.27098 + 0.02803H$	0.06348
16	0.69114	$0.79619 + 0.01912H$	0.05530
17	0.50235	$1.14756 + 0.01348H$	0.05813
18	0.276776	$1.11343 + 0.01408H$	0.04595

Table II.18 : Standard table giving average with upper and lower limit weight (lb.) for each of height at ages 10 to 18 for all boys. ^{1 inch}

NOTE:- Deduct 2 to 5 lb. for usual outdoor wearing apparel.

Age	10	11	12	13	14	15	16	17	18
40	27 33 41								
41	28 35 43								
42	29 36 45	29 35 43							
43	30 38 47	30 37 44							
44	31 39 49	31 38 47	31 39 49						
45	33 41 51	33 40 49	32 40 51						
46	34 42 53	34 42 53	34 42 53	34 43 54					
47	35 44 55	36 44 53	35 44 56	35 45 56					
48	37 46 58	37 46 56	37 46 58	37 47 59	37 47 58				
49	38 48 60	39 48 58	38 48 61	39 49 62	39 49 61				
50	40 50 62	41 50 61	40 50 63	40 51 64	41 51 64				

Continued on next page.

Table II.18 ; continued.

Age Height	10	11	12	13	14	15	16	17	18
51	42	42	42	42	43	44			
	<u>52</u>	52	53	53	53	55			
	65	64	66	67	67	67			
52	43	45	44	44	45	46	49		
	54	<u>55</u>	55	56	56	57	63		
	68	67	69	71	70	70	82		
53	45	47	46	46	47	48	51	51	
	56	57	58	58	59	60	66	72	
	70	70	72	73	73	73	85	102	
54	47	49	48	48	49	51	53	53	61
	59	60	60	61	61	62	68	74	75
	73	73	<u>76</u>	77	77	77	88	105	93
55	49	51	50	50	51	53	55	54	62
	61	63	63	64	64	65	70	76	77
	76	76	79	80	80	80	91	108	96
56	51	54	52	53	54	55	57	56	64
	64	65	66	66	67	68	73	79	80
	80	80	83	<u>84</u>	84	84	94	111	99
57	53	56	55	55	56	58	59	57	66
	66	68	69	69	70	71	76	81	82
	83	84	87	88	88	88	98	114	102
58	55	59	57	57	59	60	61	59	68
	69	72	72	73	73	74	78	83	84
	86	87	90	92	92	92	101	118	105
59	58	61	60	60	61	63	63	61	70
	72	75	75	76	<u>77</u>	78	81	86	87
	90	91	94	96	96	96	104	121	108
60	60	65	62	63	64	66	65	62	73
	75	78	79	79	80	81	84	88	90
	94	96	99	100	101	100	108	124	111
61	67	67	65	66	67	69	68	64	75
		82	82	83	85	85	87	91	92
		100	103	104	105	104	103	128	115
62		70	68	69	70	72	70	66	77
		86	86	86	88	88	90	93	95
		104	108	109	110	109	116	132	118

Continued on next page.

Table II.18 : continued.

<u>Age</u> <u>Height</u>	10	11	12	13	14	15	16	17	18
63			71 90 113	72 90 114	74 92 116	75 92 114	73 93 120	68 96 126	79 98 121
64			74 93 118	75 94 119	77 97 121	78 97 119	75 97 123	70 99 140	81 101 125
65				78 99 124	81 101 126	82 100 127	78 100 129	72 101 143	83 104 129
66				82 103 130	84 105 134	86 105 130	80 104 134	74 104 148	86 107 133
67					88 111 133	89 110 136	83 107 139	76 108 152	89 110 136
68					93 116 145	93 115 142	86 111 143	78 111 156	92 114 140
69						98 120 148	89 115 149	81 114 161	94 117 145
70						102 126 155	93 119 154	83 117 166	87 120 149
71						107 131 162	96 124 159	85 121 170	100 124 154
72							99 128 165	87 124 175	103 128 158
73								90 128 180	106 132 163
74									110 135 168

Table II.19 : Standard table giving average with upper and lower limit weight (lb.) for each inch of height at ages 10 to 18 for all girls.

Age <u>Height</u>	10	11	12	13	14	15	16	17	18
40	25 31 38								
41	26 33 40								
42	27 34 42	27 34 43							
43	29 36 44	29 36 45							
44	30 37 46	30 38 47							
45	32 39 49	31 39 50	31 39 49						
46	33 41 51	33 41 52	32 41 51						
47	34 43 53	34 43 55	34 43 54	34 44 58					
48	36 45 56	36 46 57	35 45 56	36 47 60	37 49 66				
49	38 47 59	38 48 60	37 47 59	38 49 64	39 51 69	47 60 78			
50	40 49 61	40 50 63	39 49 62	40 51 67	41 54 72	49 63 81	52 66 84	53 68 88	52 67 85
51	42 52 64	42 52 66	41 52 65	42 54 70	43 57 76	50 65 84	54 68 86	55 70 91	54 69 88

Table II.19 : continued.

Age	10	11	12	13	14	15	16	17	18
52	44 54 67	44 55 69	44 55 69	44 57 74	45 59 79	51 67 87	56 70 89	56 73 93	56 71 91
53	46 57 71	46 58 72	46 57 72	46 59 77	47 62 83	54 69 90	57 73 92	58 75 96	58 74 94
54	48 60 74	48 60 76	48 60 76	48 63 81	49 65 87	55 72 93	59 75 95	60 77 99	60 76 97
55	50 62 77	50 63 79	51 64 80	51 66 85	51 68 91	57 74 96	61 77 98	62 79 102	62 79 100
56	53 65 81	53 66 83	53 67 84	53 69 89	54 72 95	59 77 99	63 80 101	64 82 105	64 81 104
57	55 69 85	55 69 87	56 70 88	56 72 94	56 75 99	61 79 103	65 82 105	65 84 108	66 84 107
58	58 72 89	58 73 91	59 74 93	58 76 99	59 78 104	64 82 107	67 85 108	67 87 112	68 87 111
59	61 75 93	61 76 96	62 78 98	61 80 104	62 82 109	66 85 110	69 88 111	69 89 115	71 90 115
60	65 79 95	63 80 100	65 82 103	65 84 109	65 86 115	68 88 114	71 91 115	72 92 118	73 93 119
61		66 84 105	68 86 108	68 88 114	68 90 120	70 91 118	74 93 118	74 95 122	75 96 122
62		70 88 110	72 90 114	71 92 120	71 94 125	73 94 122	76 96 122	76 98 126	78 98 ⁹ 127
63			76 95 119	76 97 126	75 99 131	74 98 126	75 99 126	78 101 129	78 103 131

Table II.19 : continued.

<u>Age</u> <u>Height</u>	10	11	12	13	14	15	16	17	18
64			80 100 126	79 102 132	78 103 137	78 101 131	81 103 130	80 104 133	83 106 135
65			84 105 132	82 107 139	81 108 144	81 105 135	84 106 134	83 107 137	86 110 140
66				87 112 146	85 113 151	84 108 140	86 109 138	85 110 141	89 114 145
67				91 118 153	89 119 158	87 112 145	89 113 143	88 113 146	92 117 149
68					93 124 165	90 116 150	92 116 148	91 117 150	95 121 155
69						93 120 145	95 120 152	93 120 154	98 125 160
70							98 124 157	96 124 159	102 130 165

Table II.20 : Standard table giving average with upper and lower limit weight (lb.) for each inch of height at ages 10 to 18 for menarche-segregated age 11 and 12.

Note: Deduct 2-5 lb. for usual outdoor wearing apparel.

Age Height	10	11	12	13	14	15	16	17	18
42	21								
	29								
	41								
43	22								
	31								
	44								
44	24								
	33								
	47								
45	25	29							
	36	39							
	50	51							
46	27	31							
	38	41							
	53	54							
47	29	32	39						
	40	43	48						
	57	57	61						
48	31	34	40						
	43	45	51						
	61	60	64						
49	33	36	42	47	53				
	46	48	53	61	70				
	65	64	67	80	90				
50	35	38	44	49	56	48	57	54	39
	49	51	56	64	72	63	70	68	53
	69	67	70	83	93	83	86	85	72
51	37	40	46	50	57	50	59	56	42
	52	53	58	66	74	66	72	70	56
	73	71	73	86	95	87	88	87	76
52	40	42	48	52	59	56	60	57	44
	56	56	61	68	76	69	74	72	59
	78	75	76	89	97	90	91	90	80

Table II.20 : continued.

Age	10	11	12	13	14	15	16	17	18
53	43	45	51	54	60	54	62	59	47
	60	59	64	70	78	71	76	74	63
	84	79	80	90	100	94	94	93	85
54	45	47	53	56	62	56	64	61	49
	64	63	67	73	80	74	79	77	66
	89	83	84	95	103	98	97	96	90
55	48	50	56	58	64	59	66	63	52
	68	66	70	75	82	77	81	79	70
	95	88	88	98	105	102	100	99	95
56	52	53	58	60	65	61	68	65	55
	72	70	73	78	84	80	83	81	74
	101	93	92	102	108	106	103	103	100
57	55	56	61	62	67	63	70	67	58
	77	74	77	80	86	83	86	84	78
	108	98	96	105	111	110	106	106	106
58	59	59	64	64	69	66	72	69	61
	82	78	80	83	88	87	89	87	83
	116	103	101	109	114	114	109	109	112
59	63	62	67	66	70	69	74	71	65
	88	82	84	86	91	90	91	90	87
	123	109	105	112	118	119	112	112	118
60	67	65	70	68	72	71	76	74	68
	94	87	88	89	93	94	94	92	92
	131	115	110	116	120	123	116	116	125
61	71	69	73	71	74	74	79	77	72
	100	91	92	92	95	98	97	95	97
	140	121	115	120	123	128	119	120	131
62	76	73	77	73	76	77	81	78	76
	107	96	96	95	98	102	100	98	103
	149	128	121	124	126	134	123	123	139
63		77	80	75	78	80	83	81	81
		102	101	98	100	106	103	102	109
		135	127	128	129	139	127	127	147
64		81	84	78	80	83	86	83	85
		107	106	102	103	110	106	105	115
		143	133	133	133	145	130	131	155

Table II.20 : continued.

<u>Age</u> <u>Height</u>	10	11	12	13	14	15	16	17	18
65		86 113 151	88 111 139	81 105 137	82 106 136	87 114 150	89 110 134	86 108 136	90 122 164
66			92 116 145	84 109 142	84 109 140	90 119 156	91 112 138	89 112 140	95 128 173
67			97 121 152	86 113 147	87 112 143	94 123 162	94 116 143	92 115 144	100 136 183
68				89 117 152	89 115 147	98 128 169	97 120 147	95 119 149	106 143 193
69				92 120 157	91 117 151	102 134 176	100 123 151	98 123 154	112 151 204
70						106 139 183	103 127 156	101 126 158	118 159 216

TABLE NO. II. 21: Standard table giving average with upper and lower limit weight (lb.) for each inch of height at ages 10 to 18 for menarche-segregated age 13.

Note: Deduct 2-5 lb. for usual outdoor wearing apparel.

Height	A g e								
	10	11	12	13	14	15	16	17	18
41	25 31 39								
42	26 33 41								
43	28 34 44								
44	29 36 45	29 38 51							
45	31 38 47	30 40 53							
46	32 40 50	32 42 56	34 44 56						
47	34 42 53	33 44 59	36 46 58						
48	36 45 55	35 46 61	38 48 61	45 55 66					
49	38 47 58	36 48 64	39 50 64	43 57 68	50 64 83				
50	40 49 61	38 51 67	41 53 67	49 59 71	51 66 85	56 71 88	61 77 97	57 74 96	71 77 83

... contd.

TABLE NO. II.21 (Contd.)

Height	A g e								
	10	11	12	13	14	15	16	17	18
51	42	40	43	51	53	57	62	58	72
	52	53	55	61	68	72	78	76	78
	65	71 X	70	74	88	91	99	98	85
52	44	42	45	53	55	59	63	60	74
	55	56	58	64	70	74	80	78	80
	68	74	73	77	91	93	101	100	87
53	46	44	47	55	56	61	65	61	76
	58	58	60	66	73	76	82	79	82
	71	77	77	79	93	96	103	103	89
54	49	46	50	57	58	62	66	63	77
	61	61	63	69	75	79	83	81	84
	75	81	80	83	96	99	105	105	91
55	51	48	52	59	60	64	67	64	79
	64	64	66	71	77	81	85	83	85
	79	85	84	86	99	102	102 ⁷	108	93
56	54	50	54	62	62	66	69	66	81
	67	67	69	74	80	83	87	85	88
	84	89	88	89	103	104	110	111	95
57	57	53	57	64	64	68	70	68	83
	71	70	72	77	82	85 X	89	88	89
	88	93	92	93	106	108	112	113	97
58	60	55	60	67	66	61	72	69	85
	74	73	76	80	85	88	91	90	92
	92	98	96	96	109	111	114	116	99
59	63	58	62	69	68	72	73	71	87
	78	77	79	83	88	90	92	92	94
	97	103	101	100	113	114	117	119	102
60	66	61	65	72	70	74	75	73	88
	82	80	83	87	90	93	94	94	96
	102	107	105	104	116	117	119	122	104
61	70	63	68	75	72	76	76	74	91
	87	84	87	90	93	95	97	97	98
	108	112	110	108	120	120	122	125	106

... Contd.

TABLE NO. II.21: Contd.

=====									
A g e									
Height	10	11	12	13	14	15	16	17	18
=====									
62		66 88 117	71 91 116	78 98 112	75 96 124	78 98 124	78 99 124	76 99 128	93 101 109
63		70 93 123	75 95 112 121	81 97 117	77 99 128	80 101 127	80 101 127	78 101 131	95 103 111
64		73 97 129	78 99 126	84 101 121	80 103 132	82 103 131	81 103 130	80 104 134	97 105 114
65			82 104 132	87 105 126	82 106 136	85 107 134	83 105 132	82 106 138	99 107 116
66			86 109 139	91 109 131	85 109 140	87 110 138	84 107 135	84 109 141	101 110 119
67				95 113 136	87 112 144	90 113 142	87 109 138	86 112 144	104 112 122
68				98 118 142	90 115 149	92 116 146	88 112 141	88 114 148	106 115 124
69					93 120 154	95 119 150	91 114 144	91 117 152	109 117 128
70						98 123 154	92 117 147	93 120 156	111 120 130
=====									

TABLE NO. II.22: Standard table giving average with upper and lower limit weight (lb.) for each inch of height at ages 10 to 18 for menarche-segregated age 14.

Notes: Deduct 2-5 lb. for usual outdoor wearing-apparel.

Height	A g e								
	10	11	12	13	14	15	16	17	18
40	33 41 50								
41	34 42 51								
42	34 42 52	30 37 45							
43	35 43 53	31 38 47							
44	36 44 54	32 40 49							
45	36 45 55	34 42 51	33 41 52						
46	38 47 57	35 43 53	35 43 54						
47	39 48 58	37 45 56	36 45 57	37 47 60					
48	39 48 60	38 47 58	38 47 59	39 48 63					
49	40 49 61	40 49 60	39 49 62	40 51 66	44 57 73				
50	42 51 63	42 51 63	41 51 64	42 54 67	46 59 76	51 64 81	54 68 86	52 68 87	53 69 87

... Contd.

TABLE NO. II.22: Contd.

=====									
A g e									
Height	10	11	12	13	14	15	16	17	18
=====									
51	43	43	43	44	48	52	55	54	57
	<u>52</u>	53	54	56	<u>61</u>	66	70	70	71
	64	66	67	72	79	83	88	90	90
52	43	45	45	46	50	54	57	56	59
	53	56	56	59	64	68	72	72	74
	65	68	70	75	82	86	91	93	92
53	44	47	47	48	52	56	59	58	61
	54	<u>58</u>	59	61	66	71	74	74	76
	66	71	73	78	85	89	94	96	95
54	45	49	49	50	54	58	61	59	62
	55	60	61	64	69	73	77	77	78
	67	74	77	82	88	92	97	99	98
55	46	51	51	52	56	60	63	61	64
	56	63	<u>64</u>	67	72	76	79	79	81
	69	77	80	85	92	96	100	103	101
56	47	53	53	55	58	62	65	63	66
	57	66	67	70	74	78	82	82	83
	70	81	84	89	96	99	103	106	104
57	47	56	56	57	60	64	67	65	68
	58	68	70	73	77	81	84	84	86
	71	84	87	93	99	102	106	109	107
58	48	58	58	60	63	66	69	67	70
	59	71	73	<u>76</u>	80	84	87	87	88
	72	88	91	<u>97</u>	103	106	109	112	111
59	49	60	61	62	65	69	71	70	72
	60	74	76	79	<u>84</u>	87	89	90	91
	74	91	95	100	<u>107</u>	109	113	116	114
60	50	63	63	65	68	71	73	72	75
	61	77	79	83	87	<u>89</u>	<u>92</u>	<u>93</u>	<u>94</u>
	75	95	100	106	111	113	116	120	118
61	82	66	68	<u>68</u>	<u>70</u>	<u>73</u>	<u>75</u>	74	77
		81	83	87	90	93	95	<u>96</u>	97
		99	104	110	116	117	120	124	121

=====

.... Contd.

TABLE NO. II.22: Contd.

=====									
A g e									
Height	10	11	12	13	14	15	16	17	18
=====									
62		68	69	71	73	76	77	76	79
		84	87	91	94	91	98	99	100
		104	109	115	120	121	124	128	125
63			72	74	76	79	80	79	82
			90	95	97	99	101	102	103
			113	120	125	125	127	132	129
64			75	78	79	81	82	81	84
			94	99	101	103	104	105	106
			118	126	130	130	131	136	133
65			79	81	82	84	85	84	87
			99	103	105	106	107	109	109
			124	131	135	134	135	140	137
66				85	85	87	87	87	89
				108	109	110	110	112	112
				137	140	139	140	145	141
67				88	88	90	90	90	92
				112	113	114	114	116	116
				143	146	143	144	149	145
68				92	92	93	93	92	95
					118	118	118	119	119
					152	148	148	154	149
69					95	96	96	95	98
					123	122	121	123	123
					158	154	153	159	154
70						100	99	99	101
						126	125	127	127
						159	158	164	160
=====									

TABLE NO. II.23: Standard table giving average with upper and lower limit weight (lb.) for each inch of height at ages 11 to 18 for menarche-segregated age 15.

NOTE: Deduct 2-5 Lb. for usual outdoor wearing-apparel.

Height	Age							
	11	12	13	14	15	16	17	18
42	26 33 44							
43	27 36 47							
44	28 37 49	27 38 53						
45	30 39 51	29 40 56						
46	31 41 54	30 42 58	31 43 60					
47	33 42 56	31 44 61	32 45 63					
48	34 45 59	33 46 63	34 47 66	37 51 69				
49	36 47 62	34 48 67	36 49 69	38 53 72	49 64 84			
50	38 49 65	36 50 70	37 52 72	40 55 75	50 66 86	52 67 86	54 70 92	51 67 88
51	39 52 68	38 53 73	39 54 75	42 57 78	51 67 88	54 69 88	55 72 95	53 69 91

... Contd.

TABLE NO. II.23: Contd.

Height	A g o							
	11	12	13	14	15	16	17	18
52	41 51 71	40 55 77	40 56 78	44 60 82	51 69 91	55 71 91	57 74 97	55 72 94
53	43 57 75	41 58 81	42 59 82	45 62 85	54 71 93	51 73 93	58 76 99	56 74 97
54	45 60 78	44 <u>61</u> 84	44 62 86	47 65 89	56 73 96	59 75 96	60 78 102	58 76 100
55	48 62 82	46 63 88	46 64 90	49 68 92	57 75 99	60 77 99	62 80 105	60 79 103
56	50 66 86	48 66 93	48 67 94	51 70 96	59 77 101	62 80 102	63 83 108	62 81 106
57	52 69 90	50 70 97	50 <u>70</u> 98	54 73 100	61 80 104	64 82 105	65 84 111	64 84 110
58	55 72 94	52 73 102	53 73 102	56 <u>76</u> 104	62 82 107	66 84 108	67 87 114	66 87 114
59	57 76 99	55 77 104	55 77 107	58 80 109	64 <u>84</u> 110	68 87 112	68 89 117	68 90 117
60	60 79 104	58 80 112	58 80 112	61 83 113	65 86 113	70 89 115	70 <u>92</u> 120	71 93 121
61	63 83 109	60 84 117	60 84 117	64 87 118	68 89 116	72 92 118	72 94 123	73 96 125
62	66 87 114	63 88 123	63 87 122	66 90 124	70 91 120	74 95 122	74 97 126	75 99 129
63		66 92 128	66 91 127	69 94 128	72 94 123	76 98 126	76 99 130	78 102 134

... Contd.

TABLE NO. II. 23: Contd.

=====								
A g e								
Height	11	12	13	14	15	16	17	18
=====								
64		69	69	72	73	79	78	80
		97	95	98	96	101	102	105
		135	133	134	126	129	134	138
65			72	75	75	81	80	83
			100	102	99	104	105	109
			139	140	130	133	137	142
66			75	78	78	83	83	86
			104	106	102	107	108	112
			145	145	133	137	141	147
67				81	80	86	85	88
				111	105	110	111	116
				152	137	141	145	152
68				84	82	88	87	91
				116	108	113	114	120
				158	141	145	149	157
69					84	91	89	94
					110	117	117	123
					145	150	152	162
70						94	92	97
						120	120	128
						154	152	167
=====								

TABLE NO. II.24: Standard table giving average with upper and lower limit weight (lb.) for each inch of height at ages 12 to 18 for menarche-segregated age 16.

NOTE: Deduct 2-5 lb. for usual outdoor wearing-apparel.

		A g e								
Height		10	11	12	13	14	15	16	17	18
40										
41										
42										
43										
44				40						
				45						
				50						
45				41	32					
				46	39					
				52	47					
46				42	33					
				47	40					
				53	49					
47				43	35	34				
				49	43	43				
				55	52	53				
48				44	36	36				
				50	45	45				
				56	54	56				
49				46	38	38	42			
				51	47	47	52			
				58	57	59	65			

... Contd.

TABLE NO. II.24: Contd.

Height	A g e								
	10	11	12	13	14	15	16	17	18
50			47	40	40	43	48	51	47
			53	49	49	54	63	64	60
			60	59	62	68	81	80	78
51			48	42	42	45	50	53	49
			54	52	53	57	65	66	63
			61	62	65	71	83	83	81
52			50	44	44	47	52	54	51
			56	54	55	59	67	68	66
			63	65	68	74	86	85	84
53			51	46	46	49	53	56	53
			57	57	57	62	69	70	68
			65	68	71	77	89	88	88
54			52	48	48	51	55	58	56
			59	60	60	64	71	73	71
			57	71	75	80	92	91	92
55			54	50	51	53	57	60	58
			61	63	63	67	73	75	74
			68	75	79	84	95	94	96
56			55	53	53	56	59	62	60
			62	66	66	70	76	78	78
			70	78	83	87	98	97	100
57			57	55	56	58	61	64	63
			64	69	70	73	78	81	81
			72	82	87	91	101	101	104
58			59	58	59	60	63	67	66
			66	73	73	76	81	83	84
			74	86	91	95	104	104	108
59			60	61	62	63	65	69	68
			68	76	77	79	83	86	88
			76	90	96	99	108	108	113
60			62	63	65	66	67	71	71
			70	80	81	81	86	89	92
			78	94	100	103	111	111	118

TABLE NO. II.24:Contd.

Height	A g °								
	10	11	12	13	14	15	16	17	18
							69		
61			64	67	68	68	7	73	74
			72	84	85	86	89	92	95
			81	99	105	107	115	115	123
62			65	70	71	71	71	76	77
			74	88	89	89	92	95	99
			83	104	111	112	118	119	128
63			67	73	75	74	74	79	81
			76	93	93	93	95	98	104
			85	109	116	117	122	123	133
64			69	76	79	78	76	81	84
			78	97	98	97	98	102	108
			88	114	122	122	126	127	139
65				80	83	81	78	84	88
				102	103	101	101	105	113
				119	128	127	130	131	145
66					87	84	81	87	91
					108	106	105	109	118
					135	132	135	136	151
67					91	88	84	90	95
					114	110	108	112	123
					141	138	139	140	157
68						92	86	93	99
						115	111	116	128
						144	144	145	164
69						95	89	96	104
						120	115	120	133
						150	148	150	171
70							92	99	108
							119	124	139
							153	155	178

TABLE NO. II.25: Standard table giving average with upper and lower limit weight (lb.) for each inch of height at ages 15 to 18 for menarche-segregated age 17 and 18 together.

NOTE: Deduct 2-5 lb. for usual outdoor wearing-apparel.

Height	A g e								
	10	11	12	13	14	15	16	17	18
47						29			
						39			
						52			
48						31	40		
						41	52		
						55	67		
49						33	42		
						44	54		
						59	70		
50						35	44	51	53
						47	56	66	66
						63	73	87	81
51						37	46	52	55
						50	59	68	68
						67	76	89	84
52						40	48	54	57
						53	62	70	70
						72	80	92	86
53						43	50	56	58
						57	64	73	72
						76	83	95	89
54						45	52	57	60
						61	67	75	75
						81	87	98	92
55						48	55	59	62
						65	70	77	77
						87	91	101	95
56						52	57	61	65
						69	74	80	80
						93	95	104	98
57						55	60	63	67
						74	77	82	82
						99	99	108	102

... Contd.

TABLE NO. II.25: Contd.

Height	A g e								
	10	11	12	13	14	15	16	17	18
58						59	62	65	69
						79	80	85	85
						106	104	111	105
59						63	65	67	71
						84	84	88	88
						112	108	115	109
60						67	68	69	73
						90	88	90	91
						120	113	118	112
61						71	71	71	76
						96	92	93	94
						128	118	122	116
62						76	74	74	78
						102	96	96	97
						137	124	126	120
63						81	78	76	81
						109	100	99	100
						146	129	130	124
64						87	81	78	84
						116	105	103	103
						155	135	134	128
65						92	85	81	86
						124	109	106	107
						166	141	138	132
66						99	89	83	89
						132	114	109	110
						177	147	142	136
67						105	93	86	92
						141	119	112	114
						189	154	147	141
68							97	89	95
							125	116	118
							161	152	145
69								91	98
								120	122
								156	150
70								94	102
								123	126
								161	155

Table II.26: Standard table giving average with upper and lower limit weight (lb.) for height (in.) at quinquennial intervals at ages 10 to 18 for all boys, using three variable relationship.

Note : Deduct 2-5 lbs. for usual outdoor wearing-apparel.

Age	10	11	12	13	14	15	16	17	18
40	26 33 42	27 34 43	28 35 44	28 36 45	29 36 46	30 37 47	30 38 48	31 39 49	32 40 50
45	52 40 51	53 41 52	54 42 53	54 43 55	55 44 56	56 45 57	57 46 59	58 47 60	58 49 61
50	59 49 62	40 50 63	41 51 65	42 53 66	43 54 68	44 55 70	45 57 71	46 58 73	47 59 75
55	47 60 75	48 61 77	50 62 79	51 64 81	52 65 83	53 67 85	54 69 87	56 70 89	57 72 91
60	58 73 92	59 74 94	60 76 96	62 78 98	63 80 101	65 81 103	66 83 105	68 85 108	69 88 110
65	70 88 112	72 90 114	73 93 117	75 95 120	77 97 122	79 99 125	80 101 128	82 104 131	84 106 134
70	85 107 136	87 110 139	89 115 ³ 142	91 115 145	93 118 149	96 121 152	98 123 156	100 126 160	102 129 163
75	104 131 165	106 134 169	109 137 173	111 140 177	114 143 181	116 147 185	119 150 190	122 154 194	125 157 198

$$\text{Log } w = 0.74239 + 0.017006 H + 0.009976A$$

$$\text{S.E.}(\log w) = 0.050398.$$

$$\text{Multiple Correlation } R = 0.90932.$$

Table II.27 : Standard table giving average with upper and lower limit weight (lb.) for height (in.) at quinquennial intervals at ages 10 to 18 for all girls, using three variable relationship.

		(Weight in pounds)								
Age	Height	10	11	12	13	14	15	16	17	18
40		25	25	26	27	27	28	29	30	31
		32	32	33	34	35	36	37	38	39
		40	42	43	44	45	46	48	49	50
45		31	32	32	33	34	35	36	37	38
		40	41	42	43	44	45	46	48	49
		51	52	53	55	56	58	59	61	63
50		38	39	41	42	43	44	45	46	48
		49	51	52	53	55	56	58	59	61
		63	66	67	68	70	72	74	76	78
55		48	49	51	52	53	55	56	58	59
		61	63	65	66	68	70	72	74	76
		79	81	83	85	87	90	92	95	97
60		60	61	63	65	67	68	70	72	74
		77	79	81	83	85	88	90	92	95
		98	101	104	106	109	112	115	118	121
65		75	77	79	81	83	85	88	90	92
		96	98	101	104	106	109	112	115	118
		123	126	129	133	136	140	144	148	152
70		93	96	98	101	104	106	109	112	115
		119	122	126	129	133	136	140	144	148
		153	157	161	165	170	174	179	184	189

Note:- Deduct 2-5 lb. for usual outdoor wearing-apparel.

$$\text{Log } W = 0.61782 + 0.01918 H + 0.01160A.$$

$$\text{S.E.}(\text{log}W) = 0.05369.$$

$$\text{Multiple Correlation } R = 0.87764.$$

Table II.28 : Comparative table giving various standard weights (lb.) for average height (in.) at ages 10 to 18 by sex, deduced and presented in this report.

Type	Table No.	Age																	
		10		11		12		13		14		15		16		17		18	
		H	W	H	W	H	W	H	W	H	W	H	W	H	W	H	W	H	W
Boys																			
(a) S.H.A.	I.4	52	67	54	75	56	80	57	82	58	90	60	98	60	100	62	108	63	113
(b) Direct	I.28	52	57	54	64	56	68	57	76	58	78	60	87	60	94	62	100	63	102
(c) Calculated	II. 2 & 3	51	52	53	56	54	62	56	68	59	76	61	85	63	92	64	98	64	102
(d) 2-variable relation	II.18	51	52	53	57	54	60	56	66	59	77	61	85	63	93	64	99	64	101
(e) 3- "	II.26	50	49	53	61	55	62	55	64	60	80	60	81	65	101	65	104	65	106
Girls																			
(a) S.H.A.	I.4	51	65	53	71	55	79	57	86	58	90	58	92	58	95	60	106	60	106
(b) Direct	I.29	51	57	53	61	55	67	57	73	58	77	58	85	58	89	60	94	60	92
(c) Calculated	II.2 & 5	51	51	53	57	55	64	57	73	59	81	60	86	60	91	60	93	60	94
(d) 2-variable relation	II.19	51	52	53	58	55	64	57	72	59	82	60	88	60	91	60	92	60	93
(e) 3-variable "	II.27	50	49	50	51	55	65	55	66	60	85	60	88	60	90	60	92	60	95

Note :- H - Height in inches and W - weight in lb. Deduct 2 to 5 lb. for apparel.

P. H. Medical Examination Form



Name _____

M-F. Birth date _____

Examination Year	1959	1960	1961	1962	1963	1964	1965
St. — Div.							
Age in Y. and M.							
1 History of diseases, operations or accidents							
2 P.V.+R.V.+B.C.G. when	+ +	+ +	+ +	+ +	+ +	+ +	+ +
3 Diet Veg. Hostel ⁺ Non Veg.-N.W.	+ +	+ +	+ +	+ +	+ +	+ +	+ +
M. + T. + (T. + C. + M.)	+ (+ +	+ (+ +	+ (+ +	+ (+ +	+ (+ +	+ (+ +	+ (+ +
4 P. T. Sch. + Home	+	+	+	+	+	+	+
5 Ht. Fnp. + Insp. Wt. Abdomina.	+ +	+ +	+ +	+ +	+ +	+ +	+ +
6 Heart Pulse p. m. Physic + Anaemia.	+ +	+ +	+ +	+ +	+ +	+ +	+ +
7 Respiratory System							
8 Digestive Appetite Bowels	+ +	+ +	+ +	+ +	+ +	+ +	+ +
9 Nervous System							
10 Renal System							
11 G. B. Phimosis undes. Testis.							
G. G. M. C. Y. I. V. D. D.							
12 Eyes Vision R. + L. Diseases etc.	+	+	+	+	+	+	+
13 Ears D. + Nose D.	+	+	+	+	+	+	+
14 Throat + Tonsils	+	+	+	+	+	+	+
15 Teeth Caries + Dirty	+	+	+	+	+	+	+
16 Lymph glands, C. G.							
17 Skin diseases							
18 Bones + M + Joints							
19 Health class A + B + C	+ +	+ +	+ +	+ +	+ +	+ +	+ +
20 Any Speciality.							
21 Signature & Exam. Date							

Follow-up Form. Health Certificate when Leaving School.

	Eyes	E. N. T.	Teeth	Surgical	Medical	Ht./ Wt.	Age H.C.	G. R. Date
1 Consultant's Name								
2 H. S. Findings								
3 Specialist's "								
4 Treat. Ad.								
5 .. given + R	+	+	+	+	+			
1 Consultant's Name								
2 H. S. Findings								
3 Specialist's "								
4 Treat. Ad.								
5 .. given + R	+	+	+	+	+			
1 Consultant's Name								
2 H. S. Findings								
3 Specialist's "								
4 Treat. Ad.								
5 .. given + R	+	+	+	+	+			
1 Consultant's Name								
2 H. S. Findings								
3 Specialist's "								
4 Treat. Ad.								
5 .. given + R	+	+	+	+	+			
1 Consultant's Name								
2 H. S. Findings								
3 Specialist's "								
4 Treat. Ad.								
5 .. given + R	+	+	+	+	+			