CHAPTER-IV

ANTHROPOMETRIC VARIATION
ANTHROPOMETRIC VARIATION

This chapter describes the morphological characteristics of the Onge males and females to discern (a) the morphological variability among the Onge, (b) to examine any secular changes by comparing the present results with the earlier published materials on this population and, (c) to find out the position of the Onge in relation to other neighbouring Negrito populations of Andamans such as Great Andamanese and Jarawa as well as the south- east Asiatic Negritos namely the Semang of Malaysia and the sub-population of Aeta of Philippines.

The materials have been described under the following heads: 1. Bodily dimensions and proportions, 2. measurements on head and face, 3. analysis of temporal changes, 4. relationship of age with stature, weight and biceps girth, and 5. comparison with Negrito populations of Southeast Asia.

4.1 Bodily Dimensions and Proportions

Altogether, 23 body measurements were measured on 38 males and 33 females. Based on these measurements 9 indices were computed. In Table 4.1 are given means, SD, and CV together with SE of all the measurements as well as the indices. The classificatory categories of various measurements and proportions among the Onge male and female are presented in Table 4.2. Salient features pertaining to various measurements and indices are given below.

4.1.1 Stature

The Onge males are significantly taller (mean stature 151.25 ± 0.77 cm) than the female (mean stature 140.81 ± 0.58 cm). According to the Martin's classification (1928), the Onge are predominantly short (male 56%, female 48%) to very short (male 38%, female 48%) in height (Table 4.2). The differences between the two sexes are statistically significant (Figure 4.1).
4.1.2 Sitting Height: Absolute and Relative

The mean sitting height in male and female Onge is 78.20 cm and 72.87 cm respectively. According to the classification of sitting height both males and females are predominantly short (male 69%, female 67%) to medium (male 23%, female 30%). Though the sex difference in sitting height is marked among the Onges, it is negligible in relative sitting height. The mean relative sitting height index among the male is 51.72 and in female 51.76. With regards to relative sitting height the Onge male and female fall in metriochromic to brachychromic classes (Table 4.2). Bean (1922) suggested that the sitting height is inversely related to stature i.e., with small stature the sitting height is relatively greater and with a large stature the sitting height is relatively less. The present results confirm Bean’s observation.

4.1.3 Biacromial Breadth

The mean biacromial breadth in male (33.94 cm) is greater than the females (29.48 cm). The biacromial breadth is small among both the sexes (male 100%, female 63%), according to Martin’s classification. The trunk index (ratio of biacromial breadth and sitting suprasternal height) is slightly higher in male (66.65) than in female (62.18). The relative biacromial breadth index suggests that the males have medium (47%) to broad.
Table 4.1: Statistical constants of body measurements among the male and female Onge

<table>
<thead>
<tr>
<th>Measurements</th>
<th>MALE</th>
<th>FEMALE</th>
<th>t-values for sex differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SE</td>
<td>SD ± SE</td>
<td>CV ± SE</td>
</tr>
<tr>
<td>Stature</td>
<td>151 25 ± 0.77</td>
<td>4 82 ± 0.55</td>
<td>3 19 ± 0.36</td>
</tr>
<tr>
<td>Sitting Height</td>
<td>78 20 ± 0.41</td>
<td>2 54 ± 0.29</td>
<td>3 25 ± 0.37</td>
</tr>
<tr>
<td>Sitting Suprasternal Height</td>
<td>51 04 ± 0.47</td>
<td>2 91 ± 0.33</td>
<td>5 69 ± 0.65</td>
</tr>
<tr>
<td>Total Arm Length</td>
<td>68 51 ± 0.42</td>
<td>2 61 ± 0.30</td>
<td>3 81 ± 0.44</td>
</tr>
<tr>
<td>Upper Arm Length</td>
<td>29 62 ± 0.19</td>
<td>1 17 ± 0.13</td>
<td>3 95 ± 0.45</td>
</tr>
<tr>
<td>Fore Arm Length</td>
<td>24 22 ± 0.19</td>
<td>1 16 ± 0.13</td>
<td>4 77 ± 0.55</td>
</tr>
<tr>
<td>Hand Length</td>
<td>16 84 ± 0.16</td>
<td>0 98 ± 0.11</td>
<td>5 80 ± 0.66</td>
</tr>
<tr>
<td>Hand Breadth</td>
<td>7 79 ± 0.06</td>
<td>0 35 ± 0.04</td>
<td>4 55 ± 0.52</td>
</tr>
<tr>
<td>Upper Leg Length</td>
<td>45 14 ± 0.30</td>
<td>1 85 ± 0.21</td>
<td>4 10 ± 0.47</td>
</tr>
<tr>
<td>Lower Leg Length</td>
<td>35 15 ± 0.31</td>
<td>1 89 ± 0.22</td>
<td>5 38 ± 0.62</td>
</tr>
<tr>
<td>Foot Length</td>
<td>23 42 ± 0.17</td>
<td>1 05 ± 0.12</td>
<td>4 48 ± 0.51</td>
</tr>
<tr>
<td>Foot Breadth</td>
<td>9 87 ± 0.08</td>
<td>0 47 ± 0.05</td>
<td>4 74 ± 0.54</td>
</tr>
<tr>
<td>Biaxial Breadth</td>
<td>33 94 ± 0.17</td>
<td>1 07 ± 0.12</td>
<td>3 14 ± 0.36</td>
</tr>
<tr>
<td>Buhac Breadth</td>
<td>23 14 ± 0.14</td>
<td>0 89 ± 0.10</td>
<td>3 83 ± 0.44</td>
</tr>
<tr>
<td>Chest Girth (Exh)</td>
<td>81 13 ± 0.59</td>
<td>3 61 ± 0.41</td>
<td>4 45 ± 0.51</td>
</tr>
<tr>
<td>Chest Girth (Inh)</td>
<td>82 73 ± 0.60</td>
<td>3 72 ± 0.43</td>
<td>4 49 ± 0.51</td>
</tr>
<tr>
<td>Upper Arm Girth</td>
<td>26 17 ± 0.31</td>
<td>1 85 ± 0.21</td>
<td>7 06 ± 0.81</td>
</tr>
<tr>
<td>Fore Arm Girth</td>
<td>24 20 ± 0.19</td>
<td>1 20 ± 0.14</td>
<td>4 96 ± 0.57</td>
</tr>
<tr>
<td>Thigh Girth</td>
<td>46 22 ± 0.58</td>
<td>3 56 ± 0.41</td>
<td>7 71 ± 0.88</td>
</tr>
<tr>
<td>Calf Girth</td>
<td>30 68 ± 0.31</td>
<td>1 91 ± 0.22</td>
<td>6 23 ± 0.71</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>45 78 ± 0.79</td>
<td>4 93 ± 0.56</td>
<td>10 79 ± 1.22</td>
</tr>
<tr>
<td><strong>Indices</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brachial</td>
<td>38 81 81 ± 0.52</td>
<td>3 31 ± 0.38</td>
<td>3 92 ± 0.45</td>
</tr>
<tr>
<td>Trunk</td>
<td>38 66 65 ± 0.55</td>
<td>3 39 ± 0.39</td>
<td>5 09 ± 0.58</td>
</tr>
<tr>
<td>Hand</td>
<td>39 46 37 ± 0.44</td>
<td>2 74 ± 0.31</td>
<td>5 91 ± 0.67</td>
</tr>
<tr>
<td>Foot</td>
<td>39 42 18 ± 0.33</td>
<td>2 04 ± 0.23</td>
<td>4 83 ± 0.55</td>
</tr>
<tr>
<td>Relative Biacromial Breadth</td>
<td>38 22 43 ± 0.11</td>
<td>0 66 ± 0.08</td>
<td>2 94 ± 0.34</td>
</tr>
<tr>
<td>Relative Caruncular Breadth</td>
<td>38 15 29 ± 0.08</td>
<td>0 50 ± 0.06</td>
<td>3 27 ± 0.38</td>
</tr>
<tr>
<td>Relative Sitting Height</td>
<td>39 51 72 ± 0.19</td>
<td>1 17 ± 0.13</td>
<td>2 26 ± 0.26</td>
</tr>
<tr>
<td>Body Surface Area (m²)</td>
<td>39 1 41 ± 0.01</td>
<td>0 09 ± 0.01</td>
<td>6 38 ± 0.72</td>
</tr>
<tr>
<td>Pelidist</td>
<td>39 98 45 ± 0.46</td>
<td>2 84 ± 0.32</td>
<td>2 88 ± 0.33</td>
</tr>
</tbody>
</table>
shoulder (42%) while the female mostly have narrow shoulders (72%) followed by medium type (25%).

4.1.4 **Iliocristal Breadth**

The mean iliocristal breadth among the females (23.68 cm) exceed that of males (23.14 cm). The index of relative bicristal breadth indicate that the Onge have mostly narrow pelvis (male 100%, female 69%). The medium (25%) and broad (6%) pelvis type are also present among the Onge females.

4.1.5 **Upper Limb Measurements**

The mean values of the total arm length, upper arm length, forearm length, hand length and hand breadth of the Onge male and female are given in Table 4.1. The mean values of these measurements are greater in males than in females and sex differences are statistically significant. It is interesting to note that the mean brachial index among the male and female is almost equal and the differences are statistically non significant. The Onge hands in general are short and broad (hand index: male 46.47 and female 43.78).

4.1.6 **Lower Limb Measurements**

The lower limb measurements include the upper leg length, lower leg length, foot length and foot breadth. The results of these measurements are presented in Table 4.1 separately for male and female Onges. All these measurements suggest that female possess a relatively shorter lower limb than the males and these differences are statistically significant. Only the foot index is derived from the measurements and the sex differences is statistically non significant.

4.1.6 **Girth Measurements**

Altogether four girth measurements on the limbs such as upper arm girth, forearm girth, thigh girth and calf girth among both the sexes and the chest girth both inhalant and exhalent conditions of the male Onges are presented in Table 4.1. The chest girth in exhalent and inhalent condition of the male Onges is 81.13 cm and 82.73 cm respectively.
with a difference of 1.60 cm. It is interesting to point out that the females show greater thigh 
girth (48.68 cm) and upper arm girth (26.50 cm) than the males (thigh girth = 46.22 cm and 
upper arm girth = 26.17 cm), indicating that the women have more fat depositions on the 
segment of the limbs. The upper arm girth differences are statistically non significant. In 
contrast among the males, the forearm girth (24.20 cm) and calf girth (30.68 cm) are 
relatively greater than that of female (forearm girth = 20.78 cm and calf girth = 28.68 cm). 
This suggests that the male Onges are more muscular.

Table 4.2 : Classificatory categories of various body measurements and proportion of 
Onge males and females

<table>
<thead>
<tr>
<th>Class</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>n.</td>
</tr>
<tr>
<td>Classification: Stature (Martin)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very short</td>
<td>130.0 -149.9</td>
<td>15</td>
</tr>
<tr>
<td>Short</td>
<td>150.0 -159.9</td>
<td>22</td>
</tr>
<tr>
<td>Below medium</td>
<td>160.0 -163.9</td>
<td>2</td>
</tr>
<tr>
<td>Medium</td>
<td>164.0 -166.9</td>
<td>-</td>
</tr>
<tr>
<td>Classification: Sitting Height</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very short</td>
<td>x - 74.9</td>
<td>3</td>
</tr>
<tr>
<td>Short</td>
<td>75.0 - 79.9</td>
<td>27</td>
</tr>
<tr>
<td>Medium</td>
<td>80.0 - 84.9</td>
<td>9</td>
</tr>
<tr>
<td>Classification: Bicromial Breadth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very small</td>
<td>x - 34.1</td>
<td>24</td>
</tr>
<tr>
<td>Small</td>
<td>34.2 - 35.9</td>
<td>13</td>
</tr>
<tr>
<td>Below medium</td>
<td>36.0 - 36.7</td>
<td>1</td>
</tr>
<tr>
<td>Medium</td>
<td>36.8 - 38.5</td>
<td>-</td>
</tr>
<tr>
<td>Classification: Relative Sitting Height Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brachycormic</td>
<td>x - 50.9</td>
<td>10</td>
</tr>
<tr>
<td>Metriocormic</td>
<td>51.0 - 52.9</td>
<td>26</td>
</tr>
<tr>
<td>Macrocormic</td>
<td>53.0+</td>
<td>3</td>
</tr>
<tr>
<td>Classification: Pelidisi (Pirquet) Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malnutrition</td>
<td>x - 95</td>
<td>5</td>
</tr>
<tr>
<td>Normal</td>
<td>95 - 100</td>
<td>23</td>
</tr>
<tr>
<td>Overfed</td>
<td>100+</td>
<td>11</td>
</tr>
<tr>
<td>Classification: Relative Biacromial Breadth Index (Brugsch)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narrow shoulder</td>
<td>x - 22.0</td>
<td>8</td>
</tr>
<tr>
<td>Medium shoulder</td>
<td>22.1 - 23.0</td>
<td>23</td>
</tr>
<tr>
<td>Broad shoulder</td>
<td>23.1+</td>
<td>7</td>
</tr>
<tr>
<td>Classification: Relative Bicristal Breadth Index (Brugsch)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narrow pelvic</td>
<td>x - 16.4</td>
<td>37</td>
</tr>
<tr>
<td>Medium pelvic</td>
<td>16.5 - 17.4</td>
<td>1</td>
</tr>
<tr>
<td>Broad pelvic</td>
<td>17.5+</td>
<td>-</td>
</tr>
</tbody>
</table>
4.1.7 Weight

Weight is the most composite of all body measurement and is directly correlated with girth of trunk and limbs. On an average the male Onges are 3 kg heavier than the female Onges (Table 4.1). The mean weight of the Onge male and female is 45.78 kg and 42.70 kg respectively. Body weight along with stature gives the body surface area (BSA) of an individual. Du Bois' formulae for estimating the body surface area as quoted by Majumdar (1950) was followed in the present study. The average body surface area of the Onge males and females are $1.44 \pm 0.01 \text{ m}^2$ and $1.33 \pm 0.02 \text{ m}^2$ respectively. Sitting height is considered more suitable compared to stature for estimating the body weight, therefore, the Pelidise Index has been calculated following Mason (1931). The mean Pelidise Index among the female is remarkably higher (103.12) than that of the male (98.45). According to conventional classification of this index, the Onge male shows a normal state of nutrition (59%) followed by overfed (28%), while the majority of the female shows overfed category (76%) followed by normal state of nutrition (18%). Thus the obesity among the female Onge is a very common feature.

4.2 Head and Face Measurements and Indices

Sixteen measurements on head and face among 39 males and 34 females Onges were taken. Based on these measurements seven indices were computed for each individual. In Table 4.3 are given mean, SD and CV along with SE of all the measurements as well as the indices. Classificatory categories of various measurements on head and face and their proportions showing Onge males and females separately are presented in Table 4.4. Salient features on head and face measurements are described below.

4.2.1 Head Length

The mean value of maximum head length among the Onge male and female are 17.19 cm and 16.44 cm respectively. The frequency distribution of head length in conventional category of classification (Table 4.4) shows that 92% of individuals are in short to very short category.
4.2.2 **Head Breadth**

The mean maximum head breadth in male is 14.49 cm and in female 13.82 cm. The below medium category, however, predominates (54%), followed by narrow (31%) head breadth, according to conventional classification. The sex differences with regard to head length and head breadth are statistically significant.

4.2.3 **Cephalic Index**

The mean cephalic index in both the sexes of Onge are almost equal (male = 84.29 and female = 82.08). These differences are statistically non significant. The distribution of cephalic index in various conventional categories suggests that a majority of the Onges of both the sexes belong to brachycephal (male 67% and female 62%), followed by hyperbrachycephal (male 28% and female 29%).

4.2.4 **Auricular Head Height**

The mean auricular head height is slightly greater in male (12.29 cm) than female (11.81 cm). The length-height index and breadth-height index has also been computed and presented in Table 4.3. The length - height index clearly suggests a hypsicephalic head form among the Onge (male 100% and female 96%), while the breadth – height index shows that the Onges possess metriocephal (male 55% and female 35%) to acrocephal forms (male 45% and female 62%). These two indices suggests that the Onges are a high vaulted people.

4.2.5 **Horizontal Head Circumference**

The mean value of horizontal head circumference in males (52.41 cm) is greater than the females (49.84 cm) and the differences are statistically significant.

4.2.6 **Minimum Frontal Breadth**

The minimum frontal breadth of the Onge is relatively broad. The mean value of minimum frontal breadth in males (11.3 cm) is slightly higher than that of the female (10.95 cm). According to the conventional classification, a majority of the male Onges belong to broad categories (72%), followed by above medium (23%).
Table 4.3: Statistical constants of the measurements of head and face among the male and female Onge

<table>
<thead>
<tr>
<th>Measurements</th>
<th>MALE</th>
<th>FEMALE</th>
<th>t values for sex differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>(cm) N Mean ± S.E. SD ± S.E. CV ± S.E.</td>
<td>N Mean ± S.E. SD ± S.E. CV ± S.E.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Length</td>
<td>17.19 ± 0.08  0.49 ± 0.06  2.82 ± 0.32</td>
<td>16.44 ± 0.08  0.47 ± 0.06  2.88 ± 0.35</td>
<td>6.73</td>
</tr>
<tr>
<td>Head Breadth</td>
<td>14.49 ± 0.07  0.42 ± 0.05  2.89 ± 0.33</td>
<td>13.82 ± 0.07  0.38 ± 0.05  2.79 ± 0.34</td>
<td>7.18</td>
</tr>
<tr>
<td>Head Height</td>
<td>12.29 ± 0.09  0.59 ± 0.07  4.77 ± 0.55</td>
<td>11.81 ± 0.13  0.64 ± 0.09  5.42 ± 0.75</td>
<td>3.08</td>
</tr>
<tr>
<td>Head Circumference</td>
<td>52.41 ± 0.22  1.38 ± 0.16  2.63 ± 0.03</td>
<td>49.84 ± 0.21  1.17 ± 0.15  2.34 ± 0.29</td>
<td>8.45</td>
</tr>
<tr>
<td>Min Frontal Breadth</td>
<td>11.33 ± 0.08  0.50 ± 0.06  4.45 ± 0.51</td>
<td>10.95 ± 0.07  0.39 ± 0.05  3.55 ± 0.44</td>
<td>3.53</td>
</tr>
<tr>
<td>Bitemporal Breadth</td>
<td>13.05 ± 0.06  0.37 ± 0.04  2.81 ± 0.32</td>
<td>12.27 ± 0.07  0.38 ± 0.05  3.13 ± 0.38</td>
<td>8.74</td>
</tr>
<tr>
<td>Bbidental Breadth</td>
<td>10.08 ± 0.09  0.58 ± 0.07  5.75 ± 0.65</td>
<td>9.29 ± 0.07   0.43 ± 0.05  4.64 ± 0.56</td>
<td>6.60</td>
</tr>
<tr>
<td>Total Facial Height</td>
<td>10.24 ± 0.08  0.48 ± 0.05  4.64 ± 0.52</td>
<td>9.22 ± 0.08   0.47 ± 0.06  5.07 ± 0.61</td>
<td>9.25</td>
</tr>
<tr>
<td>Upper Facial Height</td>
<td>5.61 ± 0.06   0.37 ± 0.04  6.58 ± 0.74</td>
<td>4.13 ± 0.07   0.39 ± 0.05  7.67 ± 0.96</td>
<td>5.26</td>
</tr>
<tr>
<td>Nasal Breadth</td>
<td>4.29 ± 0.04   0.24 ± 0.03  5.55 ± 0.63</td>
<td>3.96 ± 0.05   0.31 ± 0.04  7.95 ± 0.96</td>
<td>5.09</td>
</tr>
<tr>
<td>Nasal Depth</td>
<td>3.88 ± 0.05   0.29 ± 0.03  7.66 ± 0.87</td>
<td>3.52 ± 0.04   0.21 ± 0.03  5.87 ± 0.71</td>
<td>6.08</td>
</tr>
<tr>
<td>Mouth Breadth</td>
<td>1.49 ± 0.03   0.17 ± 0.02  11.21 ± 1.28</td>
<td>1.34 ± 0.04   0.23 ± 0.03  17.07 ± 2.20</td>
<td>3.16</td>
</tr>
<tr>
<td>Ear Length</td>
<td>4.92 ± 0.05   0.30 ± 0.03  6.19 ± 0.70</td>
<td>4.58 ± 0.08   0.44 ± 0.06  9.56 ± 1.19</td>
<td>3.66</td>
</tr>
<tr>
<td>Ear Breadth</td>
<td>5.72 ± 0.05   0.31 ± 0.03  5.42 ± 0.61</td>
<td>5.58 ± 0.05   0.32 ± 0.04  5.80 ± 0.70</td>
<td>1.88</td>
</tr>
<tr>
<td>(Cephalic) Length - Breadth</td>
<td>84.29 ± 0.35  2.20 ± 0.25  2.61 ± 0.29</td>
<td>84.08 ± 0.38  2.21 ± 0.27  2.62 ± 0.32</td>
<td>0.41</td>
</tr>
<tr>
<td>Length - Height</td>
<td>71.55 ± 0.53  3.28 ± 0.38  4.59 ± 0.53</td>
<td>71.61 ± 0.73  3.70 ± 0.51  5.17 ± 0.72</td>
<td>0.07</td>
</tr>
<tr>
<td>Height - Breadth</td>
<td>84.90 ± 0.68  4.16 ± 0.48  4.90 ± 0.56</td>
<td>85.25 ± 0.77  3.93 ± 0.54  4.60 ± 0.64</td>
<td>0.34</td>
</tr>
<tr>
<td>Breadth - Height</td>
<td>78.44 ± 0.51  3.22 ± 0.36  4.10 ± 0.46</td>
<td>75.17 ± 0.70  4.06 ± 0.49  5.39 ± 0.65</td>
<td>3.76</td>
</tr>
<tr>
<td>Total Facial</td>
<td>77.27 ± 0.71  4.44 ± 0.50  5.75 ± 0.65</td>
<td>75.80 ± 0.67  3.91 ± 0.47  5.16 ± 0.63</td>
<td>3.76</td>
</tr>
<tr>
<td>Jugo - Mandibular</td>
<td>90.53 ± 1.28  7.99 ± 0.90  8.82 ± 1.00</td>
<td>89.37 ± 1.32  7.69 ± 0.93  8.61 ± 1.04</td>
<td>0.63</td>
</tr>
<tr>
<td>Nasal</td>
<td>38.87 ± 0.84  5.16 ± 0.59  13.27 ± 1.52</td>
<td>38.28 ± 1.23  6.75 ± 0.87  17.62 ± 2.27</td>
<td>0.40</td>
</tr>
</tbody>
</table>
Table 4.4 Classificatory categories of various measurements on head and face and their proportions among Onge males and females

<table>
<thead>
<tr>
<th>Classification: Head Length (Lebzelter and Sailer)</th>
<th>Range</th>
<th>Male</th>
<th>%</th>
<th>Female</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very short</td>
<td>x - 16 9</td>
<td>8</td>
<td>20.51</td>
<td>x - 16 1</td>
<td>10</td>
</tr>
<tr>
<td>Short</td>
<td>17 0 - 17 7</td>
<td>28</td>
<td>71.79</td>
<td>16 2 - 16 9</td>
<td>20</td>
</tr>
<tr>
<td>Medium</td>
<td>17 8 - 18 5</td>
<td>3</td>
<td>7.69</td>
<td>7.0 - 17 6</td>
<td>4</td>
</tr>
<tr>
<td>Long</td>
<td>18 6 - 19 3</td>
<td>-</td>
<td>-</td>
<td>17.7 - 18 4</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Head Breadth (Lebzelter and Sailer)</th>
<th>Range</th>
<th>Male</th>
<th>%</th>
<th>Female</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very narrow</td>
<td>x - 13 9</td>
<td>3</td>
<td>7.69</td>
<td>x - 13.4</td>
<td>6</td>
</tr>
<tr>
<td>Narrow</td>
<td>14 0 - 14 7</td>
<td>12</td>
<td>30.77</td>
<td>13.5 - 14 1</td>
<td>21</td>
</tr>
<tr>
<td>Below medium</td>
<td>14 8 - 15 5</td>
<td>21</td>
<td>53.85</td>
<td>14.2 - 14 9</td>
<td>7</td>
</tr>
<tr>
<td>Medium</td>
<td>15 6 - 16 3</td>
<td>3</td>
<td>7.69</td>
<td>15.0 - 15 7</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Cephalic Index</th>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolichocephal</td>
<td>71 0 - 75 9</td>
<td>-</td>
<td>-</td>
<td>72.0 - 76 9</td>
<td>-</td>
</tr>
<tr>
<td>Mesocephal</td>
<td>76 0 - 80 9</td>
<td>2</td>
<td>5.13</td>
<td>77.0 - 81 9</td>
<td>3</td>
</tr>
<tr>
<td>Brachycephal</td>
<td>81 0 - 85 4</td>
<td>26</td>
<td>66.67</td>
<td>82.0 - 86 4</td>
<td>21</td>
</tr>
<tr>
<td>Hyperbrachycephal</td>
<td>85 5 - 90 9</td>
<td>11</td>
<td>28.20</td>
<td>86.5 - 91 9</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Length-Height Index of Head (Sailer)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chamaecephal</td>
<td>x - 57 6</td>
<td>-</td>
<td>-</td>
<td>x - 57 9</td>
<td>-</td>
</tr>
<tr>
<td>Orthocephal</td>
<td>57 7 - 62 5</td>
<td>-</td>
<td>-</td>
<td>58 0 - 62 9</td>
<td>1</td>
</tr>
<tr>
<td>Hypocephal</td>
<td>62 6 +</td>
<td>39</td>
<td>100.00</td>
<td>63 0+</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Breadth-Height Index of Head (Martin &amp; Sailer)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tapeinocephal</td>
<td>x - 78 9</td>
<td>-</td>
<td>-</td>
<td>x - 78 9</td>
<td>1</td>
</tr>
<tr>
<td>Metrocephal</td>
<td>79 0 - 84 9</td>
<td>21</td>
<td>53.26</td>
<td>79.0 - 84 9</td>
<td>9</td>
</tr>
<tr>
<td>Acrocephal</td>
<td>85 0+</td>
<td>17</td>
<td>44.74</td>
<td>85 0+</td>
<td>16</td>
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<table>
<thead>
<tr>
<th>Classification: Minimum Frontal Breadth</th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Below Medium</td>
<td>9.5 - 9 9</td>
<td>-</td>
<td>-</td>
<td>9.5 - 9 9</td>
<td>-</td>
</tr>
<tr>
<td>Medium</td>
<td>10 0 - 10 4</td>
<td>1</td>
<td>2.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above Medium</td>
<td>10 5 - 10 9</td>
<td>9</td>
<td>23.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broad</td>
<td>11 0+</td>
<td>28</td>
<td>71.79</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Bzygomatic Breadth (Lebzelter and Sailer)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Narrow</td>
<td>x - 12 7</td>
<td>7</td>
<td>17.95</td>
<td>x - 12 0</td>
<td>11</td>
</tr>
<tr>
<td>Narrow</td>
<td>12 8 - 13 5</td>
<td>28</td>
<td>71.79</td>
<td>12 1 - 12 7</td>
<td>19</td>
</tr>
<tr>
<td>Medium</td>
<td>13 6 - 14 3</td>
<td>4</td>
<td>10.26</td>
<td>12 8 - 13 5</td>
<td>4</td>
</tr>
<tr>
<td>Broad</td>
<td>14 4 - 15 7</td>
<td>-</td>
<td>-</td>
<td>13 6 - 14 2</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Total Facial Height (Lebzelter &amp; Sailer)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>x - 11 1</td>
<td>39</td>
<td>100.00</td>
<td>x - 10 2</td>
<td>33</td>
</tr>
<tr>
<td>Low</td>
<td>11 2 - 11 7</td>
<td>11</td>
<td>10.00</td>
<td>10 3 - 10 7</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Total Facial Index (Martin &amp; Sailer)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperieryprosop</td>
<td>x - 78 9</td>
<td>21</td>
<td>53.85</td>
<td>x - 78 9</td>
<td>26</td>
</tr>
<tr>
<td>Euryprosop</td>
<td>79 0 - 83 9</td>
<td>17</td>
<td>43.59</td>
<td>77 0 - 80 9</td>
<td>8</td>
</tr>
<tr>
<td>Mesoprosop</td>
<td>84 0 - 87 9</td>
<td>1</td>
<td>2.56</td>
<td>81 0 - 84 9</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Nasal Height</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Short</td>
<td>x - 3 9</td>
<td>2</td>
<td>5.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short</td>
<td>4 0 - 4 4</td>
<td>25</td>
<td>64.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below Medium</td>
<td>4 5 - 4 9</td>
<td>12</td>
<td>30.77</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Nasal Breadth (Schlaginhaufen)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>3 0 - 3 4</td>
<td>2</td>
<td>5.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above Medium</td>
<td>3 5 - 3 9</td>
<td>20</td>
<td>51.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>4 0+</td>
<td>17</td>
<td>43.59</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification: Nasal Index (Martin and Sailer)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesorrhine</td>
<td>70 0 - 84 9</td>
<td>9</td>
<td>23.08</td>
<td>70 0 - 84 9</td>
<td>10</td>
</tr>
<tr>
<td>Platyrhine</td>
<td>85 0 - 99 9</td>
<td>23</td>
<td>58.97</td>
<td>85 0 - 99 9</td>
<td>27</td>
</tr>
<tr>
<td>Hyperplatyrhine</td>
<td>100 0+</td>
<td>7</td>
<td>17.95</td>
<td>100 0+</td>
<td>3</td>
</tr>
</tbody>
</table>
4.2.7 **Bizygomatic Breadth**

The mean values of maximum bizygomatic breadth is 13.05 cm and 12.27 cm respectively in male and female. According to Saller's classification (1930), the narrow to very narrow bizygomatic breadth category are the predominant type among both sexes of the Onge.

4.2.8 **Bigonial Breadth**

The mean bigonial breadth is slightly greater in male (10.88 cm) than the female (9.20 cm), and the differences are statistically significant. The Onges are medium to below medium is bigonial breadth, as per the conventional classification.

4.2.9 **Total Facial Height**

The mean of this measurement in the male is 10.24 cm and in female 9.22 cm. According to Lebzelter-Saller's classification (Saller, 1930) the Onge possess very low facial height.

4.2.10 **Upper Facial Height**

The mean value of upper facial height is slightly higher is male (5.61 cm) than the female (5.13 cm) and the differences are statistically significant. The Onge males have predominantly very low height (90%), followed by low height (10%).

4.2.11 **Total Facial Index**

In order to understand the shape of the face, the total facial index has been computed (Table 4.3). The mean values of this index are 78.44 and 75.17 in males and females respectively. According to Labzelter-Saller's classification (Saller, 1930) the Onges are predominantly hypereuryprosopic (male 54% and female 82%), followed by euryprosophic (male 42 % and female 18%). The females show relatively broader face than the males and the differences are statistically significant.
4.2.12 *Jugo-mandibular Index*

The mean jugo mandibular index in male (77.27) is higher than the female (75.80). The bizygomatic breadth on an average is 3 cm broader than the bigonial breadth in both the sexes.

4.2.13 *Nasal Height*

The mean values of nasal height indicates that the Onge have short (male 64%) to below medium (male 31%) type of nose. The means being 4.29 cm, and 3.96 cm in male and female respectively. The differences are statistically significant.

4.2.14 *Nasal Breadth*

The mean nasal breadth is slightly greater in male (3.88 cm) than the female (3.52 cm). The frequency distribution in the conventional classification, shows that the Onge have above medium (male 51%) to broad (male 44%) nasal breadth.

4.2.15 *Nasal Index*

The mean nasal index among Onge men and women are 90.53 and 89.37 respectively. The sex differences are not statistically significant. The nasal index of a majority of the Onge is platyrhine (male 59%, female 61%), followed by mesorrhine (male 23%, female 29%), according to conventional classification. Thus the Onge have a short and moderately broad nose.

4.2.16 *Nasal Elevation Index*

The mean of this index is more or less same in both the sexes (male 38.87 ; female 38.28 ) and the differences are statistically non significant.

4.2.17 *Mouth Breadth*

The mean mouth breadth among the male and female Onge varies between 4.92 cm and 4.58 cm respectively.

4.2.18 *Ear Length and Breadth*

The mean ear length among the Onge male and female is 5.72 cm and 5.58 cm respectively. The mean ear breadth of male (3.29 cm) is greater than that of the female
The sex differences with regards to ear length are statistically significant while ear breadth does not indicate any statistically significant sex differences.

From the foregoing presentation it is evident that the Onge are short to very short stature people and on an average they are well built. The Onge are brachycephalic to hyper-brachycephalic in head form and possess moderately broad nose. The shape of their face is mostly round.

4.3 Relationship of Age with Stature, Weight and Biceps Girth

No earlier report is known about the growth process of the Onge. To know the growth pattern in this small population an attempt has been made to analyse the height, weight and arm circumference of various of age groups including children. For this analysis 15 children (7 males and 8 females) were also studied. Thus the total sample analysed consists of 84 (males 45 and 39 females). Table 4.5 shows the mean stature, weight and arm circumference of various age group from 2 years to 60 years in both the sexes. The growth in stature in both the sexes is completed at about the age of 30 years in general and begin to decline from the end of 40 years. In contrast to the stature, the body weight reaches the maximum in male in the 20-24 age class and in female in the 25-29 years age class. The average birth weight among the male and female is 2.54 kg. and 2.39 kg respectively as recorded in the Health Centre (Table 4.5). The biceps girth reveals an interesting pattern with some minor variation. There is a substantial increase in biceps girth from early to late 30 years of age in case of male with a definite decline from the late 40 years. On the contrary in female there is a substantial decrease in 30-39 years which further increases after 40 years.

4.4 Comparison with Earlier Studies : An analysis of Temporal Changes

To ascertain the temporal changes, if any, in morphological characters the present metric data on head, face and body of the Onge have been compared with the corresponding measurements reported in earlier studies. There are four series of published data on the anthropometry of the Onge based on small sample of a few limited bands (Eickstedt, 1928,
Guha, 1954; Chatterjee, 1955; Mitra, 1962). Table 4.6 presents the mean values and standard error of 20 metric characters and 9 indices of the Onge taken over a period of 37 years (1948-1985). To compare the mean values of the corresponding measurements, t-test was applied and the t-values are given in Table 4.6. Out of 20 metric characters four characters such as head length, nose breadth, nose depth and biacromial breadth and four indices viz., breadth-height index of head, jugo-mandibular index of face, nasal elevation index and brachial index of arm do not show any significant differences (Table 4.6), and are comparable with the present series, but the other measurements show considerable deviation in all the series.

In respect of stature the present study shows considerable higher mean values than that of the earlier studies except the study by Mitra (1962). The mean stature of the Onge males was reported to be 148.10 cm in 1927 by Eckstedt (1928). Guha in 1948 (1954) reported 148.28 cm. However, it is highly noteworthy that the stature in the present study conducted in 1985 was found to be 151.25 cm. In respect of female Onge similar increasing

Table 4.5: Mean values of stature, weight and biceps girth among the Onges in various age groups

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Sample Size</th>
<th>Stature (cm)</th>
<th>Weight (kg)</th>
<th>Biceps Girth (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Age at birth*</td>
<td>5</td>
<td>8</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2+</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>—</td>
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<tr>
<td>3+</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4+</td>
<td>1</td>
<td>1</td>
<td>86.6</td>
<td>82.5</td>
</tr>
<tr>
<td>5+</td>
<td>1</td>
<td>2</td>
<td>89.2</td>
<td>90.8</td>
</tr>
<tr>
<td>6-7</td>
<td>1</td>
<td>1</td>
<td>96.7</td>
<td>93.4</td>
</tr>
<tr>
<td>8-9</td>
<td>1</td>
<td>—</td>
<td>102.4</td>
<td>—</td>
</tr>
<tr>
<td>10-13</td>
<td>2</td>
<td>1</td>
<td>104.9</td>
<td>107.7</td>
</tr>
<tr>
<td>14-17</td>
<td>1</td>
<td>1</td>
<td>144.0</td>
<td>138.1</td>
</tr>
<tr>
<td>18-24</td>
<td>5</td>
<td>2</td>
<td>152.7</td>
<td>138.8</td>
</tr>
<tr>
<td>25-29</td>
<td>2</td>
<td>2</td>
<td>150.9</td>
<td>139.6</td>
</tr>
<tr>
<td>30-39</td>
<td>12</td>
<td>11</td>
<td>151.8</td>
<td>142.0</td>
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<tr>
<td>40-45</td>
<td>13</td>
<td>10</td>
<td>151.0</td>
<td>141.8</td>
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<tr>
<td>50-59</td>
<td>6</td>
<td>6</td>
<td>149.6</td>
<td>139.1</td>
</tr>
</tbody>
</table>

* Source: Dugong Creek Health Centre.
trend is seen: Guha (1954) in 1948 found it to be 137.86 cm, while Chatterjee (1955) in 1955 found it to be 140.70 cm. In the present study (1985) the stature was found to be 140.81. These differences are statistically significant. Thus it is evident that during the last 37 years (1948-1985) the stature of both male and female Onges have increased by 2.97 cm and 2.95 cm respectively. These changes may be ascribed to secular reasons owing to the changes in dietary practices in the recent past as reported earlier.

Table 4.6: Comparison of the present Onge data with the earlier studies

<table>
<thead>
<tr>
<th>Meaurements</th>
<th>1948 M (n=14)</th>
<th>1948 F (n=15)</th>
<th>1955 M (n=6)</th>
<th>1955 F (n=6)</th>
<th>1985 M (n=27)</th>
<th>1985 F (n=23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST</td>
<td>148.28±1.00</td>
<td>137.86±1.08</td>
<td>151.80</td>
<td>140.70</td>
<td>147.25±1.10</td>
<td>138.95±1.12</td>
</tr>
<tr>
<td>AHH</td>
<td>11.0±0.9</td>
<td>11.07±0.8</td>
<td>11.55</td>
<td>12.08</td>
<td>12.3±0.6</td>
<td>11.8±0.7</td>
</tr>
<tr>
<td>HL</td>
<td>16.97±0.12</td>
<td>16.58±0.10</td>
<td>17.75</td>
<td>16.57</td>
<td>17.1±0.8</td>
<td>16.4±0.8</td>
</tr>
<tr>
<td>HB</td>
<td>13.9±0.11</td>
<td>13.76±0.11</td>
<td>15.05</td>
<td>13.78</td>
<td>14.4±0.7</td>
<td>13.8±0.7</td>
</tr>
<tr>
<td>MBF</td>
<td>9.78±0.1</td>
<td>9.81±0.1</td>
<td>10.60</td>
<td>9.83</td>
<td>11.3±0.8</td>
<td>10.9±0.8</td>
</tr>
<tr>
<td>BZB</td>
<td>12.70±0.12</td>
<td>12.2±0.12</td>
<td>13.55</td>
<td>12.70</td>
<td>13.05±0.8</td>
<td>12.7±0.8</td>
</tr>
<tr>
<td>BGB</td>
<td>9.71±0.14</td>
<td>8.88±0.11</td>
<td>9.90</td>
<td>8.90</td>
<td>10.08±0.9</td>
<td>9.29±0.9</td>
</tr>
<tr>
<td>NH</td>
<td>4.57±0.06</td>
<td>4.3±0.08</td>
<td>5.32</td>
<td>4.65</td>
<td>4.29±0.4</td>
<td>3.96±0.4</td>
</tr>
<tr>
<td>NB</td>
<td>3.81±0.07</td>
<td>3.52±0.08</td>
<td>4.10</td>
<td>3.58</td>
<td>3.88±0.5</td>
<td>3.52±0.4</td>
</tr>
<tr>
<td>ND</td>
<td>1.4±0.05</td>
<td>1.8±0.04</td>
<td>1.25</td>
<td>1.30</td>
<td>1.49±0.3</td>
<td>1.34±0.4</td>
</tr>
<tr>
<td>UFH</td>
<td>6.88±0.07</td>
<td>6.5±0.08</td>
<td>5.61±0.6</td>
<td>5.13±0.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TFH</td>
<td>10.6±0.13</td>
<td>9.83±0.12</td>
<td>10.90</td>
<td>9.99</td>
<td>10.24±0.8</td>
<td>9.22±0.8</td>
</tr>
<tr>
<td>HHNC</td>
<td>49.62±0.36</td>
<td>49.24±0.29</td>
<td>52.10</td>
<td>48.72</td>
<td>52.41±0.22</td>
<td>49.84±0.21</td>
</tr>
</tbody>
</table>

It is also observed that in stature the mean values of the present series lies in between the values reported from the Onge sample at Dugong Creek (Guha, 1954) and Hut Bay (Mitra, 1962), which suggest perhaps existence of an intra-band variation.

It is interesting to point out that the studies on skeletal biology of the Onge as reported by Gupta et al (1960) are in agreement with the present living Onge population.

1 Guha (1954), 2 Mitra (1962), 3 Chatterjee (1955), 4 Present Study M = male, F = Female.
The study on skeletal biology reveals that the Onge skulls are brachycranial, hypsicranial, metriocranial, with mostly low faced and broad nose. The stature calculated from long bones were also very short to below medium class (Gupta et al., 1960), as observed in the present Onge population.

4.5 Homogeneity Test Between Various Studies

The standard deviation (SD) gives a good indication of the variability of the population. It tends to increase with the increase in variability of the sample. The SD of the distribution of anthropometric characters have generally been found to be of the same order of magnitude for any homogeneous group of individuals (Majumdar and Rao, 1960). It is therefore of interest to examine whether the Onges differ in this respect. Thus the test of homogeneity between various samples of the Onge collected earlier were estimated following Bartlett's (1932) $\chi^2$ approximation ($M$). Table 4.7 presents the estimates of SD of 17 variables for males and females of three sample series of the Onge. The results of Bartlett's $\chi^2$ approximation ($M$) have also been provided in this Table. The statistical significance of the test may be obtained by entering the critical values of $M$ at the 5 per cent point of $\chi^2$ distribution with $k - 1$ degrees of freedom. It may be seen that out of 17 variables, only three characters among the males relating to stature, biacromial breadth and forearm length and two characters among the females relating to forearm length and upper arm length differ significantly. Since the values of $M$ for remaining 14 characters in males and 15 characters in females are smaller than the required level of probability for significance, the hypothesis of homogeneity of variance for the males and females, is therefore, acceptable. Thus, it is clear that the different samples from the Onge are consistent and can be considered as equal with regard to their sample variances except the stature. It is also observed that females are more homogeneous than males.

Apart from these, the mean values of stature, sitting height, head length and head breadth of the Onges for males and females with error bars of SD between the samples are plotted in Figure 4.2. The mean stature and sitting height for both Onge males and females show that the present sample is slightly higher than those of the sample in 1948 (Guha, 1954). It is also noted that the error bars of SD of the present sample of the Onge are in
Figure 4.2  Plot of the mean stature, sitting height, head length and head breadth of the Onges male and female with error bars of SD, during the year 1948-1985
general lower than those of the earlier studies for all characters suggesting more homogeneity in the present sample.

Table 4.7: Standard deviation and $\chi^2$ approximation for the homogeneity of variance between the Onge samples

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Earlier Studies</th>
<th>Present Study</th>
<th>$\chi^2$ values (Homogeneity test)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1948$^1$</td>
<td>1952$^2$</td>
<td>1985</td>
</tr>
<tr>
<td>df</td>
<td>13</td>
<td>14</td>
<td>26</td>
</tr>
<tr>
<td>ST</td>
<td>3.76</td>
<td>4.13</td>
<td>6.69</td>
</tr>
<tr>
<td>HL</td>
<td>0.45</td>
<td>0.39</td>
<td>0.49</td>
</tr>
<tr>
<td>HB</td>
<td>0.39</td>
<td>0.41</td>
<td>0.42</td>
</tr>
<tr>
<td>MFB</td>
<td>0.40</td>
<td>0.33</td>
<td>0.50</td>
</tr>
<tr>
<td>BZB</td>
<td>0.47</td>
<td>0.47</td>
<td>0.37</td>
</tr>
<tr>
<td>BGB</td>
<td>0.53</td>
<td>0.41</td>
<td>0.58</td>
</tr>
<tr>
<td>NH</td>
<td>0.21</td>
<td>0.29</td>
<td>0.24</td>
</tr>
<tr>
<td>NB</td>
<td>0.26</td>
<td>0.29</td>
<td>0.29</td>
</tr>
<tr>
<td>ND</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
</tr>
<tr>
<td>UHF</td>
<td>0.27</td>
<td>0.32</td>
<td>0.37</td>
</tr>
<tr>
<td>TFH</td>
<td>0.50</td>
<td>0.47</td>
<td>0.48</td>
</tr>
<tr>
<td>SH</td>
<td>3.17</td>
<td>1.63</td>
<td>2.54</td>
</tr>
<tr>
<td>BAB</td>
<td>2.18</td>
<td>1.11</td>
<td>1.07</td>
</tr>
<tr>
<td>FAL</td>
<td>1.67</td>
<td>1.58</td>
<td>1.16</td>
</tr>
<tr>
<td>UAL</td>
<td>1.57</td>
<td>1.88</td>
<td>1.17</td>
</tr>
<tr>
<td>HNL</td>
<td>1.05</td>
<td>0.73</td>
<td>0.98</td>
</tr>
<tr>
<td>HNB</td>
<td>0.43</td>
<td>0.28</td>
<td>0.35</td>
</tr>
</tbody>
</table>

* Significant at 5% level
** Significant at 1% level
$^1$ Guha (1954), $^2$ Chatterjee (1955)

4.6 Comparison with Negrito Populations of South East Asia

To ascertain the morphological affinities of the Onge, the present data are compared with the available data on their collateral groups of Andaman islands, namely, the Andamanese (North and South) and the Jarawa as well as the similar other Negrito population of Asia viz., the Semang of Malaysia, and the Aeta of Philippines.
4.6.1 Inter-population Homogeneity between the Onge and other Negrito population of Asia

The standard deviation of six common anthropometric variables (stature, head length, head breadth, bizygomatic breadth, nasal height, and nasal breadth) of eight Negrito populations of south-east Asia are given in Table 4.8 for males and in Table 4.9 for females. The female sample of Jarawa could not be included in this analysis owing to its rather small sample size. The results of $\chi^2$ statistics for homogeneity between the corresponding variance estimates of the Onge and other Asiatic Negritos are also presented in the same tables. It is observed from the values of $\chi^2$ that out of six characters tested for each sex, three variance estimates relating to stature, bizygomatic breadth, and nasal height for males and head breadth, bizygomatic breadth, nasal height for females are statistically significant.

The mean values of stature, head length, head breadth, bizygomatic breadth, nasal height and nasal breadth of each population groups for males and females are also plotted with their respective error bars of SD (Figures 4.3, 4.4 and 4.5). It may be noted that the SD of Andaman Negritos agree closely with each other. The values for Semang and the Aeta (Zambales) are in general slightly higher than those of other Asiatic Negritos for all characters except the nasal breadth. In many characters the means among these populations are very similar.

Table 4.8: Standard deviation and $\chi^2$ approximation for the homogeneity of variance between male Asiatic Negritos

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Onge North</th>
<th>South North</th>
<th>Jarawa</th>
<th>Semang</th>
<th>Aeta (Z)</th>
<th>Aeta (B)</th>
<th>Aeta (C)</th>
<th>$\chi^2$ values (Homogeneity test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>df</td>
<td>38</td>
<td>49</td>
<td>49</td>
<td>18</td>
<td>30</td>
<td>53</td>
<td>23</td>
<td>34</td>
</tr>
<tr>
<td>ST</td>
<td>4.82</td>
<td>4.55</td>
<td>4.28</td>
<td>5.31</td>
<td>7.07</td>
<td>4.78</td>
<td>5.97</td>
<td>4.70</td>
</tr>
<tr>
<td>HL</td>
<td>0.49</td>
<td>0.41</td>
<td>0.51</td>
<td>0.30</td>
<td>0.57</td>
<td>0.61</td>
<td>0.50</td>
<td>0.57</td>
</tr>
<tr>
<td>HB</td>
<td>0.42</td>
<td>0.43</td>
<td>0.36</td>
<td>0.34</td>
<td>0.46</td>
<td>0.58</td>
<td>0.49</td>
<td>0.67</td>
</tr>
<tr>
<td>BZB</td>
<td>0.37</td>
<td>0.36</td>
<td>0.41</td>
<td>0.51</td>
<td>0.66</td>
<td>0.79</td>
<td>0.57</td>
<td>0.51</td>
</tr>
<tr>
<td>NH</td>
<td>0.24</td>
<td>0.29</td>
<td>0.36</td>
<td>0.41</td>
<td>0.51</td>
<td>0.63</td>
<td>0.44</td>
<td>0.43</td>
</tr>
<tr>
<td>NB</td>
<td>0.30</td>
<td>0.27</td>
<td>0.25</td>
<td>0.25</td>
<td>0.33</td>
<td>0.29</td>
<td>0.28</td>
<td>0.36</td>
</tr>
</tbody>
</table>

* Significant at 5% level of probability
** Significant at 1% level of probability

1 Present study (1985), 2 Molesworth (1893), 3 Sarkar (1989), 4 Schebesta (1952)
4.6.2 Morphological Distance

There are various reviews concerning comparisons between different distance measures, and their merits and demerits (Sanghvi, 1953; Balakrishan, 1974, Balakrishan and Sanghvi, 1968 and others). It is apparent from these studies that there is a high correlation between Sanghvi's distance measures and Mahalanobis $D^2$. In the present analysis the morphological distance ($T^2$) developed by Sanghvi (1953) was utilized for the estimation of distances utilizing anthropometric, dermatoglyphic and genetic data.

Table 4.9: Standard deviation and $\chi^2$ approximation for the homogeneity of variance between female Asiatic Negritos

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Ong</th>
<th>North Andamanese</th>
<th>South Andamanese</th>
<th>Semang</th>
<th>Aeta(Z)</th>
<th>Aeta(B)</th>
<th>Aeta(C)</th>
<th>$\chi^2$ values (Homogeneity test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>df</td>
<td>32</td>
<td>49</td>
<td>49</td>
<td>22</td>
<td>34</td>
<td>23</td>
<td>25</td>
<td>6</td>
</tr>
<tr>
<td>ST</td>
<td>3.31</td>
<td>4.10</td>
<td>4.07</td>
<td>5.60</td>
<td>5.11</td>
<td>3.89</td>
<td>3.56</td>
<td>11.9811</td>
</tr>
<tr>
<td>HL</td>
<td>0.47</td>
<td>0.43</td>
<td>0.48</td>
<td>0.67</td>
<td>0.49</td>
<td>0.57</td>
<td>0.64</td>
<td>10.7079</td>
</tr>
<tr>
<td>HB</td>
<td>0.39</td>
<td>0.32</td>
<td>0.58</td>
<td>0.42</td>
<td>0.48</td>
<td>0.38</td>
<td>0.42</td>
<td>19.4427*</td>
</tr>
<tr>
<td>BZB</td>
<td>0.38</td>
<td>0.32</td>
<td>0.43</td>
<td>0.53</td>
<td>0.63</td>
<td>0.43</td>
<td>0.43</td>
<td>22.0219*</td>
</tr>
<tr>
<td>NH</td>
<td>0.31</td>
<td>0.27</td>
<td>0.36</td>
<td>0.49</td>
<td>0.49</td>
<td>0.45</td>
<td>0.34</td>
<td>22.2437*</td>
</tr>
<tr>
<td>NB</td>
<td>0.21</td>
<td>0.18</td>
<td>0.24</td>
<td>0.23</td>
<td>0.28</td>
<td>0.25</td>
<td>0.29</td>
<td>11.5948</td>
</tr>
</tbody>
</table>

** Significant at 1% level of probability  
1 Present study (1985), 2 Molesworth (1983), 3 Schebesta (1952)

The distance statistics were computed separately for the males and females. Though varying number of measurements were available from the other Negrito population of Asia, only six common measurements viz., Stature, Head length, Head breadth, Biszygomatic breadth, Nasal height and Nasal breadth are utilized for computing the $T^2$ between eight male Negrito groups of South East Asia, (Table 4.10 and 4.11). These groups are the Onge to sub population of present day Great Andamanese - North Andamanese and South Andamanese as reported by Molesworth (cf. Guha, 1954), Jarawa of Andaman (Sarkar, 1989), three sub-population of Aeta namely the Aeta Camarines of Philippines, and the Semang of Malaysia, as reported by Schebesta (1952). Molesworth's (1893) anthropometric data on the Andamanese (North and South) are extremely valuable as the present day Great Andamanese are on the way to extinction.
Figure 4.3  Plot of the mean stature of eight Negrito population groups of Southeast Asia for males and females, with error bars of SD
Figure 4.4  Plot of the mean of head length, head breadth and bizygomatic breadth of eight Negrito population groups of Southeast Asia for males and females, with error bars of SD.
Figure 4.5  Plot of the mean of nasal height and nasal breadth of eight Negrito population groups of Southeast Asia for males and females, with error bars of SD

Table 4.10: Mean and standard deviation of anthropometric measurements among the male Asiatic Negritos

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Ooge¹ (N=39)</th>
<th>North Andamanese² (N=50)</th>
<th>South Andamanese² (N=19)</th>
<th>Jarawa¹ (N=19)</th>
<th>Semang³ (N=31)</th>
<th>Aeta (G)³ (N=54)</th>
<th>Aeta (B)³ (N=24)</th>
<th>Aeta (C)³ (N=35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI</td>
<td>151.25 ± 4.82</td>
<td>148.56 ± 4.55</td>
<td>148.17 ± 4.28</td>
<td>152.69 ± 5.31</td>
<td>152.58 ± 7.07</td>
<td>147.44 ± 4.78</td>
<td>147.50 ± 5.97</td>
<td>147.49 ± 4.70</td>
</tr>
<tr>
<td>HL</td>
<td>17.19 ± 0.49</td>
<td>17.30 ± 0.41</td>
<td>17.31 ± 0.51</td>
<td>17.28 ± 0.30</td>
<td>18.20 ± 0.57</td>
<td>17.95 ± 0.61</td>
<td>17.99 ± 0.50</td>
<td>17.48 ± 0.57</td>
</tr>
<tr>
<td>HB</td>
<td>14.49 ± 0.42</td>
<td>14.18 ± 0.43</td>
<td>14.37 ± 0.36</td>
<td>14.46 ± 0.34</td>
<td>13.77 ± 0.46</td>
<td>14.72 ± 0.58</td>
<td>14.67 ± 0.49</td>
<td>14.80 ± 0.67</td>
</tr>
<tr>
<td>B/B</td>
<td>13.05 ± 0.37</td>
<td>13.26 ± 0.36</td>
<td>13.20 ± 0.41</td>
<td>12.69 ± 0.51</td>
<td>12.95 ± 0.66</td>
<td>13.73 ± 0.79</td>
<td>13.64 ± 0.57</td>
<td>13.54 ± 0.51</td>
</tr>
<tr>
<td>NH</td>
<td>4.29 ± 0.24</td>
<td>4.14 ± 0.29</td>
<td>4.27 ± 0.36</td>
<td>4.76 ± 0.41</td>
<td>4.78 ± 0.51</td>
<td>5.28 ± 0.63</td>
<td>4.83 ± 0.44</td>
<td>4.77 ± 0.43</td>
</tr>
<tr>
<td>NB</td>
<td>3.88 ± 0.30</td>
<td>3.84 ± 0.27</td>
<td>3.77 ± 0.25</td>
<td>3.83 ± 0.25</td>
<td>3.90 ± 0.33</td>
<td>3.97 ± 0.29</td>
<td>3.91 ± 0.28</td>
<td>3.96 ± 0.36</td>
</tr>
</tbody>
</table>

Sources:¹ Present Study (1985), ² Molesworth (1893), ³ Schebesta (1952)
Table 4.11: Mean and standard deviation of anthropometric measurements among the female Asiatic Negritos

<table>
<thead>
<tr>
<th>Measure</th>
<th>Onge (N=33)</th>
<th>North Andamanese (N=50)</th>
<th>South Andamanese (N=50)</th>
<th>Semong (N=23)</th>
<th>Aeta (Z) (N=35)</th>
<th>Aeta (B) (N=24)</th>
<th>Aeta (C) (N=26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST</td>
<td>140.25 (138.54)</td>
<td>142.72 (140.25)</td>
<td>137.93 (137.58)</td>
<td>139.05 (139.05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HL</td>
<td>16.60 (16.52)</td>
<td>17.51 (17.32)</td>
<td>17.30 (17.30)</td>
<td>16.82 (16.82)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BZB</td>
<td>12.69 (12.52)</td>
<td>12.29 (12.29)</td>
<td>12.75 (12.75)</td>
<td>12.86 (12.86)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>3.87 (3.69)</td>
<td>4.30 (4.30)</td>
<td>4.61 (4.61)</td>
<td>4.40 (4.40)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NB</td>
<td>3.46 (3.48)</td>
<td>3.54 (3.54)</td>
<td>3.51 (3.51)</td>
<td>3.61 (3.61)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: 1 Present Study (1985), 2 Molesworth (1893), 3 Schebesta (1952)

In order to understand the morphological affinities between various Asiatic Negritos, the distance analysis was performed (i) separately for the four Negrito populations of Andamans, and (ii) for all the eight Asiatic Negritos.

(i) Morphological Affinities Between Andaman Negritos

Considering six characters, the morphological distances were computed separately for males and females between the four Negrito tribes of Andaman Islands. Due to paucity of data, the female Jarawa was excluded for this analysis. Table 4.12 presents the relative morphological distances between the Andaman Negritos for male and female separately. It reveals that among the male samples, the least distance (0.37) is observed between the two sub-population of Andamanese i.e., North Andamanese and South Andamanese followed by the Onge and South Andamanese (0.63) and between the Onge and the Jarawa (0.83). These distance matrices are also presented through dendrogram in Figure 4.6a for males and in Figure 4.6b for females. The pattern of clustering is almost identical in both the sexes.
two sub-populations of Great Andamnese show a higher level of similarity. However, the difference in male cluster is at lower level than female, especially for North and South Andamanese.

![Dendrogram of the four Andaman Negritos based on Sanghvi’s (T²) distance in respect of six morphological characters, a) males and b) females.](image)

**Figure 4.6** Dendrogram of the four Andaman Negritos based on Sanghvi’s (T²) distance in respect of six morphological characters, a) males and b) females.

(ii) Morphological Affinities Between Eight Populations of Asiatic Negritos

Table 4.13 presents the T² values between the eight male Negrito populations. The least distance is observed between the two sub-population of present day Great Andamanese – the North Andamanese and the South Andamanese (relative morphological distance 0.15). The next closer groups are Aeta Bataan and Aeta Camarines being 0.18 followed by Aeta Zambales and Aeta Bataan (0.17) and between Onge and South Andamanese (0.25). The maximum relative distance is observed between North Andamanese and Aeta Zambales (2.86) followed by Onge and Aeta Zambales (2.49).
Table 4.13: Morphological distances among the Asiatic Negritos (Male)

<table>
<thead>
<tr>
<th>Populations</th>
<th>ON</th>
<th>NA</th>
<th>SA</th>
<th>JA</th>
<th>SE</th>
<th>AZ</th>
<th>AB</th>
<th>AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td></td>
<td>0.46</td>
<td>0.25</td>
<td>0.33</td>
<td>1.59</td>
<td>2.49</td>
<td>1.19</td>
<td>0.99</td>
</tr>
<tr>
<td>NA</td>
<td>0.15</td>
<td>0.71</td>
<td>1.55</td>
<td></td>
<td>2.86</td>
<td>1.34</td>
<td>1.13</td>
<td></td>
</tr>
<tr>
<td>SA</td>
<td></td>
<td>0.49</td>
<td>1.55</td>
<td>2.21</td>
<td>0.99</td>
<td>0.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JA</td>
<td></td>
<td></td>
<td>0.76</td>
<td>1.05</td>
<td>0.66</td>
<td>0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td></td>
<td></td>
<td></td>
<td>1.52</td>
<td>0.90</td>
<td>1.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AZ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.17</td>
<td>0.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ON Onge, NA North Andamanese, SA South Andamanese, JA Jarawa, SE Semang, AZ Aeta (Zambales), AB Aeta (Betaan), AC Aeta (Camannes)

Since the anthropometric data were not available for female Jarawa, the T² values between seven female populations for six metric characters are presented in Table 4.14. With regards to the female population, the least morphological distance is recorded between the three sub-populations of Aeta (between Aeta Camarines and Aeta Bataan = 0.14, and between Aeta Zambales and Aeta Bataan = 0.17), followed by the Andamanese groups between North Andamanese and South Andamanese = 0.27 and between Onge and South Andamanese = 0.31. The North Andamanese and the Aeta Zambales show the maximum distance (2.82) which is similar to the male.

Table 4.14: Morphological distances among the Asiatic Negritos (Female)

<table>
<thead>
<tr>
<th>Populations</th>
<th>ON</th>
<th>NA</th>
<th>SA</th>
<th>SE</th>
<th>AZ</th>
<th>AB</th>
<th>AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td></td>
<td>0.54</td>
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</tr>
<tr>
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<td>1.05</td>
<td>2.82</td>
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<td>2.34</td>
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<tr>
<td>SA</td>
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<td>1.45</td>
<td>0.71</td>
<td>0.86</td>
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</tr>
<tr>
<td>SE</td>
<td></td>
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<td></td>
<td></td>
<td>0.17</td>
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</tr>
<tr>
<td>AZ</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>AB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>AC</td>
<td></td>
<td></td>
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</tbody>
</table>

ON Onge, NA North Andamanese, SA South Andamanese, SE Semang, AZ Aeta (Zambales), AB Aeta (Betaan), AC Aeta (Camannes)

The dendrograms are generated by utilizing matrices of Sanghvi’s T² and are presented in Figure 4.7a for males and in Figure 4.7b for females respectively. It is evident from the figures that in both the sexes two meaningful clusters are discernible. The various groups of Andaman Negritos, namely, the North Andamanese, South Andamanese, Onge and the Jarawa are closer to each other with regards to morphological characters and form a
Figure 4.7  Dendrogram of the eight Asiatic Negrito populations based on Sanghvi's ($T^2$) distance in respect of six morphological characters, a) males and b) females.
single cluster. On the other hand the three sub-populations of the Aeta (Negrito groups) of Philippines namely the Aeta (Zambales), Aeta (Bataan) and Aeta (Camarines) show relatively closer morphological affinities, and form the second cluster. The Semang of Malaysia, although closer to the second cluster, i.e., the cluster for Aeta, provides a link between the Negritos of Andaman Islands and Negritos of Philippines. The populations of both the clusters inhabit different territory and are separated from each other by few thousand kilometers.

Close biological affinity of the Negritos of the Andaman islands with the Semang of the Malay Peninsula and Aeta of Philippine islands have been suggested by Martin (1905), Sullivan (1921), Schebesta (1952), Radcliffe Brown (1922), Cipriani (1966), Guha (1954), and Sarkar (1952). It is believed that people of the Andamans, the Malay Peninsula, originated from the same Negrito stock (Martin, 1905).

Thus, the observed morphological affinities between the eight groups of Asiatic Negritos are in agreement with the known ethnohistory and conform the ethnobiological relationship of the Asiatic Negritos as proposed by Radcliffe Brown (1922), Cipriani (1955), Schebesta (1952). The morphological affinities as could be seen from Figure 48 are based on the geographical proximity of the populations.

4.7 Analysis of Morphogenetic Traits

A number of morphological observations, described below, were also studied among the Onges.

4.7.1 Hand Clasping

The individual was classified under two categories: R-type and L-type after Beckman and Elston (1962). Many scholars argued that the trait is genetically determined (Lutz, 1908; Downey, 1926; Yamaura, 1940; Kawabe, 1949, Frieire-Maia et al., 1958 and Pons, 1961) but no simple Mendelian mechanism seems to explain the mode of inheritance. Lourie (1972) and Rhwads and Damon (1973) suggested that hand clasping is more useful trait than Arm folding in population comparison. However, Dahlberg (1926), Weiner (1932) and Lat and Walsh (1965) are of the opinion that it is a habit rather than genetic mechanism.
Figure 4.8 Distribution of the Negritos of Southeast Asia
which determines the manner of hand clasping in the individuals. Pons (1961) showed that the pattern was dependent on age – an increasing proportion of 'R' individuals available with increase of age in both the sexes. The utility of this trait in inter-population comparison had been a subject of various studies (Lutz, 1908; Downey, 1926; Kamm, 1930; Pons, 1961; Lai and Walsh, 1965; Malhotra and Bhanu, 1967 and others). Though data on both the traits have been reported among a few populations of African Negroes (Freire-Maia and Almeida, 1966), data on Asiatic Negritos are rather scanty (Som, 1983).

Table 4.15 gives the distribution of both types of hand clasping among the Onge. In Table 4.11 the frequencies of both phenotypes in males and females Onges are given irrespective of age. The frequency of L-type of hand clasping in males is 61% and in females it is 47%. The sex differences are statistically non significant $\chi^2 = 1.44$ ; d.f.=1; 0.30 > P > 0.20). These results are in close agreement with the observation of earlier studies.

It is observed that in a majority of the Indian populations the percentage of 'R' type of hand clasping exceeds that of 'L' type. The distribution of the 'R' hand clasping in the different population of mankind as reported by Lai and Walsh (1965) and Pons (1961), show that the Negroid represent highest value (68.71%), the Australoid have a value of 65% (Australian aborigines), Mongoloids vary from 48.6% to 60.57% and the Caucasoids range from 49% to 56.9%. It is interesting to point out that the Onges of Andaman Island differ from the Negroes in respect to the hand clasping and these differences are statistically significant ($\chi^2$ =15.55; d.f.=1; p > .01).

### 4.7.2 Arm Folding

A large number of studies have reported on arm folding from various populations of the world and India as well (Freire Maia and Almeida, 1966, Singh and Malhotra, 1971). The pattern of arm folding in the two sexes of Onge are presented in Table 4.15. It is seen from the table that incidence of R-type of arm folding is dominant in both sexes and is 68.29% in males and 87.25% in females. The sexual variation, however, is statistically non-significant ($\chi^2$ = 1.57; d.f.=1; 0.30 > p > 0.20) With regards to arm folding the Onge show highest incidence of R-type of arm folding among the Indian populations so far.
studied. They also depict marked differences from the Negroes, who possess only 41.82 of R-type (Frieire Maia and Almedia 1966).

4.7.3 Digital Formula of Hands

The digital formula is a numerical expression of the relative forward position of the tips of 2nd and 4th digits when hand is laid flat on the surface (Wood Jones, 1920; Huizinga, 1924). Inheritance of this trait has been described by Klopher (1946), Phelps (1952) and Winchester (1966). This trait exhibits significant differences between different ethnic groups in India (Das, 1954; Singh and Bansal, 1965; Malhotra and Bhanu, 1967 and others).

In Table 4.15 the frequency distribution of the three digital formulae of hands among males and females has been shown. In both the sexes as well as in both the hands, the formulae 2<4 predominates, followed by 2>4 and 2=4. The incidence of 2<4 is greater in males (right 64% and left 57%) than the females (right 53% and left 55%). On the contrary, the 2>4 type occurs more frequently in females (right 37% and left 39%) than the males (right 25% and left 18%). This sex difference is found to be statistically significant ($\chi^2 = 7.32$; df. = 2; .05 > p > .02 ), while the bimanual differences are not statistically significant in both the sexes (male $\chi^2 = 2.89$, df. = 2; .50 > p > .20 and female $\chi^2 = 0.23$, df. = 2, .90 > p > .80) These findings support the results of earlier works of Singh and Bansal, (1965) and, Malhotra and Bhanu (1967). Further it is evident that the frequency of 2>4 type is not influenced by sex, rather it could be ethnic in nature. With regards to digital formula 2<4 of hands, the present sample of Onge shows a close proximity with the Great Andamanese (Som,1983).

4.7.4 Digital Formulae of Foot

The human feet can be classified into three categories, each depending on the relative lengths of first toe over the second toe (Hawkes, 1914; Wood Jones, 1920,1949, Huizinga, 1924). Hawkes (1914) suggested irregular dominance of type 1>2 over 1<2 in males, and dominance of type 1<2 in females; showing the autosomal inheritance of the trait with sex influence. The occurrence of three digital formulae of feet in males and females are
presented in Table 4.15. In both the sexes the formulae 1>2 type predominates over the 1<2 and 1=2. The formulae 1>2 is however, greater in female (right 65.79%, left 71.05%) than in the male (right 50.00%, left 47.73%). In male the proportion of the formulae 1>2 and 1<2 is almost equal, particularly in the left foot. However the bilateral difference (male $\chi^2 = 0.29$, df. = 2; $0.90 > p > 0.80$ and female $\chi^2 = 0.76$, df. = 2; $0.80 > p > 0.50$) as well as the sex differences (right $\chi^2 = 1.91$, df. = 2; $0.50 > p > 0.20$ and left $\chi^2 = 4.39$, df. = 2; $0.20 > p > 0.10$) are statistically non significant. The present findings corroborate the earlier studies by Pal (1971), wherein he reported a high frequency of formulae 1>2 in both the sexes of the Onge.

Table 4.15: Distribution of some morphogenetic traits among the Onge

<table>
<thead>
<tr>
<th>Characters</th>
<th>Male (N=44)</th>
<th>Female (N=38)</th>
<th>$\chi^2$ - values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Clasping</td>
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<td></td>
</tr>
<tr>
<td>Right - Type</td>
<td>16</td>
<td>17</td>
<td>1.44</td>
</tr>
<tr>
<td>Left - Type</td>
<td>25</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Arm Folding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right - Type</td>
<td>28</td>
<td>26</td>
<td>1.57</td>
</tr>
<tr>
<td>Left - Type</td>
<td>13</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Ear Lobe Attachment</td>
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<td></td>
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</tr>
<tr>
<td>Attached</td>
<td>28</td>
<td>27</td>
<td>0.33</td>
</tr>
<tr>
<td>Semi-attached</td>
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<td>3</td>
<td></td>
</tr>
<tr>
<td>Free</td>
<td>11</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Digital Formulae of Hands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right finger -2 &gt; 4</td>
<td>11</td>
<td>14</td>
<td>36.84</td>
</tr>
<tr>
<td>2 = 4</td>
<td>5</td>
<td>4</td>
<td>10.53</td>
</tr>
<tr>
<td>2 &lt; 4</td>
<td>28</td>
<td>20</td>
<td>52.63</td>
</tr>
<tr>
<td>Left finger -2 &gt; 4</td>
<td>8</td>
<td>15</td>
<td>39.47</td>
</tr>
<tr>
<td>2 = 4</td>
<td>11</td>
<td>2</td>
<td>5.26</td>
</tr>
<tr>
<td>2 &lt; 4</td>
<td>25</td>
<td>21</td>
<td>55.26</td>
</tr>
<tr>
<td>Digital Formulae of Foot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right toe -1 &gt; 2</td>
<td>22</td>
<td>25</td>
<td>65.79</td>
</tr>
<tr>
<td>1 = 2</td>
<td>2</td>
<td>1</td>
<td>2.63</td>
</tr>
<tr>
<td>1 &lt; 2</td>
<td>20</td>
<td>12</td>
<td>31.58</td>
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<tr>
<td>Left toe -1 &gt; 2</td>
<td>21</td>
<td>27</td>
<td>71.05</td>
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<tr>
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<td>2.63</td>
</tr>
<tr>
<td>1 &lt; 2</td>
<td>21</td>
<td>10</td>
<td>26.32</td>
</tr>
</tbody>
</table>
4.7.5 Ear Lobe Attachment

The ear lobe attachment is classified into three categories as (i) completely attached or soldered, (ii) partially attached or intermediate and, (iii) completely free or free. The inheritance of this trait has been discussed by Hilden (1922), Quelprud (1934), Weiner (1932) and Gates (1954). Table 4.15 shows the distribution of ear lobe attachment in both males and female Onges. It reveals that the attached type of ear lobe (female 71.05% and male 63.64%) predominates over the free type (male 25% and female 21.05%). However, the distribution of ear lobe in males and females are found to be statistically homogeneous $\chi^2 = 0.33$, df. = 2, .90 > p > .80). Pal (1970) studied another sample of 80 Onges of both sex and found that the attached type (50%) predominates over the free type (17.5%). Som (1983) however reported a high incidence of free type (52%) among a hybrid group of the Great Andamanese of 21 individuals.

4.7.6 Rare Abnormal Traits

Since the Onge population is very small, all the 96 Onge individuals were examined to detect the occurrence of any rare abnormal trait like polydactyly, syndactyly, cleft palate, hair lip and albinism. It is highly noteworthy that the above mentioned rare anomalies were totally absent among the Onges.

4.8 Summary

The salient features of the morphological characteristics of the Onge are summarised below:

1. In morphometric characters, the Onge are predominantly short to very short in height. The mean stature among the male and female is 151.25 cm and 140.81 cm respectively.

2. The relative sitting height of the Onge male and female falls in metriochromic to brachychromic classes. The mean relative sitting height index among the male and female is 51.72 and 51.76 respectively.

3. The Onge males exhibit medium (47%) to broad shoulder (42%) while the females show mostly narrow (72%) to medium (25%) type of shoulder.
4 The Onges possess mostly narrow pelvis (male 100% and female 69%). However, the medium (25%) and broad (6%) pelvis type are also found among the female Onge.

5 The proportion of upper limb is almost equal among the male and female Onges as revealed from the mean brachial index. However, the female possesses a relatively shorter lower limb than males.

6 Females show greater thigh girth (48.68 cm) and upper arm girth (26.50 cm) than the males (thigh girth 46.22 cm and upper arm girth 26.17 cm), suggesting more deposition of fat among the female particularly at the limb segment. The forearm girth (24.20 cm) and calf girth (30.68 cm) of the male is relatively greater than that of the female.

7 The mean weight of the Onges male and female is 45.78 kg and 42.70 kg respectively. The Pelidise index among the female is strikingly higher (103.12) than that of the male (98.45), suggesting more obesity among the female.

8 The average body surface area of the Onges male and female is 1.41 m² and 1.33 m² respectively.

9 In head form, a majority of the Onges are brachycephal (male 67% and female 62%) followed by hyperbrachycephal (male 28% and female 29%). They are high vaulted people and in general exhibit hypricephalic head form (male 100% and female 96%).

10 In facial form, the Onges are predominantly hyperprosophic (male 54% and female 82%) to euryprosophic (male 42% and female 18%) with the mean Total facial index of 78.44 and 75.17 in male and female respectively. The mean Nasal index is 90.53 and 89.37 among the male and female respectively. Majority of the Onges are platyrrhine in nose form (male 59% and female 61%) followed by mesorrhine (male 23% and female 29%).

11 During the last 37 years (1948 to 1985) the stature of both male and female Onges shows an increase by 2.97 cm and 2.95 cm respectively. This increase may have resulted due to the changes in their dietary habit in the recent past. Analysis of variance indicate homogeneity between the various samples.
With regard to morphometric characters, the Andaman Negritos, namely, the Onge, Jarawa, North Andamanese and the South Andamanese are closer to each other and form one cluster. On the other hand the three sub-population of Aeta of the Philippine Negritos form another distinct cluster. The Semang of Malaysia although closer to Aeta, provides a link between the Negritos of Andamans and the Philippine. The morphological affinities between the eight Asiatic Negrito groups are in agreement with the known ethnohistory and the pattern of observed affinities go hand in hand with their geographical distribution.

The incidence of some morphogenetic characters of the Onge reveals that the frequency of L-type of hand clasping in male and female is 61% and 47% respectively and they differ considerably from majority of the Indian populations where R-type exceeds the L-type. In arm folding the Onge shows the highest incidence of R-type (male 68.29% and female 87.25%). With regard to arm folding the Onges markedly differ from the Negroes, who posses only 41.82% of R-type. The digital formulae of hands and foot reveal predominance of type 2<4 (male, right 54% and left 57%; and female, right 53% and left 55%) and 1>2 (male, right 50% and left 47.73%; female, right 65.79% and left 71.05%) respectively. The attached type of ear lobe is predominant (male 63.64% and female 71.05%) among the Onges.

The rare abnormal traits like polydactyly, syndactyly, cleft palate, hare lip and albinism were not found among the Onges.