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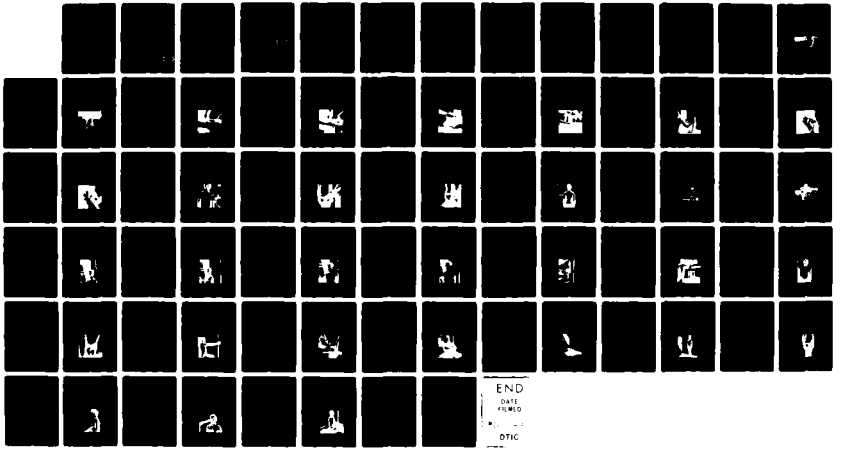

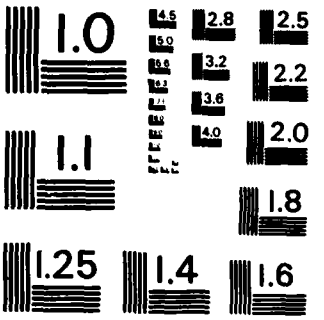

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DEFENCE SCIENCE AND TECHNOLOGY ORGANISATION

AERONAUTICAL RESEARCH LABORATORIES

MELBOURNE, VICTORIA

SYSTEMS REPORT 15

AUSTRALIAN TRI-SERVICE ANTHROPOMETRIC SURVEY, 1977:

PART 3. Survey results: Air Force TRANSPORT and CATERING group

by

K. C. HENDY

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SYSTEMS REPORT 15

AUSTRALIAN TRI-SERVICE ANTHROPOMETRIC SURVEY, 1977:

PART 3. Survey results: Air Force TRANSPORT and CATERING group

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SUMMARY

An anthropometric survey of approximately 3000 male members of the three Australian military branches was conducted during 1977. Part 3 of this nine-part document contains the results of the analysis for the Air Force combined TRANSPORT and CATERING group data. This group, of 312 subjects in total, is a combination of the TRANSPORT and CATERING groups of the original sample.

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ABSTRACT

An anthropometric survey of approximately 3000 male members of the three Australian military branches was conducted during 1977. Part 3 of this nine-part document contains the results of the analysis for the Air Force combined TRANSPORT and CATERING group data. This group, of 312 subjects in total, is a combination of the TRANSPORT and CATERING groups of the original sample.

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TABLE 21: Elbow Rest Height

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TABLE 25: Functional Reach

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TABLE 28: Stool Height

TABLE 29: Stature

TABLE 30: Crotch Height

TABLE 31: Chest Depth

TABLE 32: Head Breadth

TABLE 33: Inter-Elbow Breadth

DISTRIBUTION

1. INTRODUCTION

Part 3 of Systems Report 15 contains the results of an analysis performed on the combined Air Force TRANSPORT and CATERING group data. The rationale for the combination of these groups is contained in Part 1 of Reference 1. Other groups subjected to separate analysis are reported in Parts 2 to 9 of Reference 1.

The composition of this group is as follows:

	Number
AIR FORCE	
Transport	114
Catering	198
Total	312

An analysis was performed on the combined TRANSPORT and CATERING group data and summary statistics derived. The results of this analysis are presented in Tables 1 to 33. An index to the tabulated results appears in the Contents listing to this document. For convenience in using the information, a Visual Index and alphabetical listing precedes Table 1. The photographs accompanying the Tables are to illustrate technique only.

2. SITTING POSTURE

For all sitting measurements the height of the hydraulic stool was adjusted so that with the subject sitting erect, back free of the wall, the line joining the femoral marks was horizontal and with feet flat on the floor the line joining the upper and lower fibular marks was vertical.

Without changing the position of his legs after adjusting the stool the subject sat erect, back free of the wall with the trunk straight, upper arms vertical, elbows resting lightly against the sides and the forearms extended so that the hands rested on mid-thighs. The shoulders were equally relaxed.

Note: In Tables 1 to 33

—— unsmoothed data and 'Normal' fit

xxx 3rd order Gram Charlier fit

REFERENCES

1. Hendy, K.C.: Australian Tri-service Anthropometric Survey, 1977:

   PART 1. Survey planning, conduct, data handling and methods of analysis.

   PART 2. Survey results: Combined services AIRCREW group.

   PART 4. Survey results: Airforce TECHNICAL and CLERICAL group.

   PART 5. Survey results: Army CATERING group.

   PART 6. Survey results: Army TECHNICAL group.

   PART 7. Survey results: Army WEAPON USERS and OTHERS group.

   PART 8. Survey results: Navy CLEARANCE DIVER group.

   PART 9. Survey results: Navy CONSOLIDATION group.

   Aeronautical Research Laboratories, Systems Report 15. Fishermen's Bend, Melbourne, Australia, 1979.

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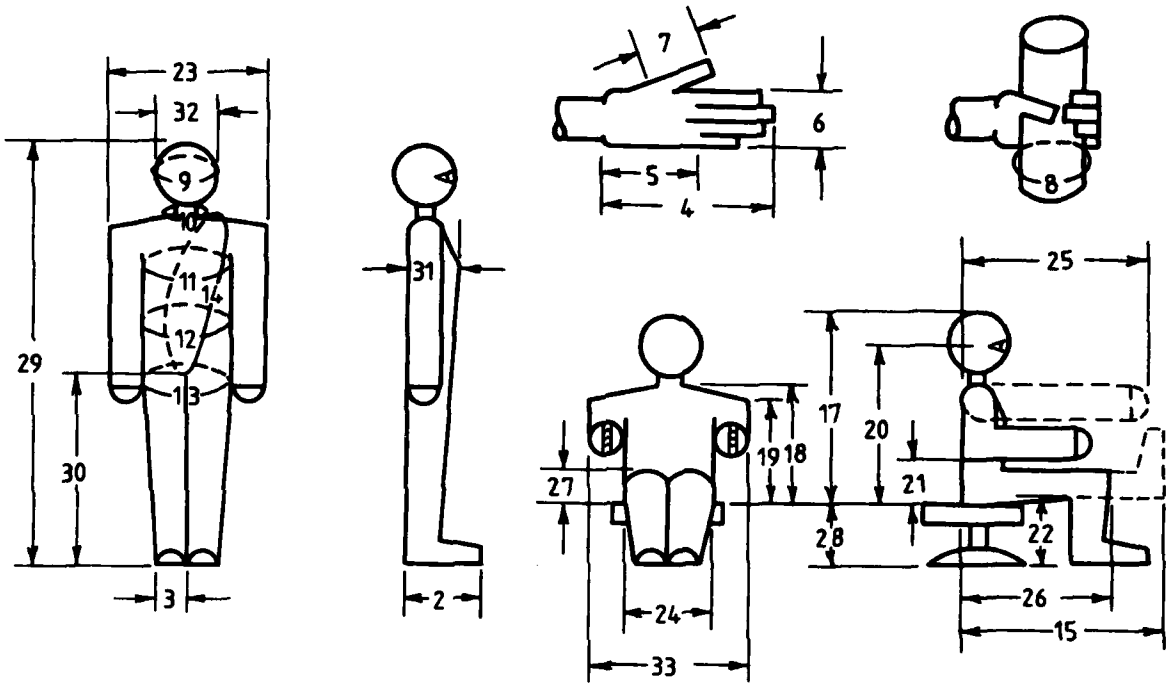
VISUAL INDEX

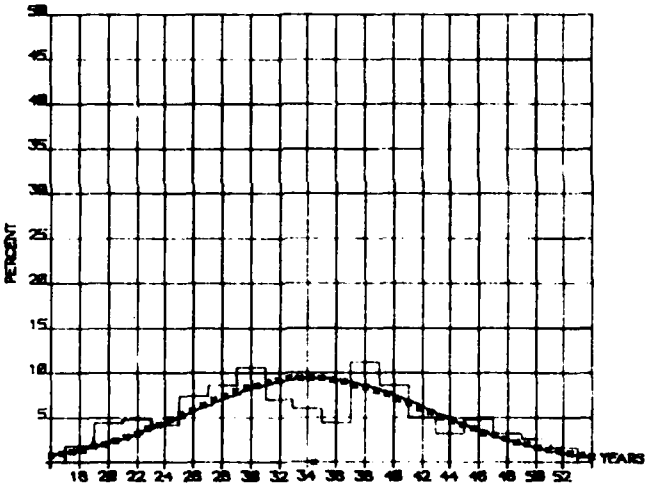


Measurement	Table	Measurement	Table
Acromial Height—Sitting	19	Head Circumference	9
Age	1	Hip Breadth	24
Bideltoid Breadth	23	Inner Hand Grip Circumference	8
Buttock Circumference	13	Inter-Elbow Breadth	33
Buttock–Heel Length	15	Mass	16
Buttock–Knee Length	26	Neck Circumference	10
Chest Circumference	11	Palm Length	5
Chest Depth	31	Popliteal Height	22
Crotch Height	30	Shoulder Height—Sitting	18
Elbow Rest Height	21	Sitting Height	17
Eye Height—Sitting	20	Stature	29
Foot Breadth	3	Stool Height	28
Foot Length	2	Thigh Clearance Height	27
Functional Reach	25	Thumb Length	7
Hand Breadth	6	Vertical Trunk Circumference	14
Hand Length	4	Waist Circumference	12
Head Breadth	32		

TABLE 1

Age (years)

Number of Subjects	: 312
Mean	: 34·4
Standard Deviation	: 8·4
Coefficient of Skewness	: 0·15
Coefficient of Kurtosis	: −0·81
Range of Data	: 18–53



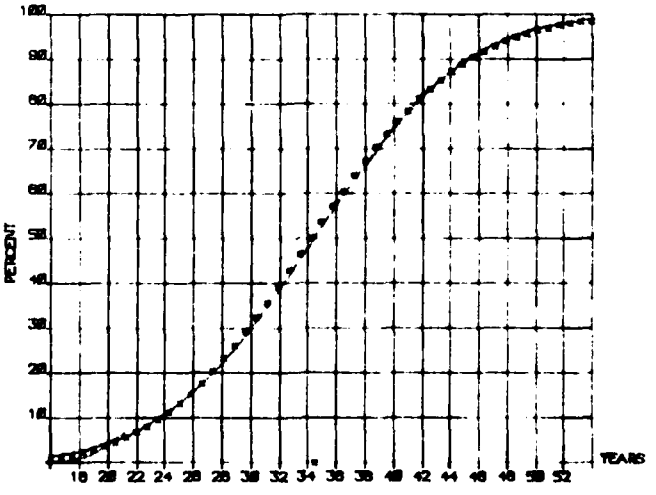
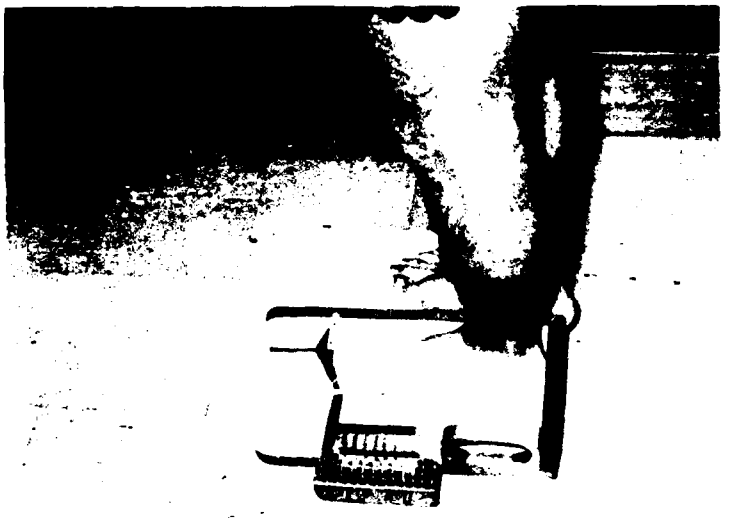


TABLE 2

Foot Length

Subject stands with his left foot in the foot-box, heel against the back wall and the medial side of the foot in contact with the side wall of the box. The datum edge is brought up to touch the most prominent toe. Record the distance of the datum edge from the back wall of the foot-box.

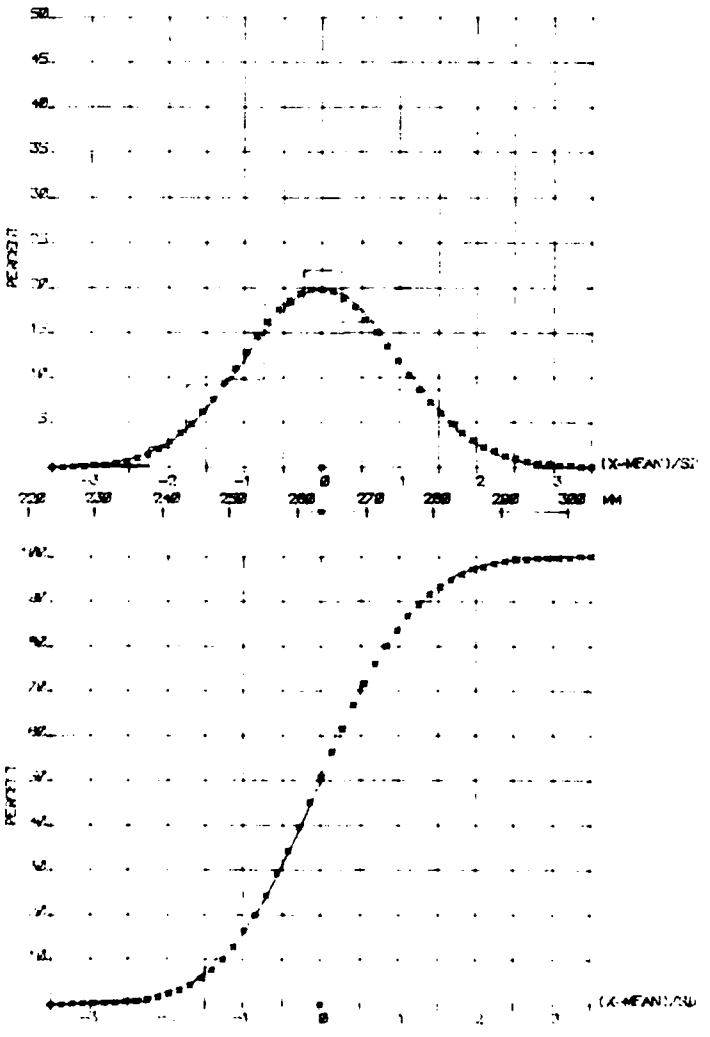


[-]

TABLE 2

Foot Length (mm)

Number of Subjects	: 312
Mean	: 263·5
Standard Deviation	: 11·4
Coefficient of Skewness	: 0·13
Coefficient of Kurtosis	: −0·14
Range of Data	: 230–301



1st percentile 238
3rd percentile 243
5th percentile 245
10th percentile 249
15th percentile 252
20th percentile 254
25th percentile 256
30th percentile 257
40th percentile 260
50th percentile 263
60th percentile 266
70th percentile 269
75th percentile 271
80th percentile 273
85th percentile 275
90th percentile 278
95th percentile 283
97th percentile 286
99th percentile 291

TABLE 3

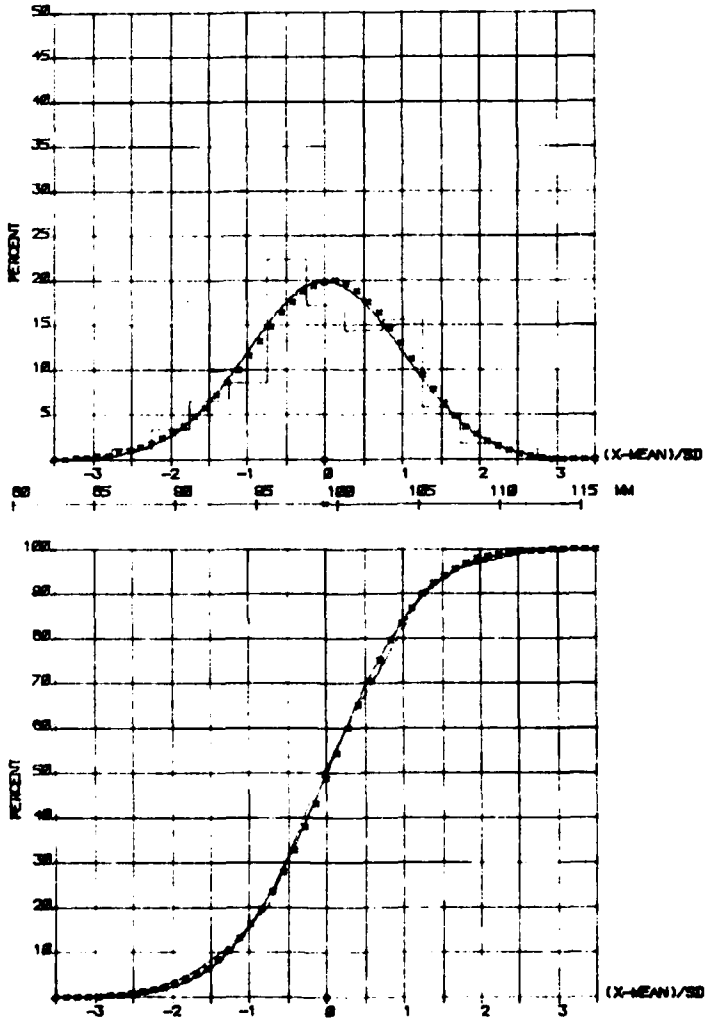
Foot Breadth

Subject stands with his left foot in the foot-box, heel against the back wall and the medial side of the foot in contact with the side wall of the box. The datum edge is brought into light contact with the widest aspect of the foot. Record the distance of the datum edge from the side wall of the foot-box.

TABLE 3

Foot Breadth (mm)

Number of Subjects	: 312
Mean	: 99·2
Standard Deviation	: 4·8
Coefficient of Skewness	: −0·16
Coefficient of Kurtosis	: −0·16
Range of Data	: 86–110



1st percentile	88
3rd percentile	90
5th percentile	91
10th percentile	93
15th percentile	94
20th percentile	95
25th percentile	96
30th percentile	97
40th percentile	98
50th percentile	99
60th percentile	101
70th percentile	102
75th percentile	102
80th percentile	103
85th percentile	104
90th percentile	105
95th percentile	107
97th percentile	108
99th percentile	110

TABLE 4

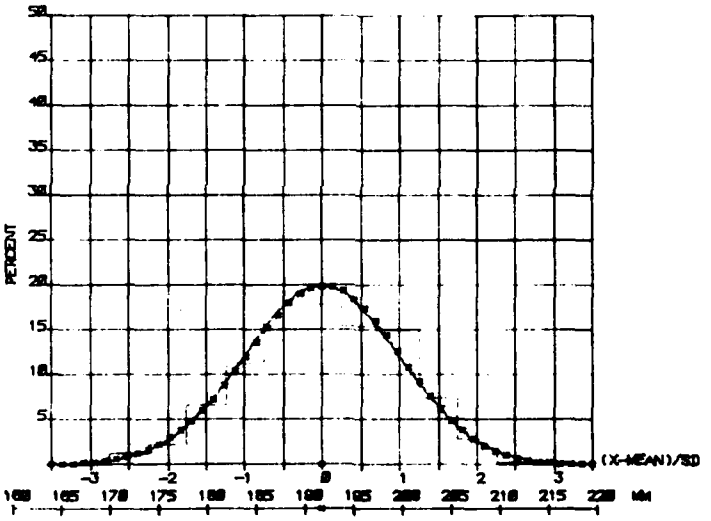
Hand Length

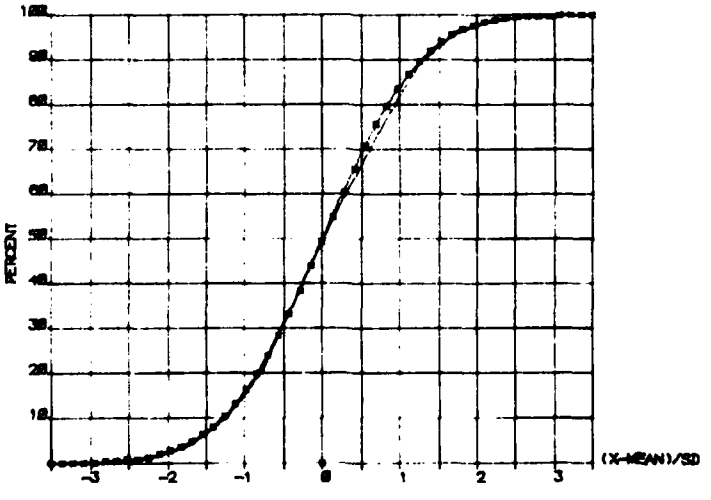
Subject's left hand is fully extended and supinated in the axis of the forearm, fingers together. With the bar of the sliding calipers parallel to the longitudinal axis of the hand, measure the distance from the tip of the third digit to the wrist mark at the first major skin crease proximal to the base of the hypothenar eminence.

TABLE 4

Hand Length (mm)

Number of Subjects	: 312
Mean	: 191·7
Standard Deviation	: 7·9
Coefficient of Skewness	: −0·08
Coefficient of Kurtosis	: −0·28
Range of Data	: 170–214





1st percentile	173
3rd percentile	176
5th percentile	178
10th percentile	181
15th percentile	183
20th percentile	185
25th percentile	186
30th percentile	188
40th percentile	190
50th percentile	192
60th percentile	194
70th percentile	196
75th percentile	197
80th percentile	198
85th percentile	200
90th percentile	202
95th percentile	205
97th percentile	206
99th percentile	210

TABLE 5

Palm Length

Subject's left hand is fully extended and supinated in the axis of the forearm, fingers together. With the bar of the sliding calipers parallel to the longitudinal axis of the hand, measure the distance from the skin fold at the junction of the third digit and the palm of the hand to the wrist mark at the first major skin crease proximal to the base of the hypothenar eminence.

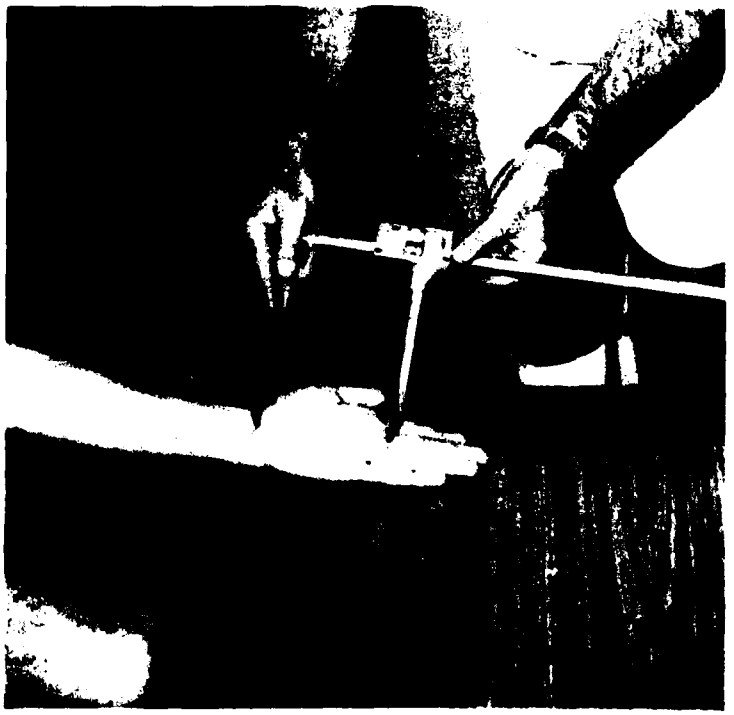
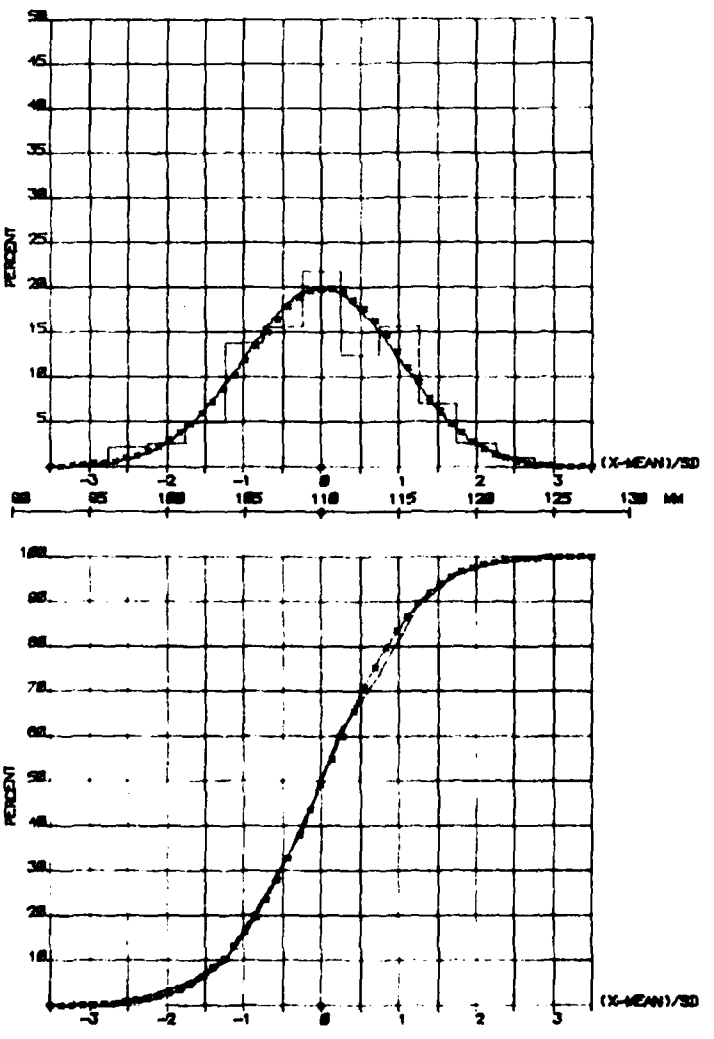


TABLE 5

Palm Length (mm)

Number of Subjects	: 312
Mean	: 110·0
Standard Deviation	: 5·0
Coefficient of Skewness	: −0·13
Coefficient of Kurtosis	: −0·22
Range of Data	: 97–122



1st percentile	98
3rd percentile	100
5th percentile	102
10th percentile	103
15th percentile	105
20th percentile	106
25th percentile	107
30th percentile	107
40th percentile	109
50th percentile	110
60th percentile	111
70th percentile	113
75th percentile	113
80th percentile	114
85th percentile	115
90th percentile	116
95th percentile	118
97th percentile	119
99th percentile	121

TABLE 6

Hand Breadth

Subject's left hand is fully extended and supinated in the axis of the forearm, fingers together with the thumb held away from the hand. Using the sliding calipers measure the distance across the distal ends of the metacarpal bones.

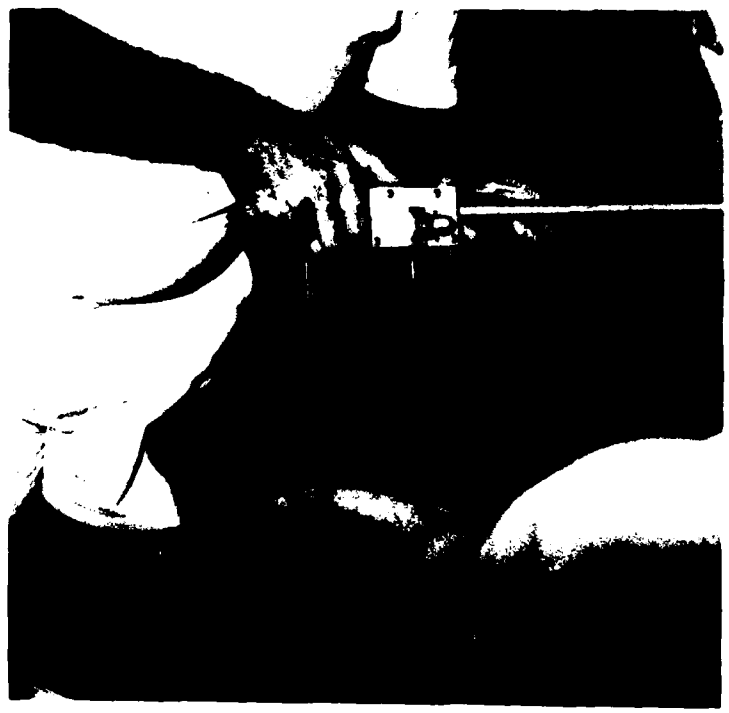
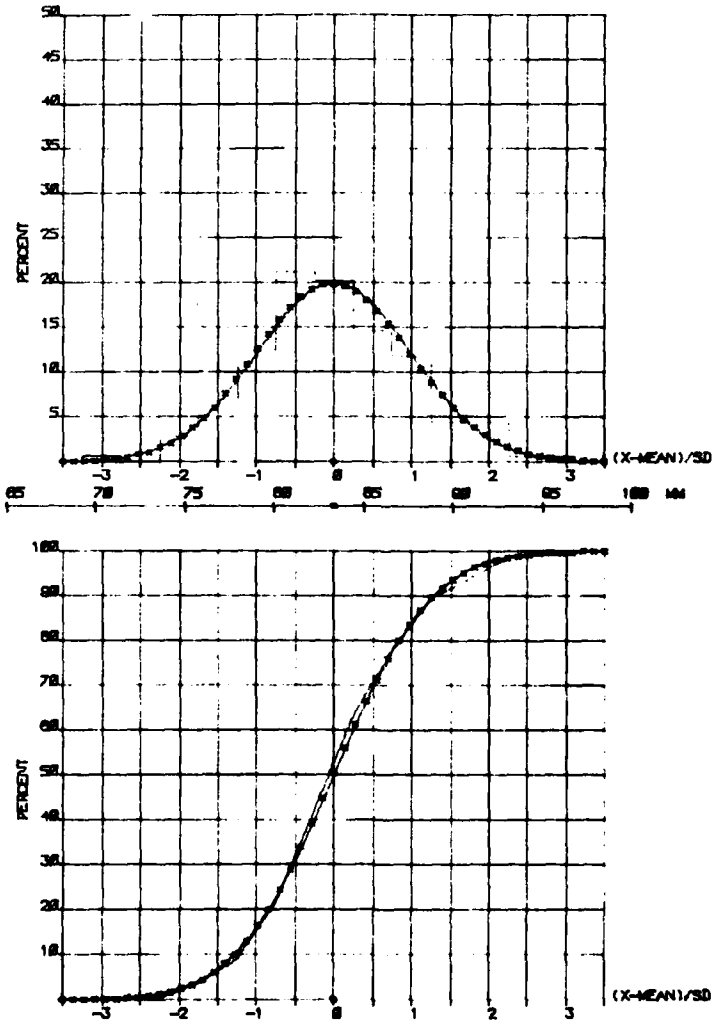


TABLE 6

Hand Breadth (mm)

Number of Subjects	: 312
Mean	: 83·3
Standard Deviation	: 4·3
Coefficient of Skewness	: 0·05
Coefficient of Kurtosis	: 0·33
Range of Data	: 70–97



1st percentile 73
3rd percentile 75
5th percentile 76
10th percentile 78
15th percentile 79
20th percentile 80
25th percentile 80
30th percentile 81
40th percentile 82
50th percentile 83
60th percentile 84
70th percentile 86
75th percentile 86
80th percentile 87
85th percentile 88
90th percentile 89
95th percentile 91
97th percentile 92
99th percentile 94

TABLE 7

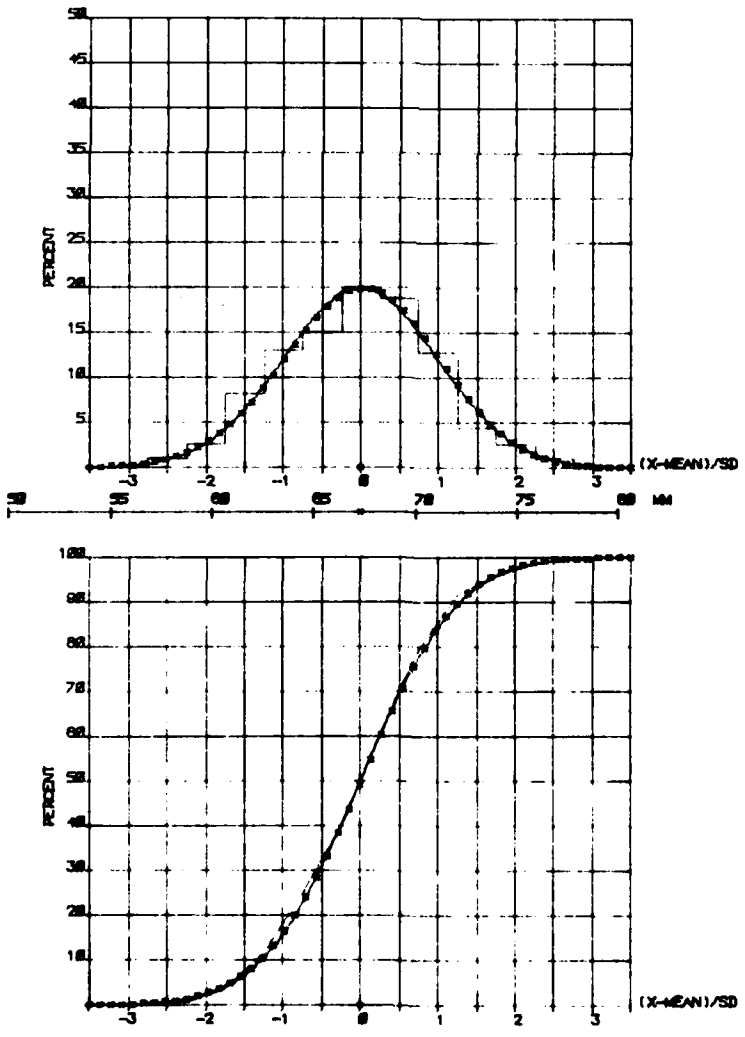
Thumb Length

Subject's left hand is fully extended and pronated in the axis of the forearm, fingers together with the thumb held away from the hand. With the bar of the sliding calipers parallel to the longitudinal axis of the thumb, measure the distance from the tip of the thumb to the thumb mark at the first metacarpophalangeal joint.

TABLE 7

Thumb Length (mm)

Number of Subjects	: 312
Mean	: 67·3
Standard Deviation	: 3·8
Coefficient of Skewness	: −0·09
Coefficient of Kurtosis	: −0·35
Range of Data	: 57–78



1st percentile 58
3rd percentile 60
5th percentile 61
10th percentile 62
15th percentile 63
20th percentile 64
25th percentile 65
30th percentile 65
40th percentile 66
50th percentile 67
60th percentile 68
70th percentile 69
75th percentile 70
80th percentile 71
85th percentile 71
90th percentile 72
95th percentile 73
97th percentile 74
99th percentile 76

TABLE 8

Inner Hand Grip Circumference

The measuring device is a cone of linearly increasing diameter. The subject grips the cone firmly from behind with the left hand at the maximum diameter at which the thumb and third digit may be lightly opposed. The point of opposition lies over the line scribed on the front of the cone. The Inner Hand Grip Circumference is the circumference of the cone in a horizontal plane containing the point of opposition.

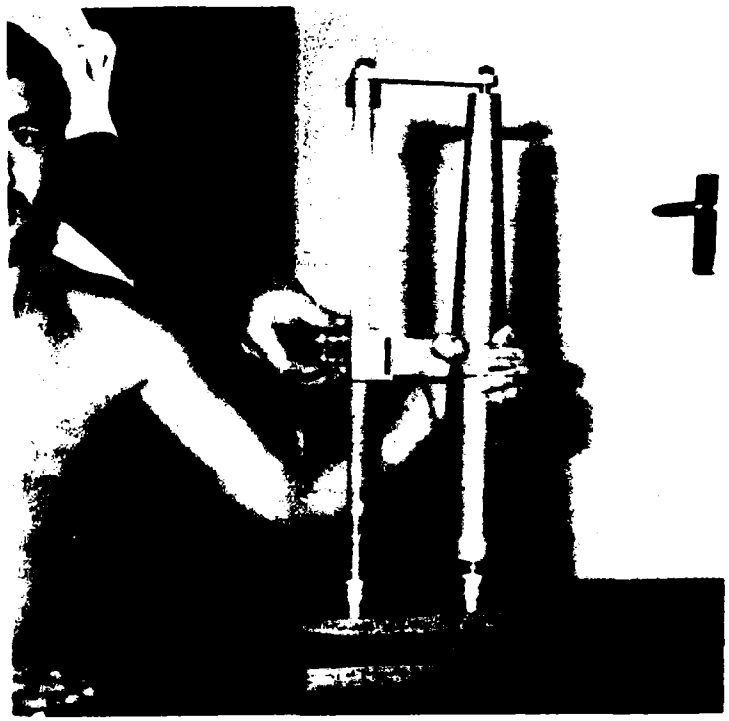
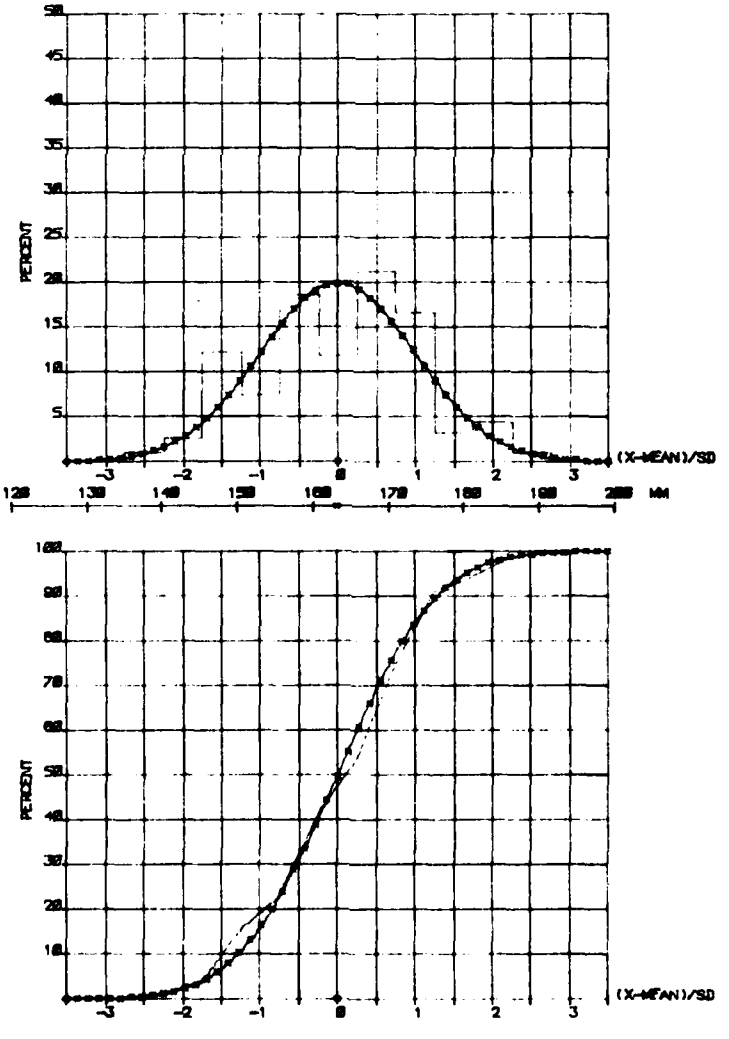


TABLE 8

Inner Hand Grip Circumference (mm)

Number of Subjects	: 312
Mean	: 163·2
Standard Deviation	: 10·3
Coefficient of Skewness	: −0·02
Coefficient of Kurtosis	: −0·28
Range of Data	: 135–191



1st percentile 139
3rd percentile 144
5th percentile 146
10th percentile 150
15th percentile 153
20th percentile 155
25th percentile 156
30th percentile 158
40th percentile 161
50th percentile 163
60th percentile 166
70th percentile 169
75th percentile 170
80th percentile 172
85th percentile 174
90th percentile 176
95th percentile 180
97th percentile 182
99th percentile 187

TABLE 9

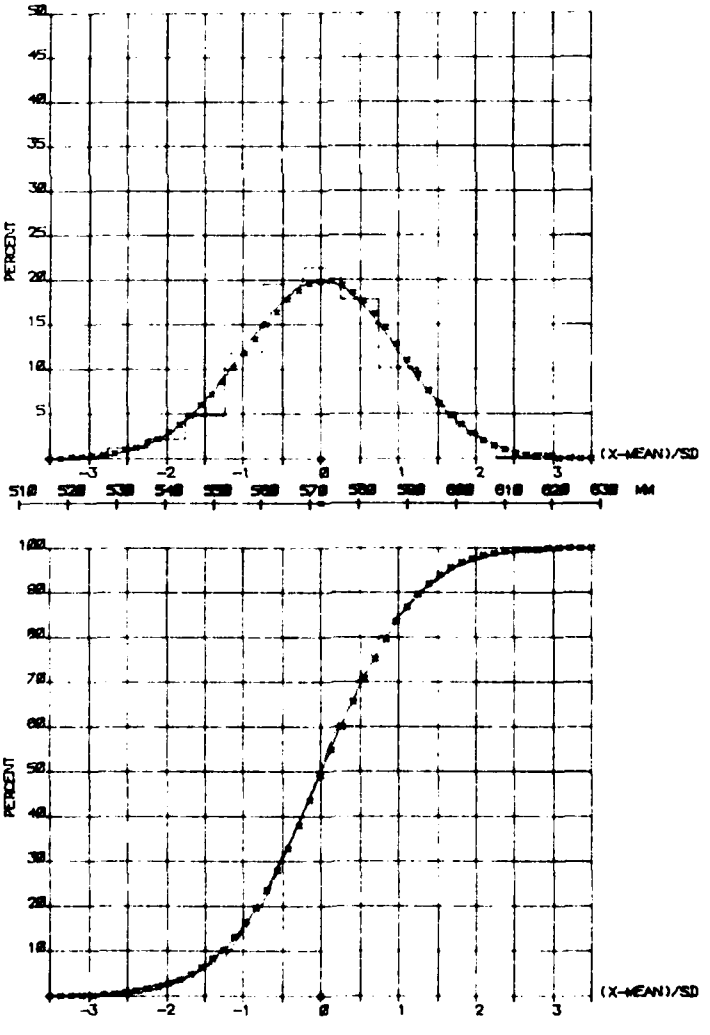
Head Circumference

Subject sits erect, looking straight ahead. Measure the maximum head circumference, the tape passing just over the brow ridges and over the occiput, using just sufficient tape tension to flatten the hair.

TABLE 9

Head Circumference (mm)

Number of Subjects	: 312
Mean	: 572·3
Standard Deviation	: 16·0
Coefficient of Skewness	: −0·13
Coefficient of Kurtosis	: 1·16
Range of Data	: 506–624



1st percentile 534
3rd percentile 541
5th percentile 545
10th percentile 552
15th percentile 556
20th percentile 559
25th percentile 562
30th percentile 564
40th percentile 569
50th percentile 573
60th percentile 577
70th percentile 581
75th percentile 583
80th percentile 586
85th percentile 589
90th percentile 593
95th percentile 598
97th percentile 601
99th percentile 608

TABLE 10

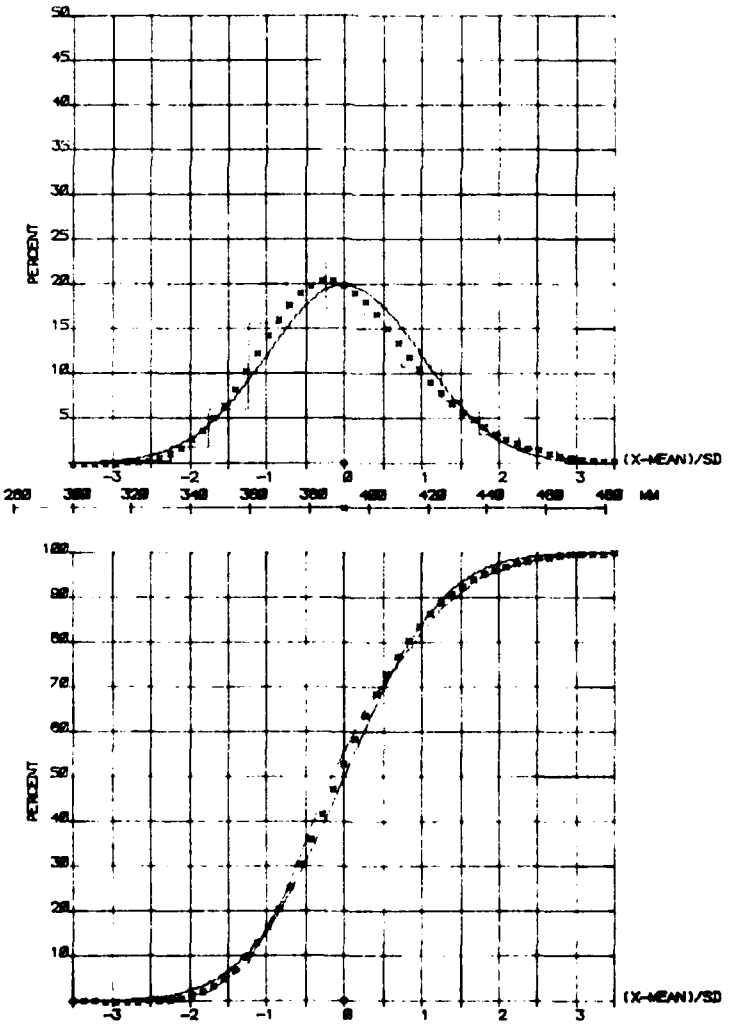
Neck Circumference

Subject sits erect, looking straight ahead. Measure the circumference of the neck ensuring that the tape is at right angles to the longitudinal axis of the neck and that the datum edge of the tape passes over the tip of the thyroid cartilage.

TABLE 10

Neck Circumference (mm)

Number of Subjects	: 312
Mean	: 391·8
Standard Deviation	: 26·1
Coefficient of Skewness	: 0·46
Coefficient of Kurtosis	: 0·00
Range of Data	: 322–473



1st percentile 339
3rd percentile 347
5th percentile 352
10th percentile 359
15th percentile 365
20th percentile 369
25th percentile 373
30th percentile 377
40th percentile 383
50th percentile 390
60th percentile 396
70th percentile 404
75th percentile 408
80th percentile 413
85th percentile 419
90th percentile 427
95th percentile 439
97th percentile 446
99th percentile 460

TABLE 11

Chest Circumference

Subject stands erect, feet approximately 100 mm apart, with arms away from the sides. The tape is passed horizontally around the chest, aligning the datum edge with the nipples and the chest marks made on the subject's back. The arms are lowered, tape alignment checked and Chest Circumference measured at the end of a normal inspiration.

TABLE 11

Chest Circumference (mm)

Number of Subjects : 312

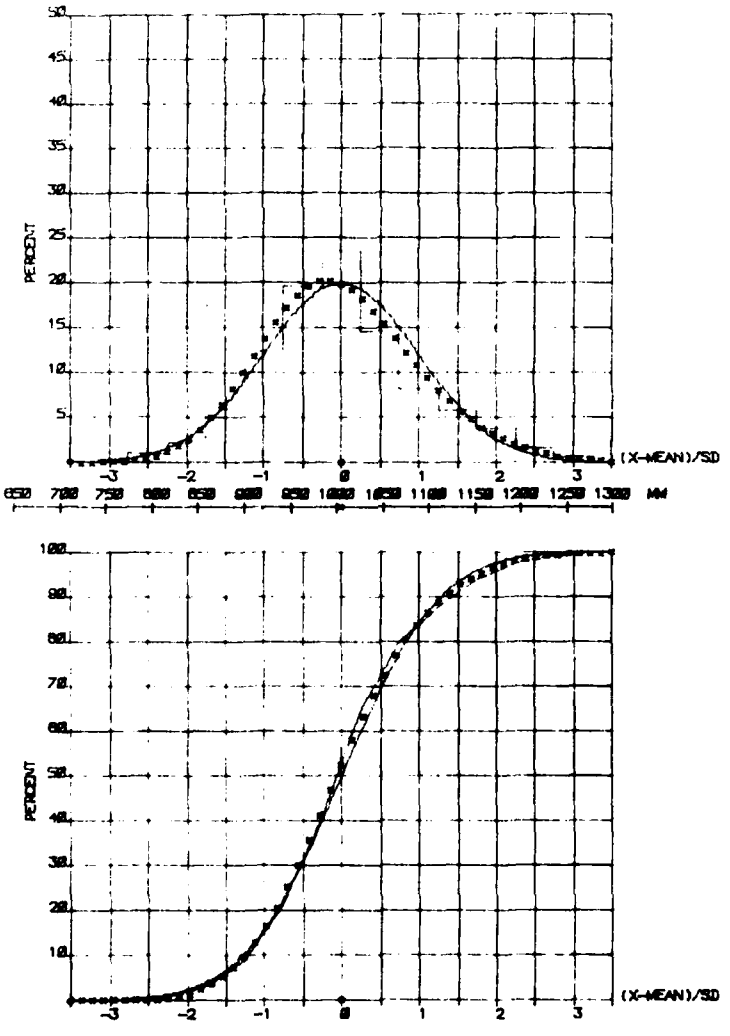
Mean : 1004·2

Standard Deviation : 83·8

Coefficient of Skewness: 0·37

Coefficient of Kurtosis : 0·22

Range of Data : 798–1269



1st percentile	831
3rd percentile	858
5th percentile	874
10th percentile	900
15th percentile	918
20th percentile	932
25th percentile	945
30th percentile	957
40th percentile	978
50th percentile	999
60th percentile	1020
70th percentile	1044
75th percentile	1058
80th percentile	1073
85th percentile	1092
90th percentile	1116
95th percentile	1152
97th percentile	1176
99th percentile	1220

TABLE 12

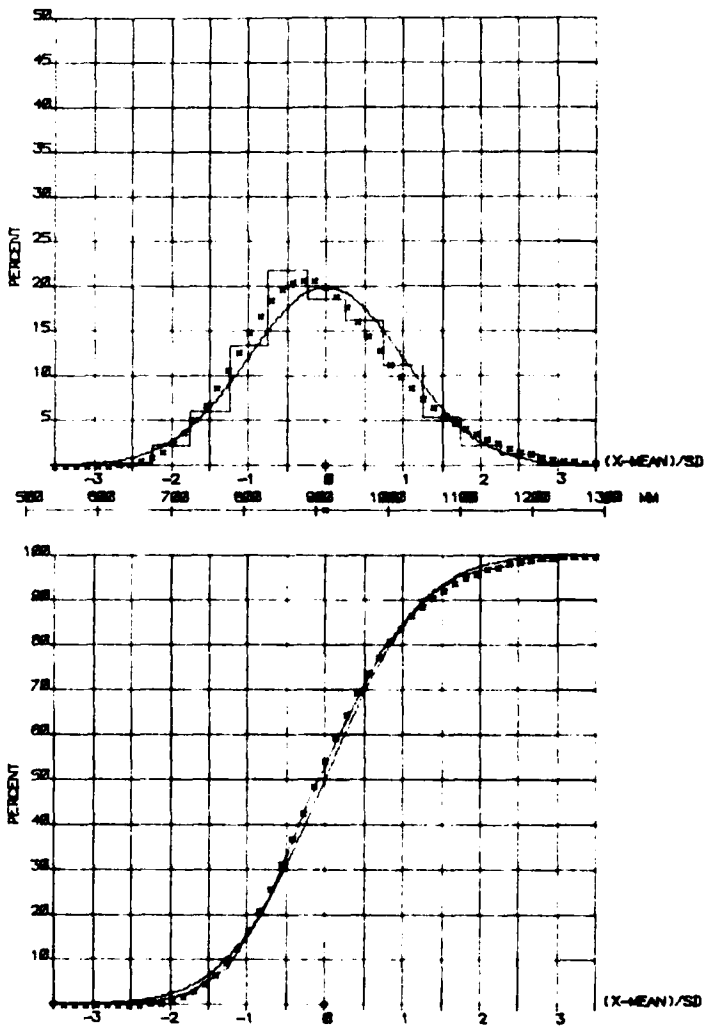
Waist Circumference

Subject stands erect, heels approximately 100 mm apart, with arms away from the sides. The tape is passed horizontally around the waist, aligning the datum edge with the umbilicus and the waist marks made on the subject's back. The arms are lowered, tape alignment checked, and the Waist Circumference measured.

TABLE 12

Waist Circumference (mm)

Number of Subjects	:	312
Mean	:	913·9
Standard Deviation	:	107·0
Coefficient of Skewness	:	0·60
Coefficient of Kurtosis	:	0·86
Range of Data	:	660–1360



1st percentile	708
3rd percentile	735
5th percentile	753
10th percentile	782
15th percentile	804
20th percentile	821
25th percentile	837
30th percentile	851
40th percentile	878
50th percentile	903
60th percentile	931
70th percentile	961
75th percentile	979
80th percentile	1000
85th percentile	1026
90th percentile	1060
95th percentile	1111
97th percentile	1144
99th percentile	1203

TABLE 13

Buttock Circumference

Subject stands erect, feet together. Measure Buttock Circumference with the tape passing horizontally around the maximum posterior protuberance of the buttocks.

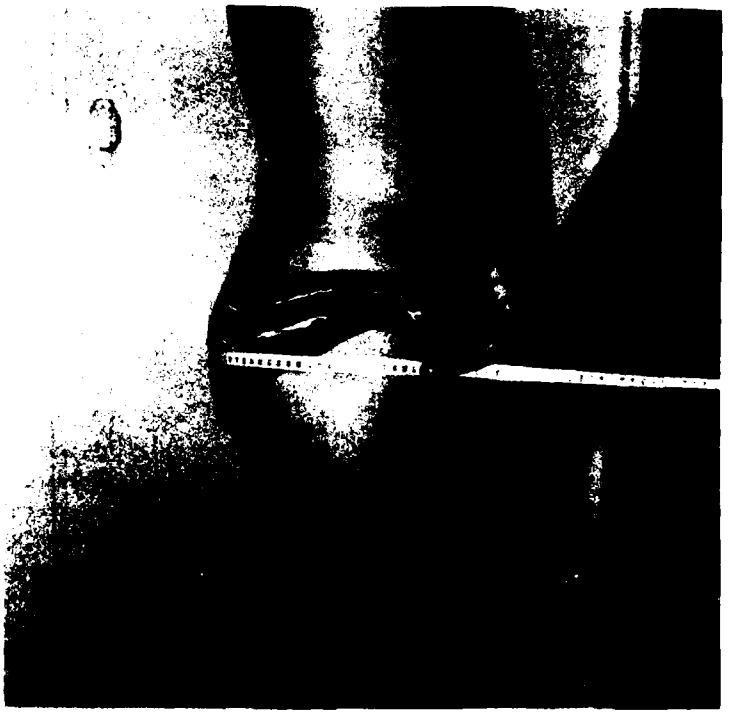


TABLE 13

Buttock Circumference (mm)

Number of Subjects : 312

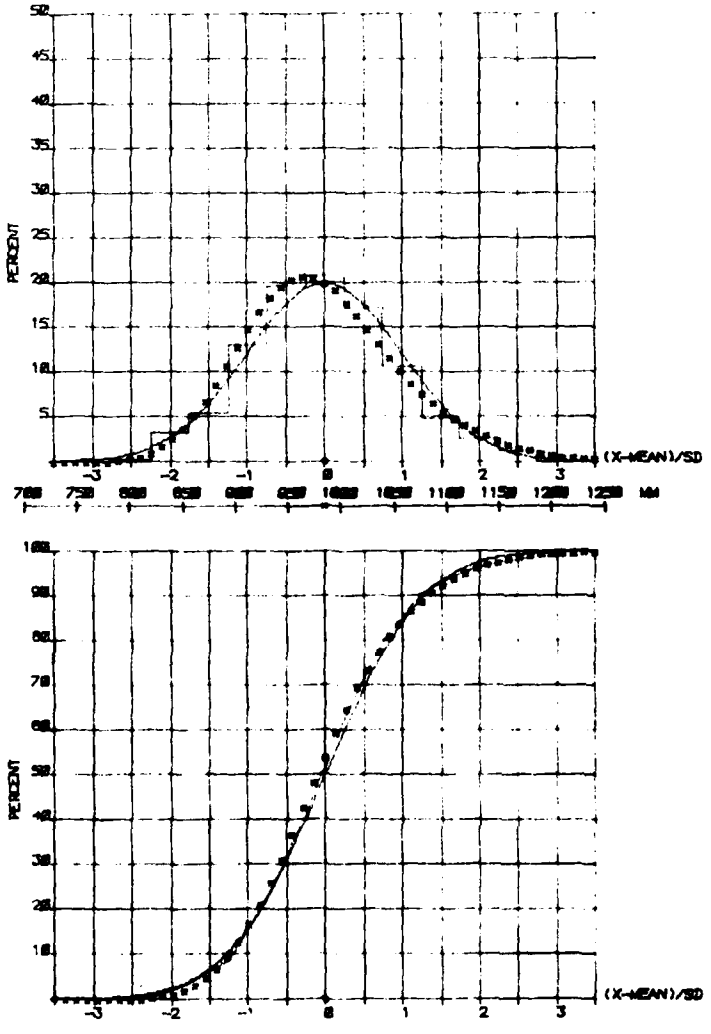
Mean : 984·4

Standard Deviation : 73·2

Coefficient of Skewness: 0·58

Coefficient of Kurtosis : 1·32

Range of Data : 792–1290



1st percentile	842
3rd percentile	862
5th percentile	874
10th percentile	894
15th percentile	909
20th percentile	921
25th percentile	932
30th percentile	941
40th percentile	960
50th percentile	977
60th percentile	996
70th percentile	1017
75th percentile	1029
80th percentile	1044
85th percentile	1061
90th percentile	1084
95th percentile	1119
97th percentile	1141
99th percentile	1181

TABLE 14

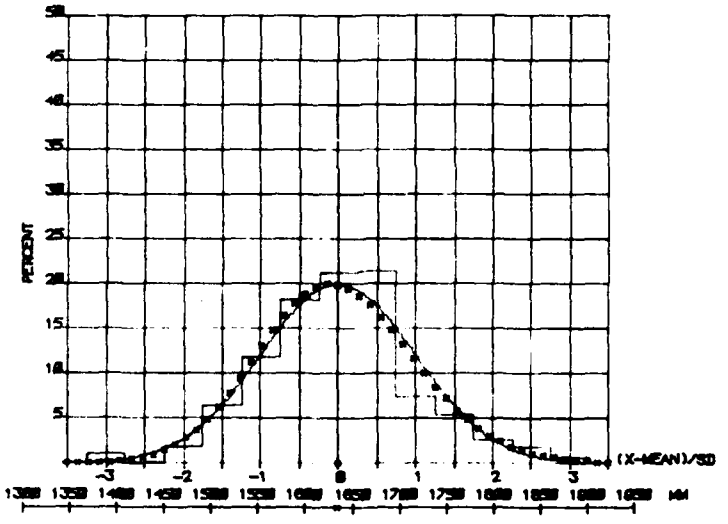
Vertical Trunk Circumference

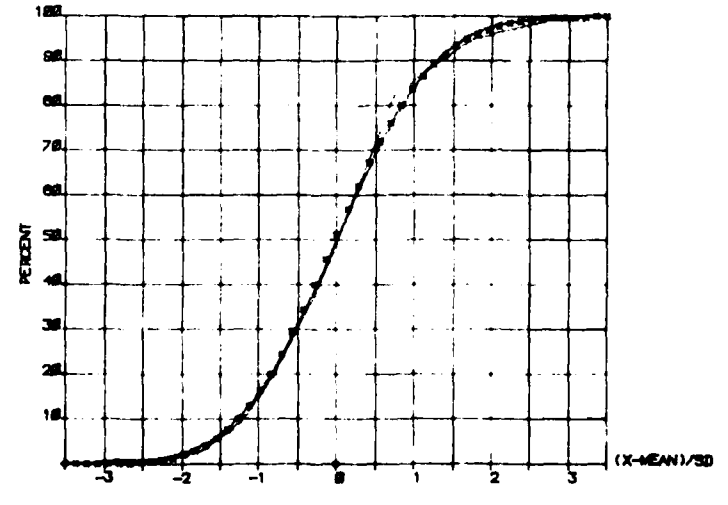
Subject stands erect, looking straight ahead, heels approximately 100 mm apart and the arms relaxed by the sides. Measure Vertical Trunk Circumference, passing the tape back over the left shoulder, the datum edge aligned with the 90 mm shoulder mark, down between the buttocks, through the crotch to the left of the genitals and up the front of the trunk spanning all body hollows. Adjust the tape tension so that firm pressure is applied to the crotch without indenting the shoulder.

TABLE 14

Vertical Trunk Circumference (mm)

Number of Subjects	: 312
Mean	: 1634·2
Standard Deviation	: 82·0
Coefficient of Skewness	: 0·18
Coefficient of Kurtosis	: 0·51
Range of Data	: 1372–1882





1st percentile 1454
3rd percentile 1486
5th percentile 1503
10th percentile 1531
15th percentile 1549
20th percentile 1564
25th percentile 1578
30th percentile 1589
40th percentile 1611
50th percentile 1632
60th percentile 1653
70th percentile 1675
75th percentile 1688
80th percentile 1702
85th percentile 1719
90th percentile 1741
95th percentile 1773
97th percentile 1795
99th percentile 1836

TABLE 15

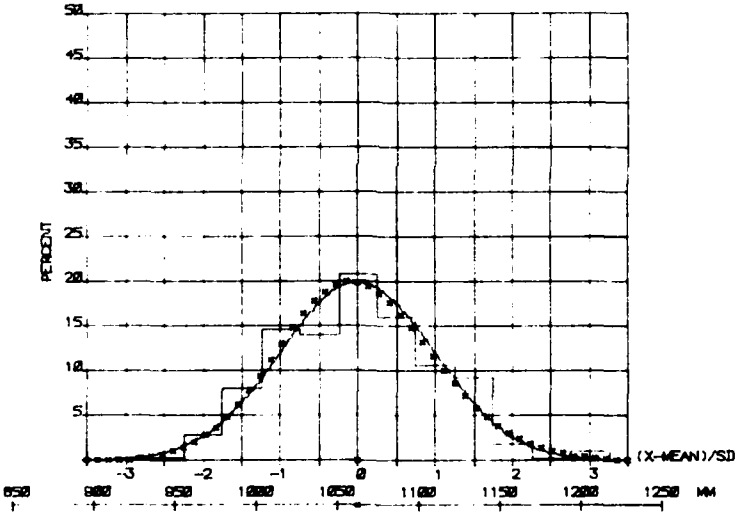
Buttock–Heel Length

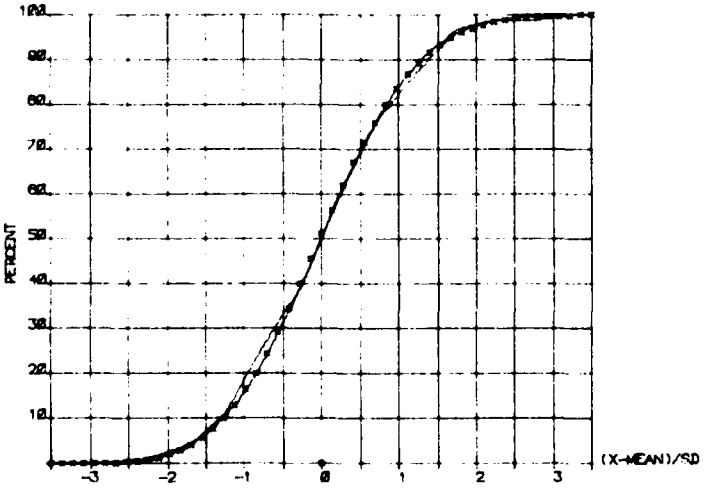
Subject sits on the measuring rig with both legs out straight and the knees locked. The subject is instructed to '. . . push your buttocks as far as possible into the back wall'. Before the subject relaxes, the foot block is brought up to the left heel and the distance of the datum edge from the rear wall of the measuring device is recorded.

TABLE 15

Buttock–Heel Length (mm)

Number of Subjects	: 312
Mean	: 1062·8
Standard Deviation	: 47·7
Coefficient of Skewness	: 0·17
Coefficient of Kurtosis	: −0·42
Range of Data	: 952–1198





1st percentile	958
3rd percentile	976
5th percentile	987
10th percentile	1003
15th percentile	1014
20th percentile	1022
25th percentile	1030
30th percentile	1037
40th percentile	1050
50th percentile	1061
60th percentile	1074
70th percentile	1087
75th percentile	1094
80th percentile	1103
85th percentile	1112
90th percentile	1125
95th percentile	1144
97th percentile	1156
99th percentile	1179

TABLE 16

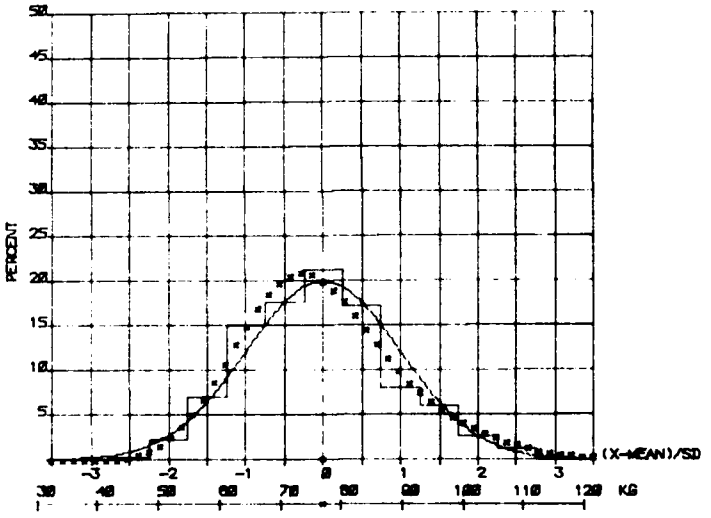
Mass

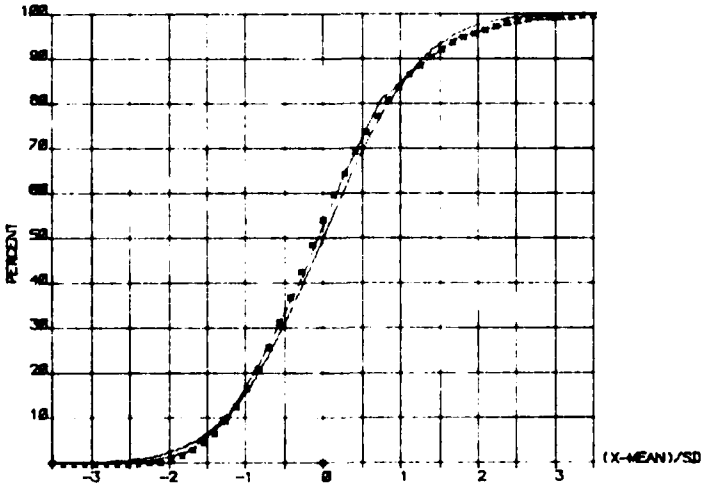
The mass of the subject is recorded standing on a spring scale (subject wearing briefs only).

TABLE 16

Mass (kg)

Number of Subjects	: 312
Mean	: 77·0
Standard Deviation	: 12·7
Coefficient of Skewness	: 0·61
Coefficient of Kurtosis	: 0·98
Range of Data	: 46·0–124·5





1st percentile	52·6
3rd percentile	55·9
5th percentile	57·9
10th percentile	61·4
15th percentile	63·9
20th percentile	66·0
25th percentile	67·9
30th percentile	69·5
40th percentile	72·7
50th percentile	75·8
60th percentile	79·0
70th percentile	82·6
75th percentile	84·8
80th percentile	87·3
85th percentile	90·3
90th percentile	94·4
95th percentile	100·6
97th percentile	104·5
99th percentile	111·5

TABLE 17

Sitting Height

The subject holds the sitting posture. The datum edge is brought down in the midsagittal plane until light contact is made with the vertex. Record the height of the datum edge from the floor. Sitting Height equals datum height less Stool Height.

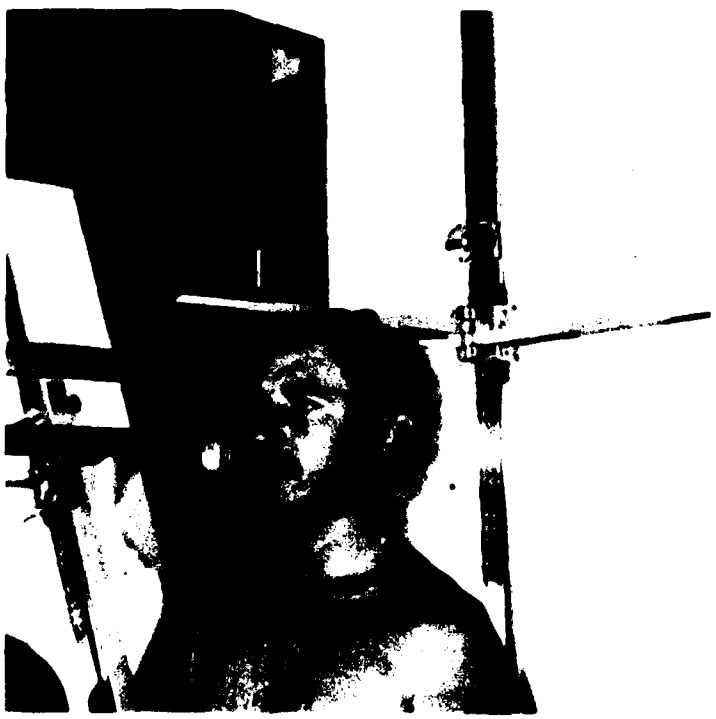
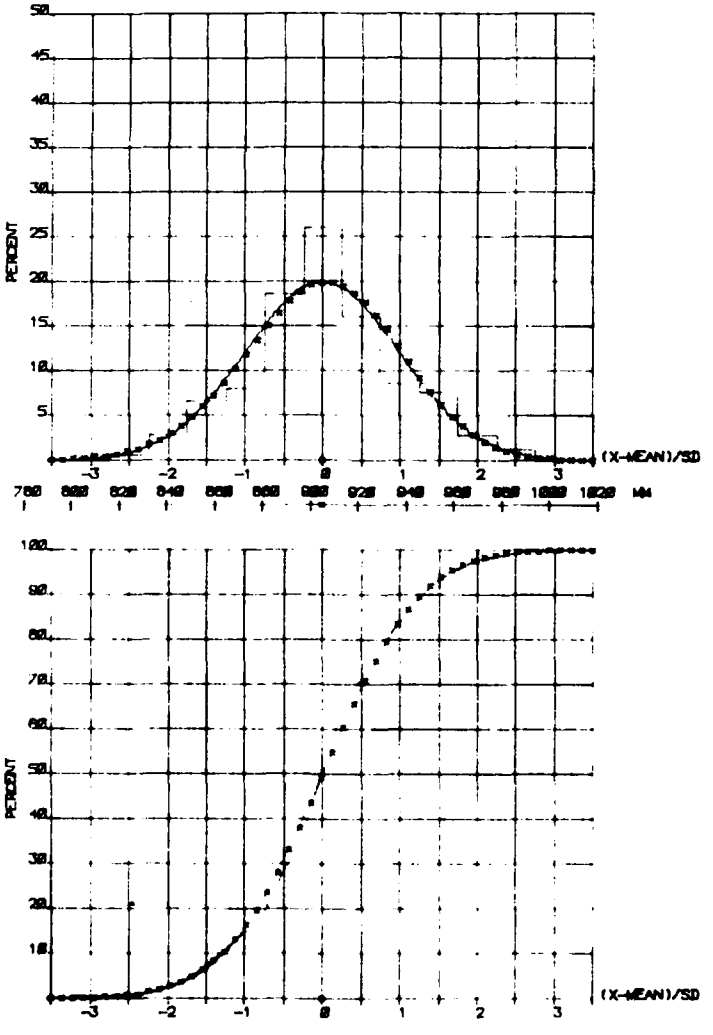


TABLE 17

Sitting Height (mm)

Number of Subjects	: 312
Mean	: 905·0
Standard Deviation	: 32·3
Coefficient of Skewness	: −0·12
Coefficient of Kurtosis	: 0·30
Range of Data	: 796–987



1st	percentile 827
3rd	percentile 842
5th	percentile 851
10th	percentile 863
15th	percentile 871
20th	percentile 878
25th	percentile 884
30th	percentile 889
40th	percentile 897
50th	percentile 906
60th	percentile 914
70th	percentile 922
75th	percentile 927
80th	percentile 932
85th	percentile 938
90th	percentile 946
95th	percentile 957
97th	percentile 964
99th	percentile 977

TABLE 18

Eye Height (Sitting)

The subject holds the sitting posture. The datum line is brought up until the reflections of this line and the centre of the subject's left pupil, in the mirror opposite, are coincident. Record the height of the datum line from the floor. Eye Height equals datum height less Stool Height.

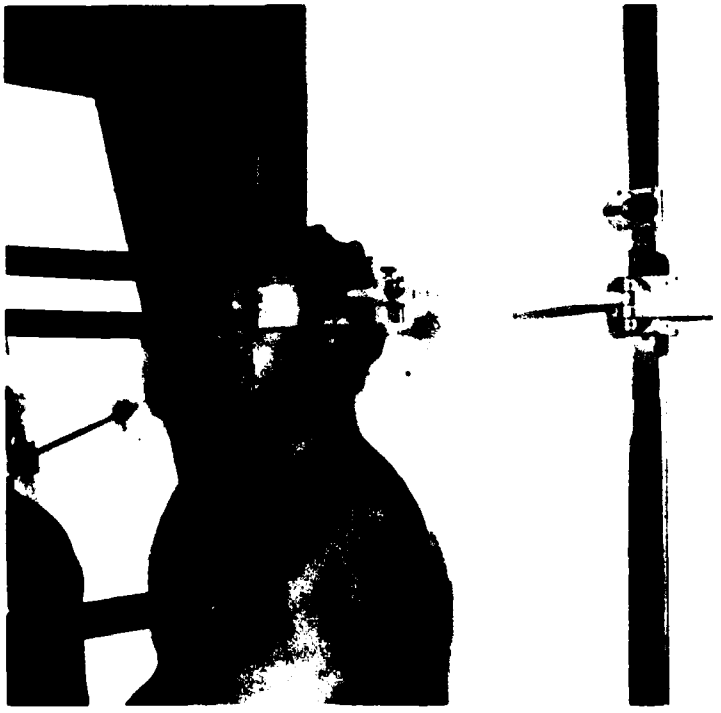
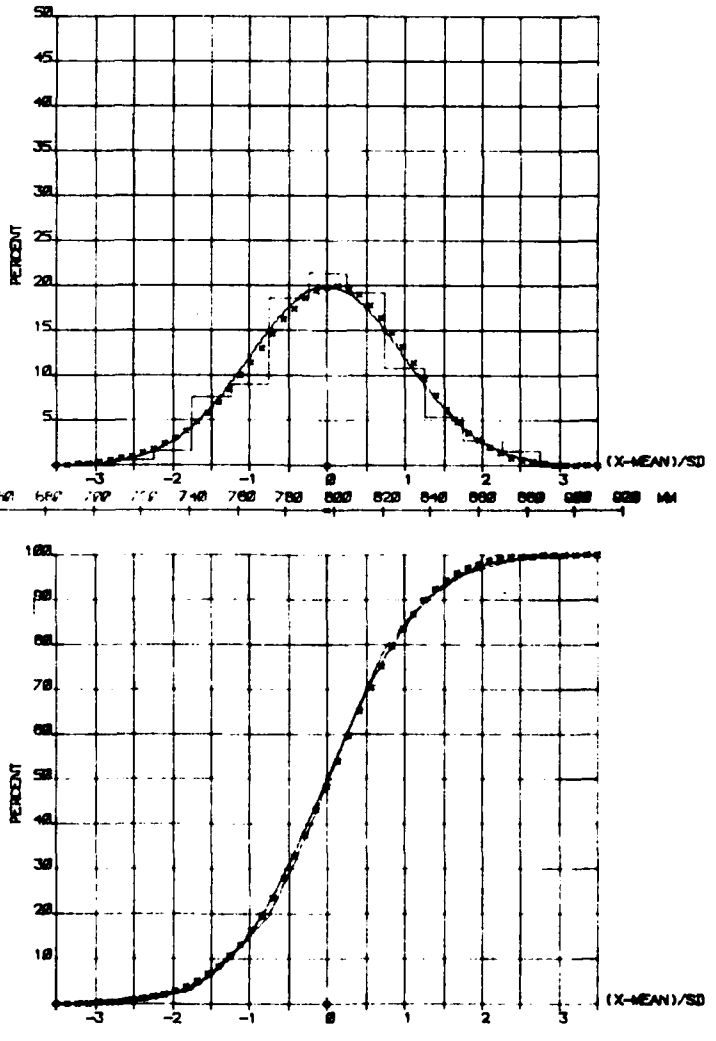


TABLE 18

Eye Height (Sitting) (mm)

Number of Subjects	: 312
Mean	: 797·1
Standard Deviation	: 32·1
Coefficient of Skewness	: −0·20
Coefficient of Kurtosis	: 0·51
Range of Data	: 687–882



1st percentile 718
3rd percentile 734
5th percentile 742
10th percentile 755
15th percentile 764
20th percentile 770
25th percentile 776
30th percentile 781
40th percentile 790
50th percentile 798
60th percentile 806
70th percentile 815
75th percentile 819
80th percentile 824
85th percentile 830
90th percentile 838
95th percentile 848
97th percentile 855
99th percentile 867

TABLE 19

Shoulder Height (Sitting)

The subject holds the sitting posture. The datum edge is brought down until light contact is made with the 90 mm mark on the left shoulder. Record the height of the datum edge from the floor. Shoulder Height equals datum height less Stool Height.

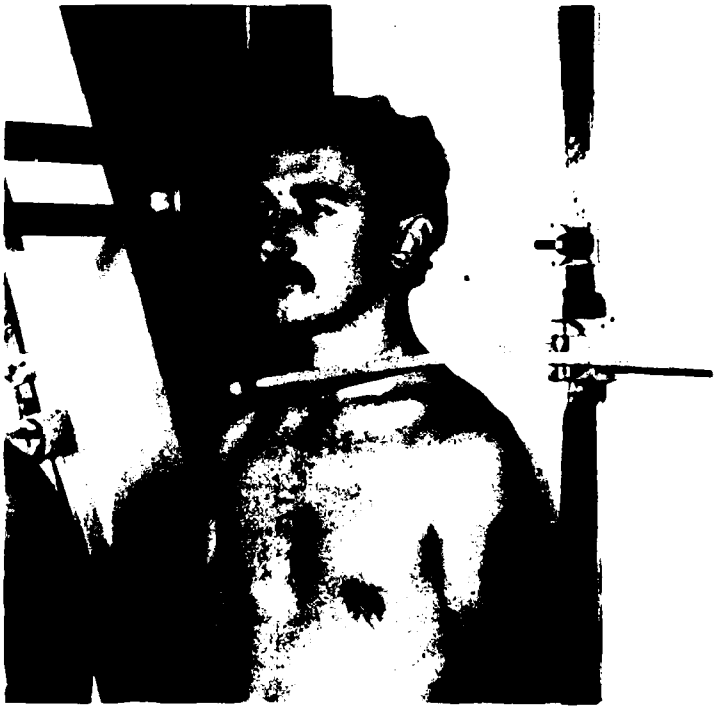


TABLE 19

Shoulder Height (Sitting) (mm)

Number of Subjects : 312

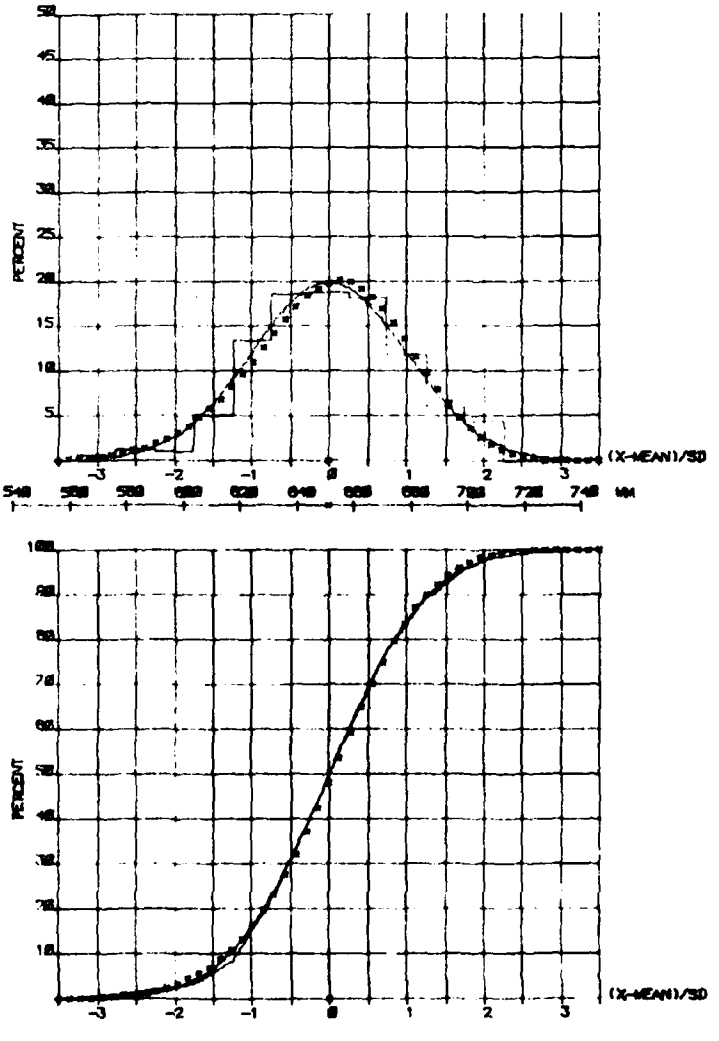
Mean : 651·1

Standard Deviation : 27·2

Coefficient of Skewness: −0·30

Coefficient of Kurtosis : 0·52

Range of Data : 548–711



1st percentile 582
3rd percentile 596
5th percentile 604
10th percentile 615
15th percentile 623
20th percentile 629
25th percentile 634
30th percentile 638
40th percentile 646
50th percentile 652
60th percentile 659
70th percentile 666
75th percentile 670
80th percentile 674
85th percentile 679
90th percentile 685
95th percentile 694
97th percentile 699
99th percentile 709

TABLE 20

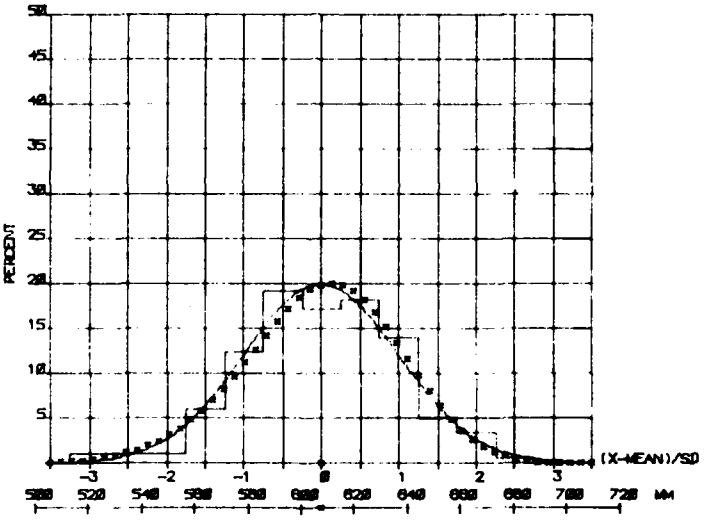
Acromial Height (Sitting)

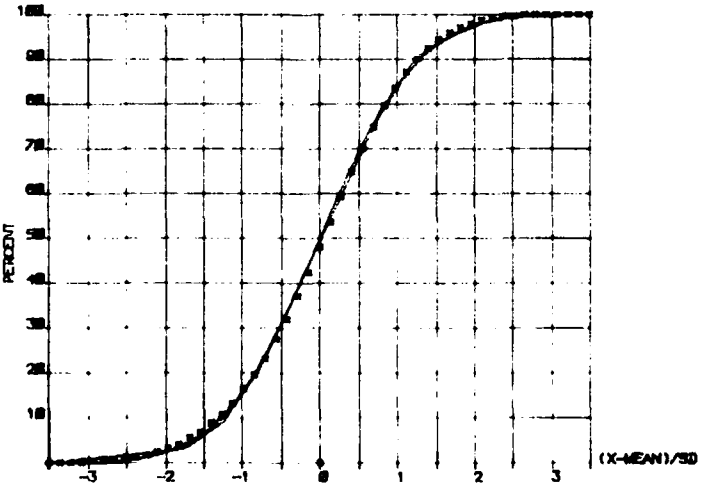
The subject holds the sitting posture. The datum edge is brought down until light contact is made with the left acromial mark. Record the height of the datum edge from the floor. Acromial Height equals datum height less Stool Height.

TABLE 20

Acromial Height (Sitting) (mm)

Number of Subjects	: 312
Mean	: 607·6
Standard Deviation	: 29·1
Coefficient of Skewness	: −0·29
Coefficient of Kurtosis	: 0·40
Range of Data	: 512–676





1st percentile 534
3rd percentile 549
5th percentile 557
10th percentile 569
15th percentile 577
20th percentile 584
25th percentile 589
30th percentile 593
40th percentile 602
50th percentile 609
60th percentile 616
70th percentile 624
75th percentile 628
80th percentile 633
85th percentile 638
90th percentile 644
95th percentile 653
97th percentile 659
99th percentile 669

TABLE 21

Elbow Rest Height

The subject holds the sitting posture except that the forearms are raised and extended forwards horizontally. The hands and fingers are extended in the vertical plane containing the forearm. The datum edge is brought up to make contact with the lower edge of the left olecrannon. Record the height of the datum edge from the floor. Elbow Rest Height equals datum height less Stool Height.

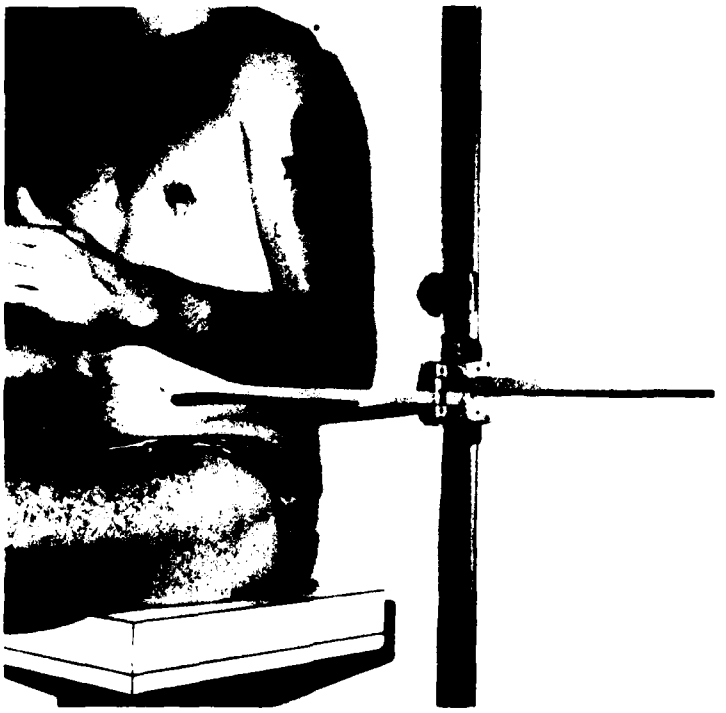


TABLE 21

Elbow Rest Height (mm)

Number of Subjects : 312

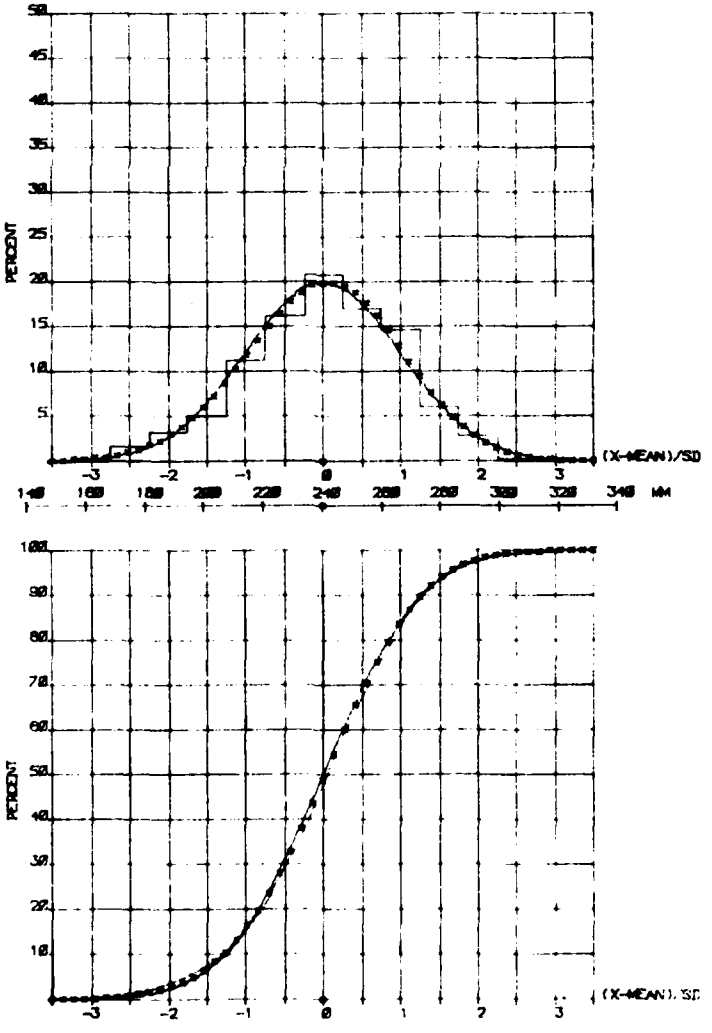
Mean : 240·3

Standard Deviation : 26·2

Coefficient of Skewness: −0·14

Coefficient of Kurtosis : −0·04

Range of Data : 165–313



1st percentile 177
3rd percentile 189
5th percentile 196
10th percentile 206
15th percentile 213
20th percentile 218
25th percentile 223
30th percentile 227
40th percentile 234
50th percentile 241
60th percentile 247
70th percentile 254
75th percentile 258
80th percentile 263
85th percentile 267
90th percentile 274
95th percentile 282
97th percentile 288
99th percentile 299

TABLE 22

Popliteal Height

The subject holds the sitting posture. With the sliding calipers measure the vertical distance from the floor to the underside of the tendon of the left biceps femoris muscle where it joins the calf.

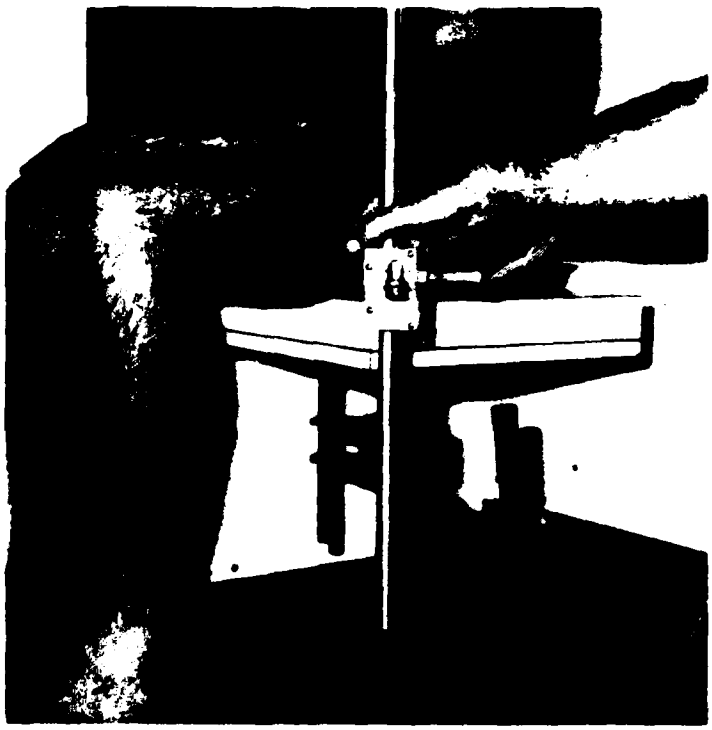
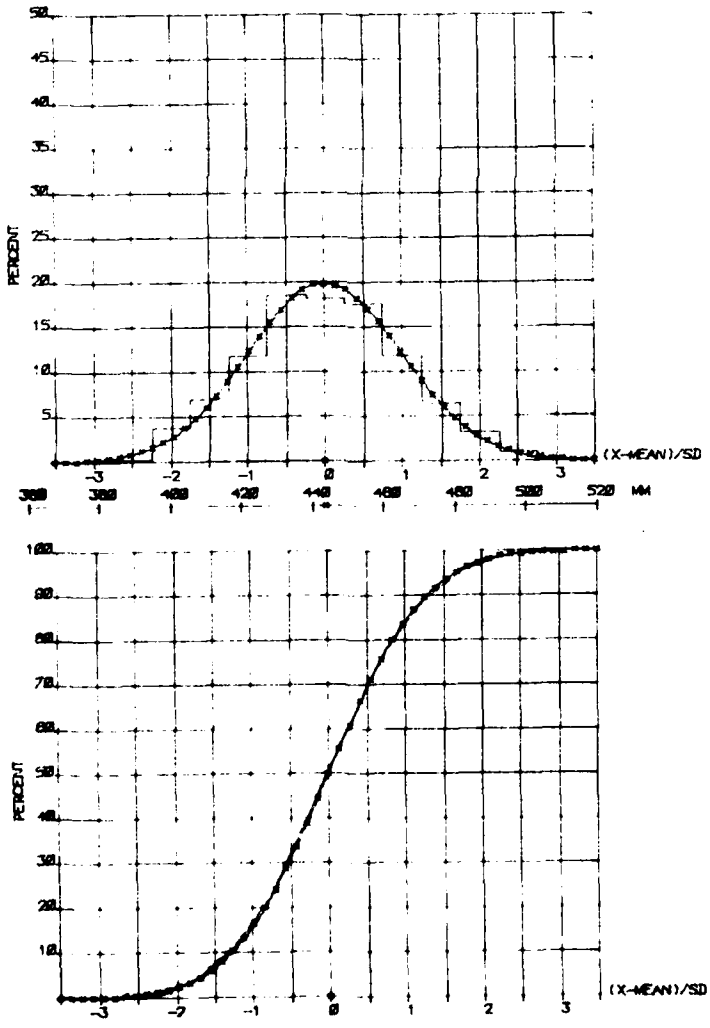


TABLE 22

Popliteal Height (mm)

Number of Subjects	: 312
Mean	: 443·8
Standard Deviation	: 21·7
Coefficient of Skewness	: 0·01
Coefficient of Kurtosis	: −0·46
Range of Data	: 389–496



1st percentile	393
3rd percentile	403
5th percentile	408
10th percentile	416
15th percentile	421
20th percentile	426
25th percentile	429
30th percentile	432
40th percentile	438
50th percentile	444
60th percentile	449
70th percentile	455
75th percentile	458
80th percentile	462
85th percentile	466
90th percentile	472
95th percentile	480
97th percentile	485
99th percentile	495

TABLE 23

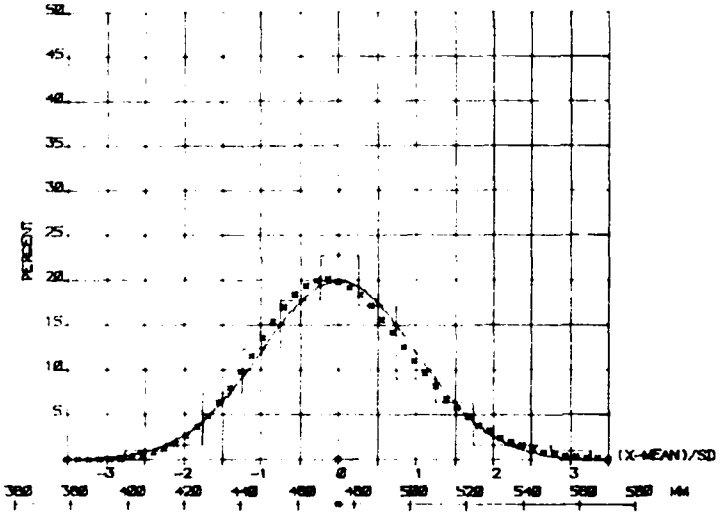
Bideltoid Breadth

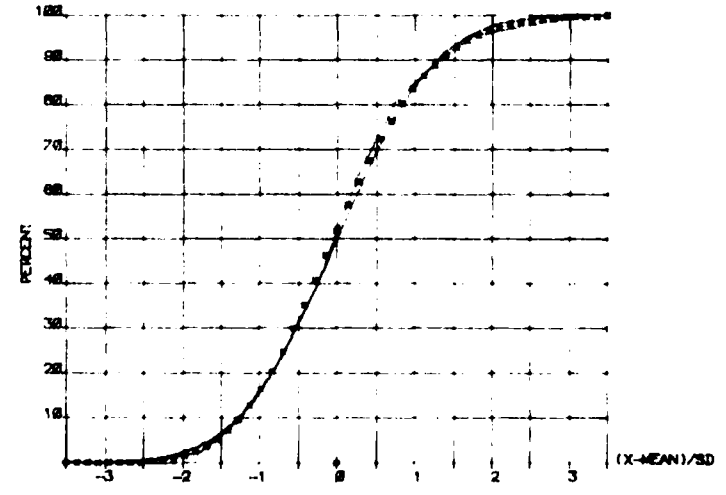
The subject moves across to his right-hand side until the right deltoid muscle is brought into light contact with the perspex wall panel. The circle of skin in contact with the perspex has a diameter of approximately 30 mm (this is monitored in the mirror). The subject regains the sitting posture and the datum edge is moved horizontally until light contact is made with the most distal portion of the left deltoid prominence. Record the distance of the datum edge from the end wall.

TABLE 23

Bideltoid Breadth (mm)

Number of Subjects	: 312
Mean	: 474·5
Standard Deviation	: 27·4
Coefficient of Skewness	: 0·31
Coefficient of Kurtosis	: 0·27
Range of Data	: 403–560





1st percentile 417
3rd percentile 426
5th percentile 432
10th percentile 440
15th percentile 446
20th percentile 451
25th percentile 455
30th percentile 459
40th percentile 466
50th percentile 473
60th percentile 480
70th percentile 488
75th percentile 492
80th percentile 497
85th percentile 503
90th percentile 511
95th percentile 522
97th percentile 530
99th percentile 544

TABLE 24

Hip Breadth

Subject moves across to his right-hand side so that the fleshy part of his right hip makes light contact with the perspex wall panel (monitored in the mirror). The subject's knees are brought together; feet are flat on the floor. The datum edge is moved horizontally until light contact is made with the widest region of the left hip. Record the distance of the datum edge from the end wall.

TABLE 24

Hip Breadth (mm)

Number of Subjects : 312

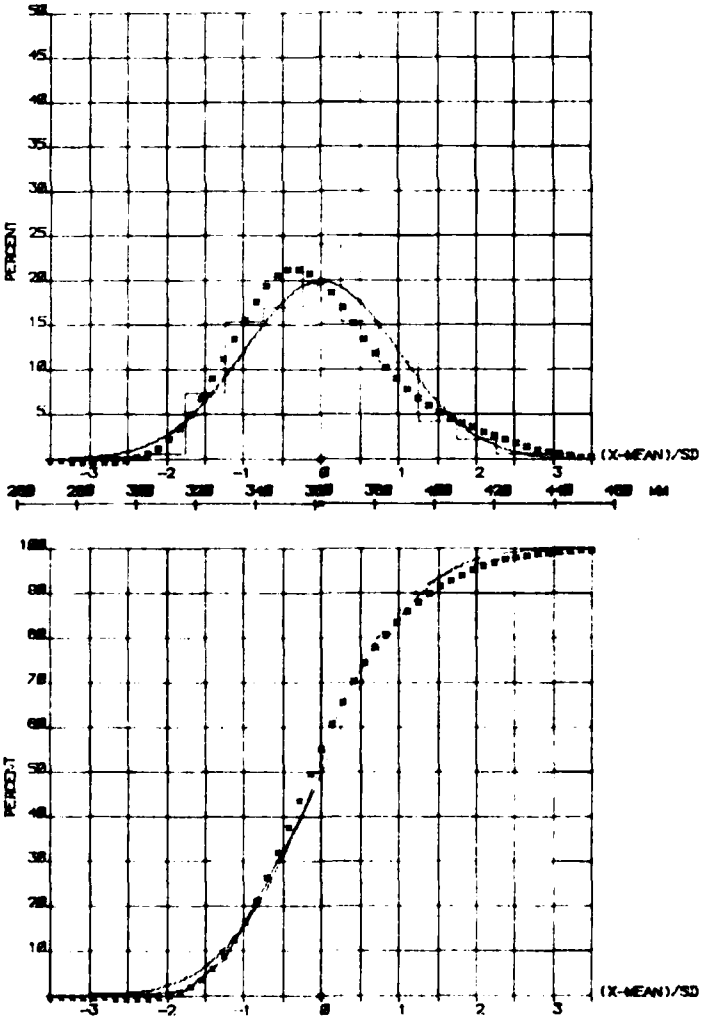
Mean : 361·9

Standard Deviation : 25·9

Coefficient of Skewness: 0·82

Coefficient of Kurtosis : 2·13

Range of Data : 282–478



1st percentile 315
3rd percentile 320
5th percentile 324
10th percentile 330
15th percentile 335
20th percentile 339
25th percentile 343
30th percentile 346
40th percentile 352
50th percentile 358
60th percentile 365
70th percentile 372
75th percentile 377
80th percentile 382
85th percentile 389
90th percentile 398
95th percentile 412
97th percentile 420
99th percentile 434

TABLE 25

Functional Reach

The subject sits erect looking straight ahead at the reflection of his pupils in the mirror directly in front of him. Both shoulder blades are symmetrically and lightly touching the perspex panel in the end wall of the measuring rig (monitored in the mirror). The arms are extended forward horizontally and the hand is pronated with the tip of the index finger touching the extended thumb (which is held in the plane of the extended arm). The datum edge is moved horizontally until contact is made with the tip of the left thumb. Record the distance of the datum edge from the end wall.

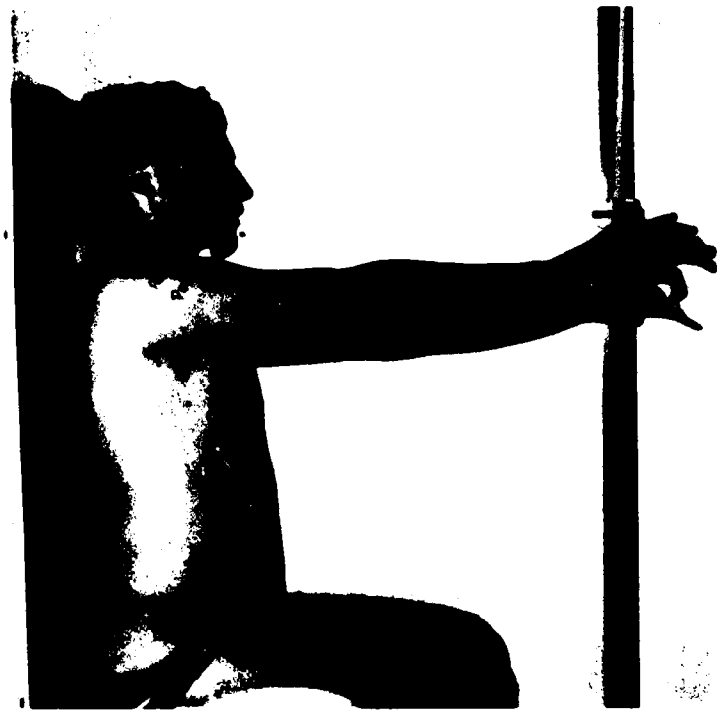
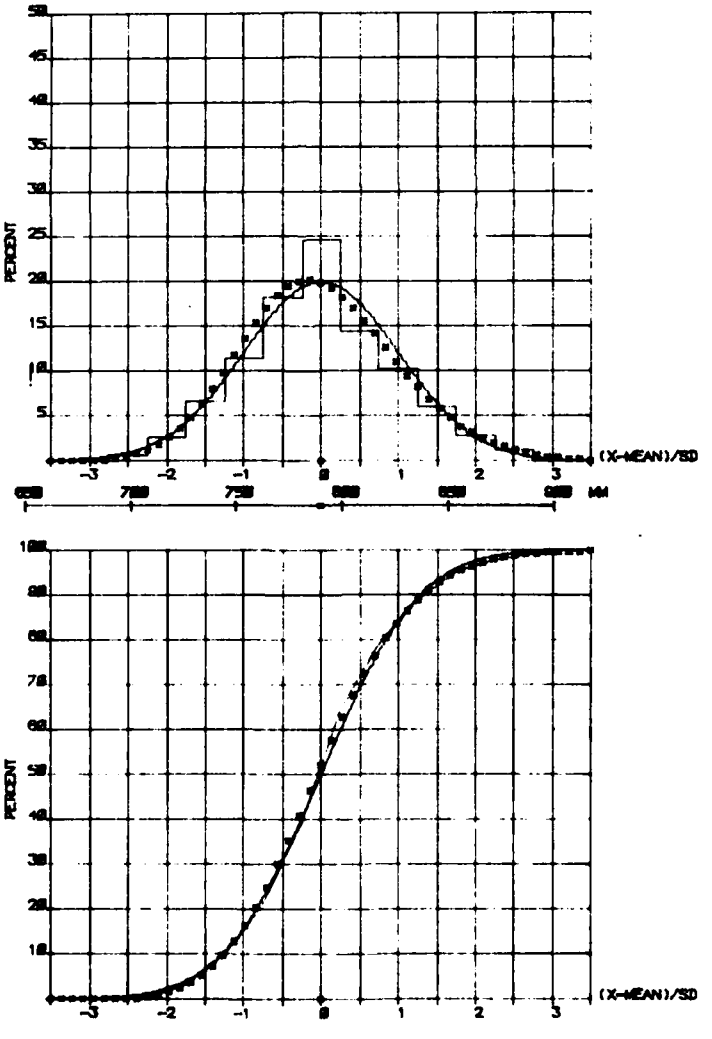


TABLE 25

Functional Reach (mm)

Number of Subjects	: 312
Mean	: 789·8
Standard Deviation	: 36·4
Coefficient of Skewness	: 0·32
Coefficient of Kurtosis	: 0·28
Range of Data	: 691–916



1st percentile 713
3rd percentile 726
5th percentile 733
10th percentile 744
15th percentile 752
20th percentile 759
25th percentile 764
30th percentile 769
40th percentile 779
50th percentile 788
60th percentile 797
70th percentile 807
75th percentile 813
80th percentile 820
85th percentile 828
90th percentile 838
95th percentile 853
97th percentile 863
99th percentile 883

TABLE 26

Buttock–Knee Length

The subject sits erect, feet flat on the floor and thighs parallel to the rear wall of the measuring rig. The subject is instructed to '. . . push your buttocks back until you have equal pressure on both buttocks against the perspex wall'. Both shoulder blades are symmetrically and lightly touching the perspex panel in the end wall of the measuring rig. The datum edge is moved horizontally until contact is made with the most forward prominence of the left patella. Record the distance of the datum edge from the end wall.

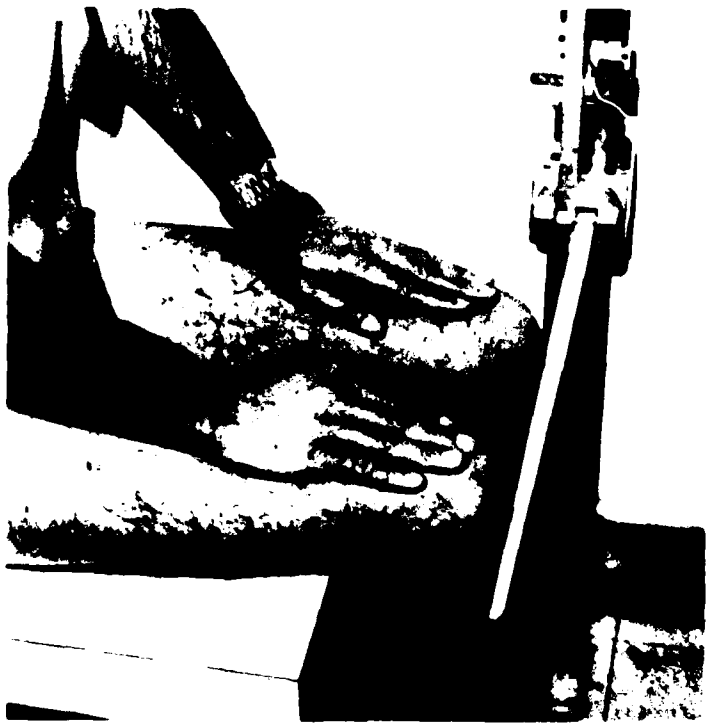
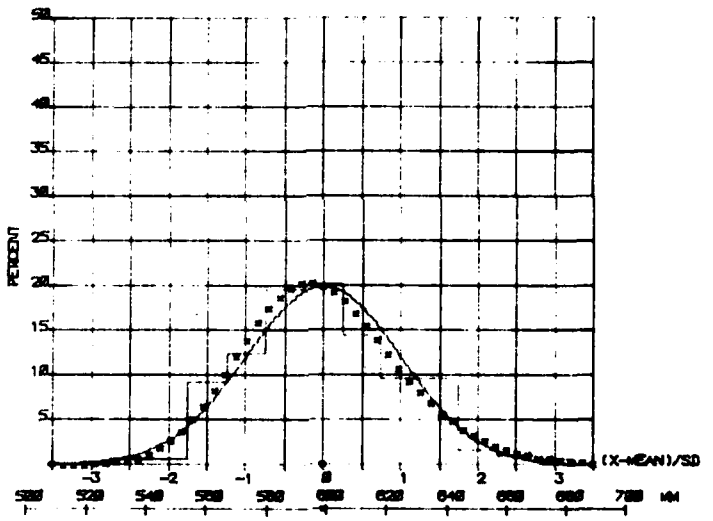
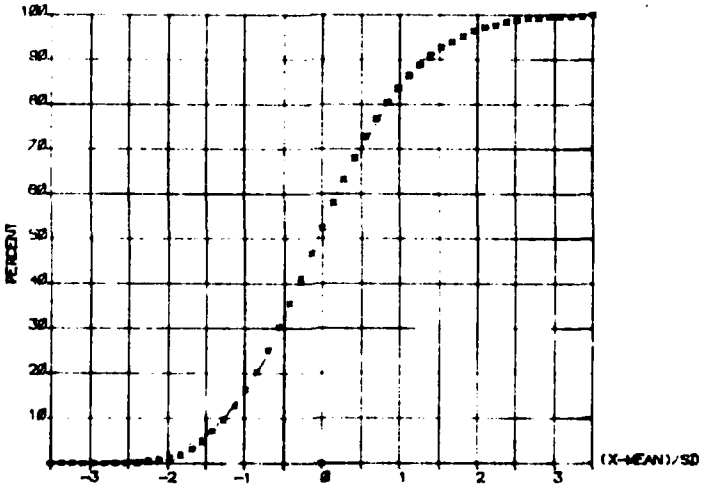


TABLE 26

Buttock–Knee Length (mm)

Number of Subjects	: 312
Mean	: 599·0
Standard Deviation	: 25·7
Coefficient of Skewness	: 0·39
Coefficient of Kurtosis	: 0·19
Range of Data	: 534–698





1st percentile 546
3rd percentile 554
5th percentile 559
10th percentile 567
15th percentile 572
20th percentile 577
25th percentile 581
30th percentile 584
40th percentile 591
50th percentile 597
60th percentile 604
70th percentile 611
75th percentile 615
80th percentile 620
85th percentile 626
90th percentile 633
95th percentile 645
97th percentile 652
99th percentile 666

TABLE 27

Thigh Clearance Height

The subject sits erect, feet flat on the floor, arms hanging vertically and lightly touching the sides. The datum edge is brought down to make light contact with the highest point on the left thigh. Record the height of the datum edge from the floor. Thigh Clearance Height equals datum height less Stool Height.

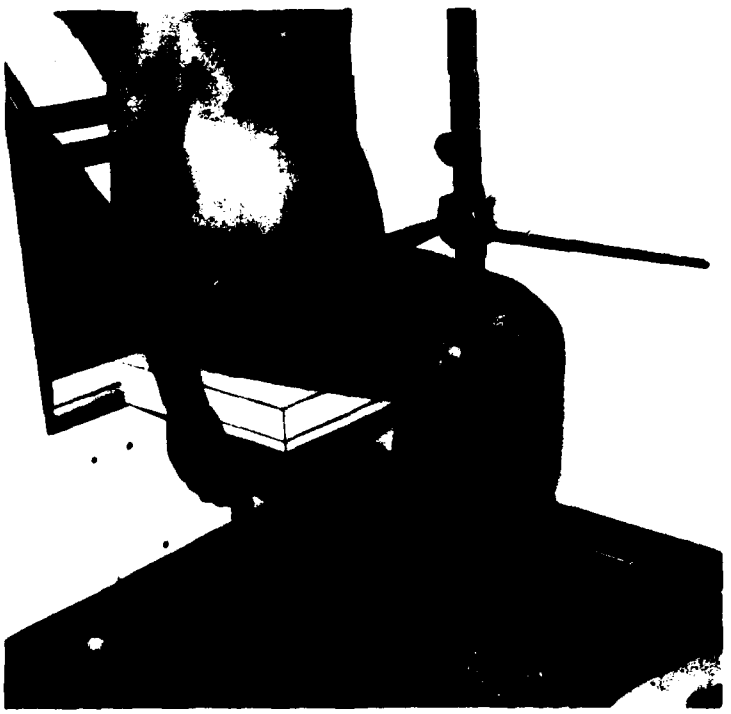


TABLE 27

Thigh Clearance Height (mm)

Number of Subjects : 312

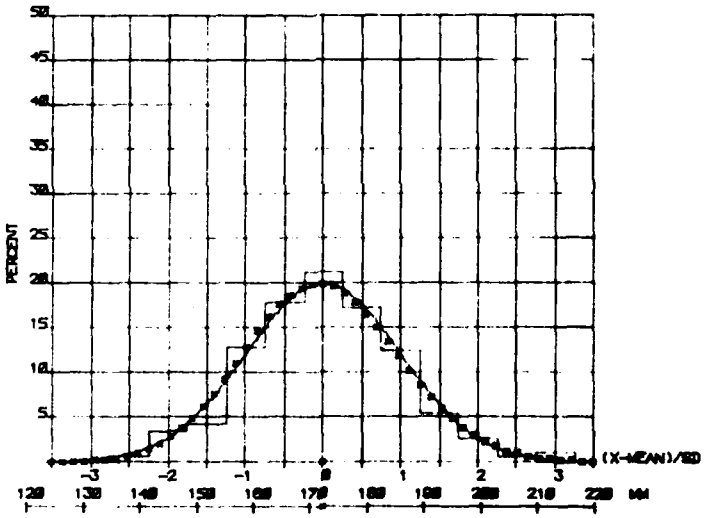
Mean : 172·2

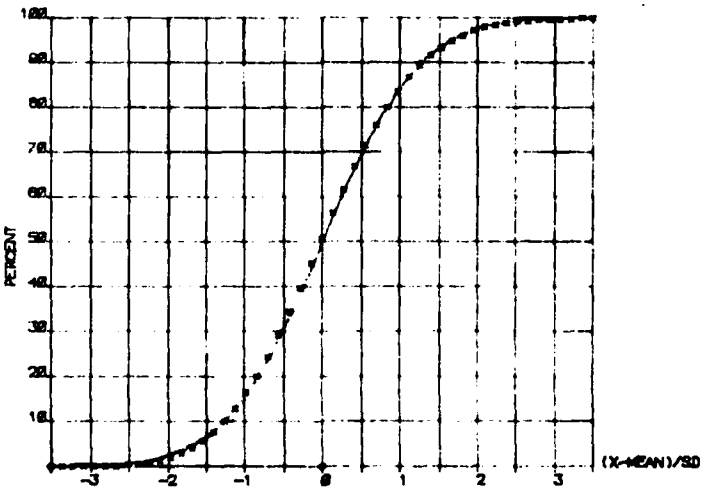
Standard Deviation : 13·6

Coefficient of Skewness: 0·12

Coefficient of Kurtosis : 0·39

Range of Data : 126–216





1st percentile 142
3rd percentile 147
5th percentile 150
10th percentile 155
15th percentile 158
20th percentile 161
25th percentile 163
30th percentile 165
40th percentile 168
50th percentile 172
60th percentile 175
70th percentile 179
75th percentile 181
80th percentile 184
85th percentile 186
90th percentile 190
95th percentile 195
97th percentile 199
99th percentile 205

TABLE 28

Stool Height

The subject stands and moves away from the stool. The datum edge is brought down to make contact with the upper surface of the stool seat. Record the height of the datum edge from the floor.

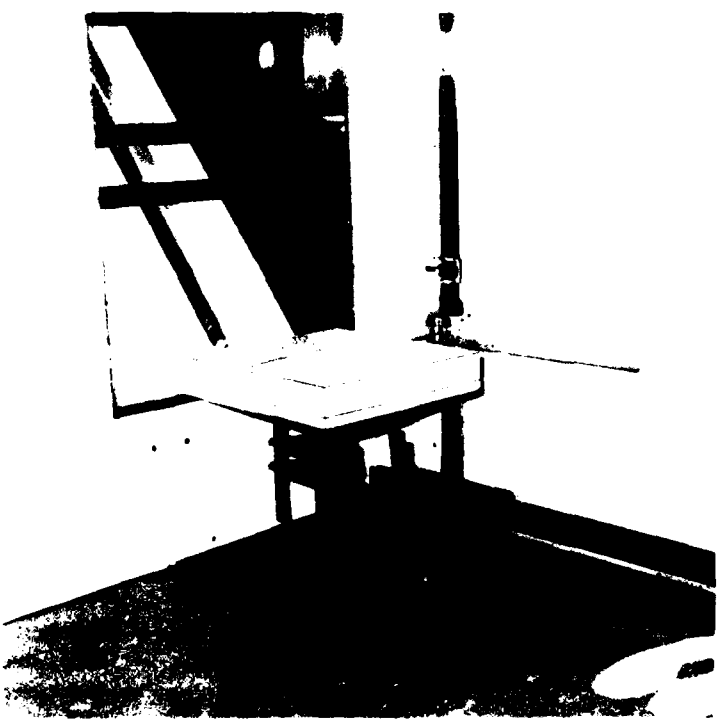
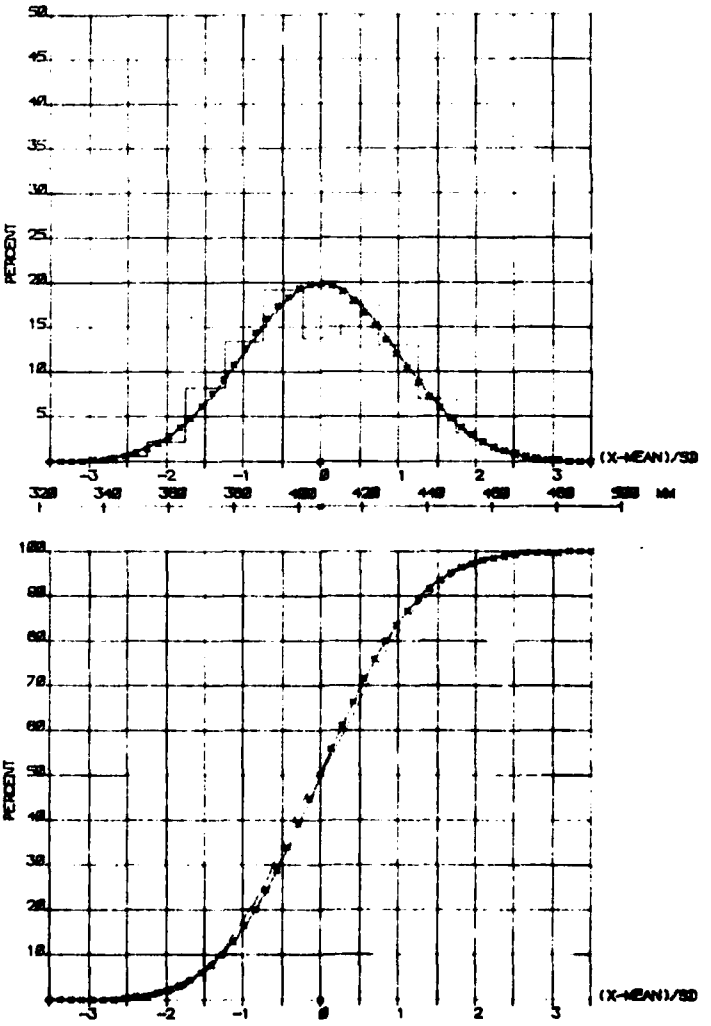


TABLE 28

Stool Height (mm)

Number of Subjects	: 312
Mean	: 407·1
Standard Deviation	: 23·9
Coefficient of Skewness	: 0·08
Coefficient of Kurtosis	: −0·55
Range of Data	: 350–472



1st percentile	353
3rd percentile	363
5th percentile	368
10th percentile	377
15th percentile	382
20th percentile	387
25th percentile	391
30th percentile	394
40th percentile	401
50th percentile	407
60th percentile	413
70th percentile	419
75th percentile	423
80th percentile	427
85th percentile	432
90th percentile	438
95th percentile	447
97th percentile	453
99th percentile	464

TABLE 29

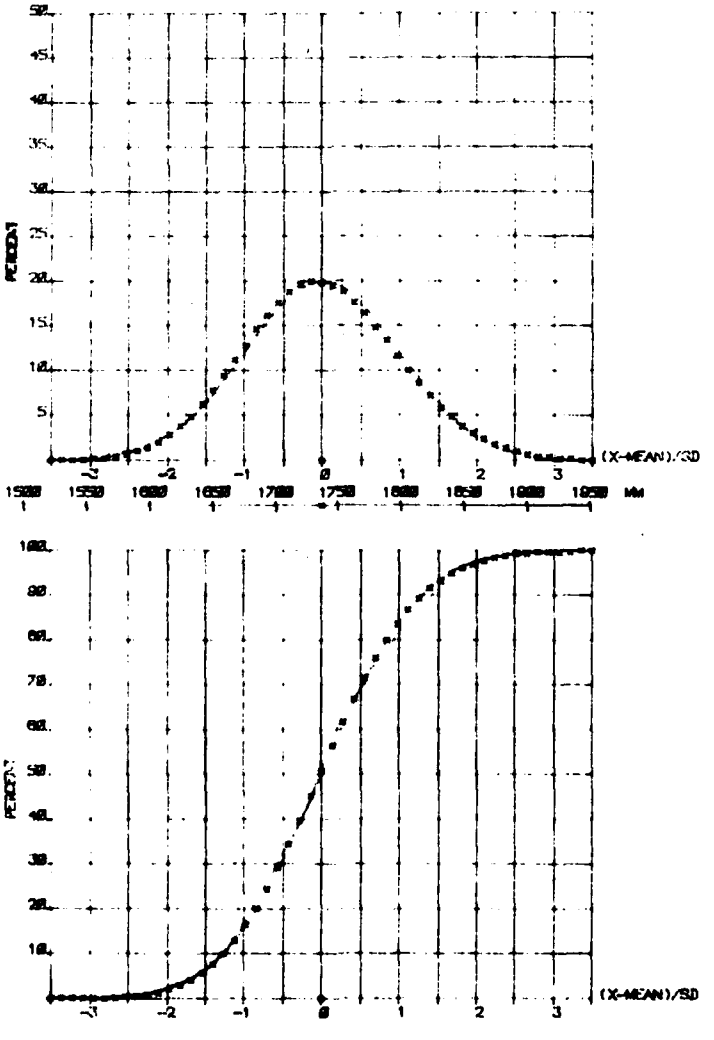
Stature

The subject stands erect, looking straight ahead, heels together and back free of the wall. The datum edge is brought down in the midsagittal plane until light contact is made with the vertex. Record the height of the datum edge from the floor.

TABLE 29

Stature (mm)

Number of Subjects	: 312
Mean	: 1736·8
Standard Deviation	: 61·3
Coefficient of Skewness	: 0·15
Coefficient of Kurtosis	: −0·27
Range of Data	: 1590–1912



1st percentile	1601
3rd percentile	1625
5th percentile	1638
10th percentile	1659
15th percentile	1673
20th percentile	1685
25th percentile	1695
30th percentile	1704
40th percentile	1720
50th percentile	1735
60th percentile	1751
70th percentile	1768
75th percentile	1777
80th percentile	1788
85th percentile	1800
90th percentile	1816
95th percentile	1840
97th percentile	1856
99th percentile	1886

TABLE 30

Crotch Height

The subject stands erect looking straight ahead with heels approximately 100 mm apart. The datum edge is pushed up into the floor of the perineum, taking care not to impinge on the buttocks or the genitals. Record the height of the datum edge from the floor.

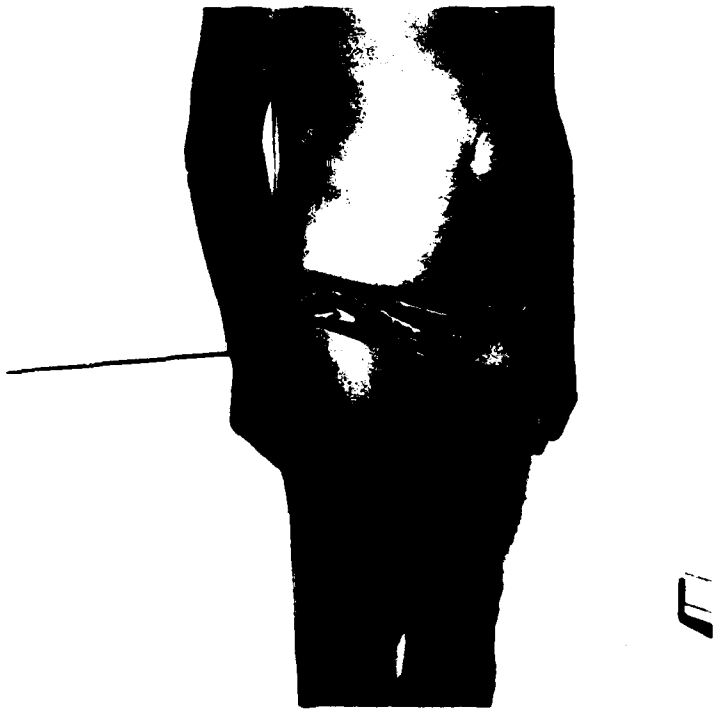
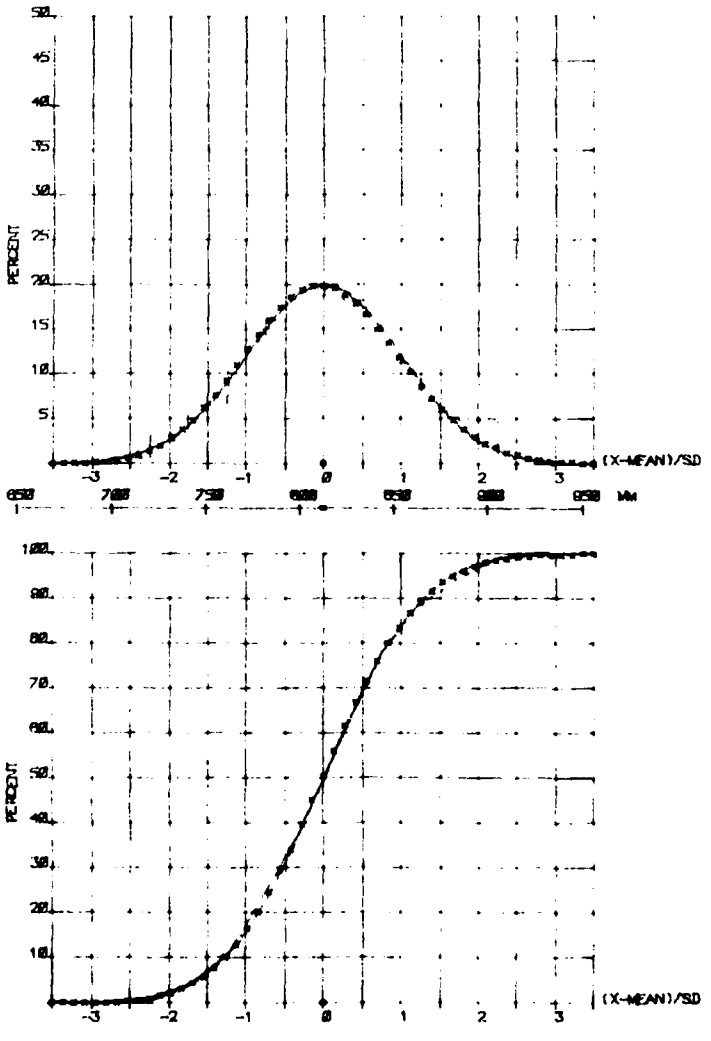


TABLE 30

Crotch Height (mm)

Number of Subjects	: 312
Mean	: 812·6
Standard Deviation	: 41·0
Coefficient of Skewness	: 0·10
Coefficient of Kurtosis	: −0·32
Range of Data	: 718–925



1st percentile 720
3rd percentile 737
5th percentile 746
10th percentile 760
15th percentile 770
20th percentile 778
25th percentile 785
30th percentile 791
40th percentile 802
50th percentile 812
60th percentile 822
70th percentile 834
75th percentile 840
80th percentile 847
85th percentile 855
90th percentile 866
95th percentile 881
97th percentile 892
99th percentile 911

TABLE 31

Chest Depth

The subject stands erect with arms relaxed by the sides. With the bar of the sliding calipers held horizontally and parallel to the midsagittal plane at the level of the left nipple, measure Chest Depth at the end of a normal inspiration.

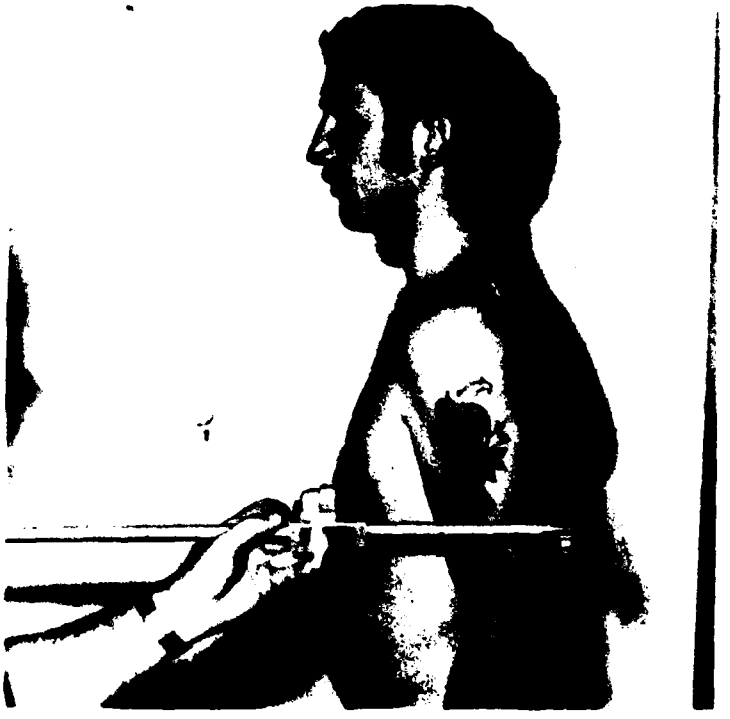
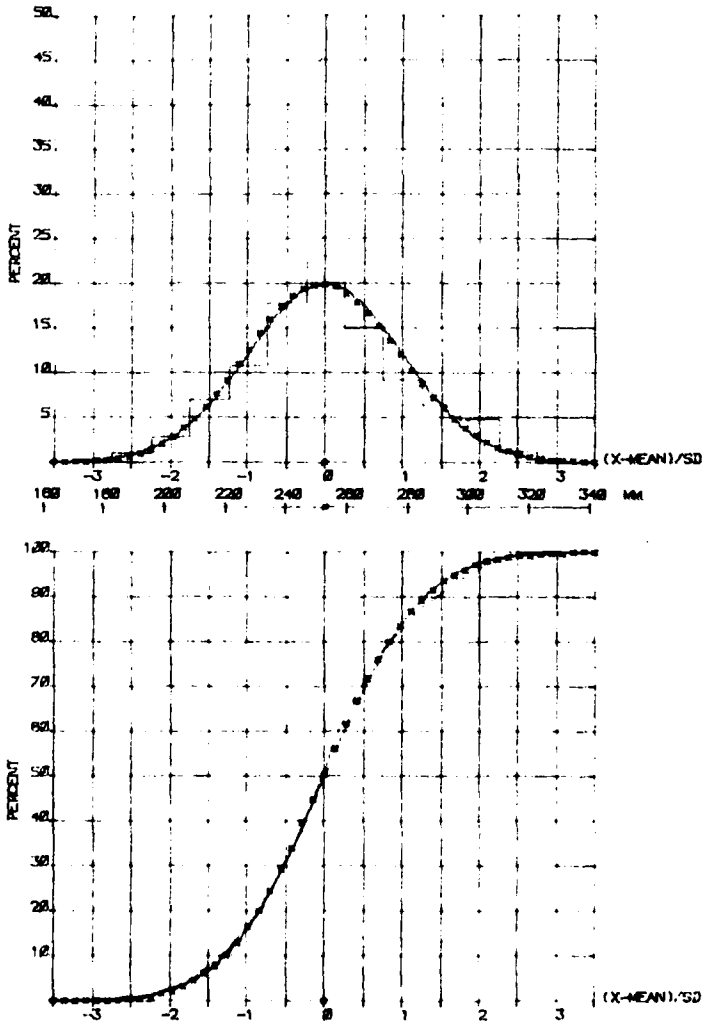


TABLE 31

Chest Depth (mm)

Number of Subjects	: 312
Mean	: 253·0
Standard Deviation	: 25·5
Coefficient of Skewness	: 0·09
Coefficient of Kurtosis	: −0·20
Range of Data	: 180–315



1st percentile 195
3rd percentile 206
5th percentile 212
10th percentile 221
15th percentile 227
20th percentile 231
25th percentile 236
30th percentile 239
40th percentile 246
50th percentile 253
60th percentile 259
70th percentile 266
75th percentile 270
80th percentile 274
85th percentile 279
90th percentile 286
95th percentile 296
97th percentile 302
99th percentile 314

TABLE 32

Head Breadth

The subject sits, looking straight ahead. With the sliding calipers held in a horizontal plane and applying sufficient pressure with the jaws of the calipers to flatten the hair, measure the maximum head breadth in the coronal plane.

TABLE 32

Head Breadth (mm)

Number of Subjects : 312

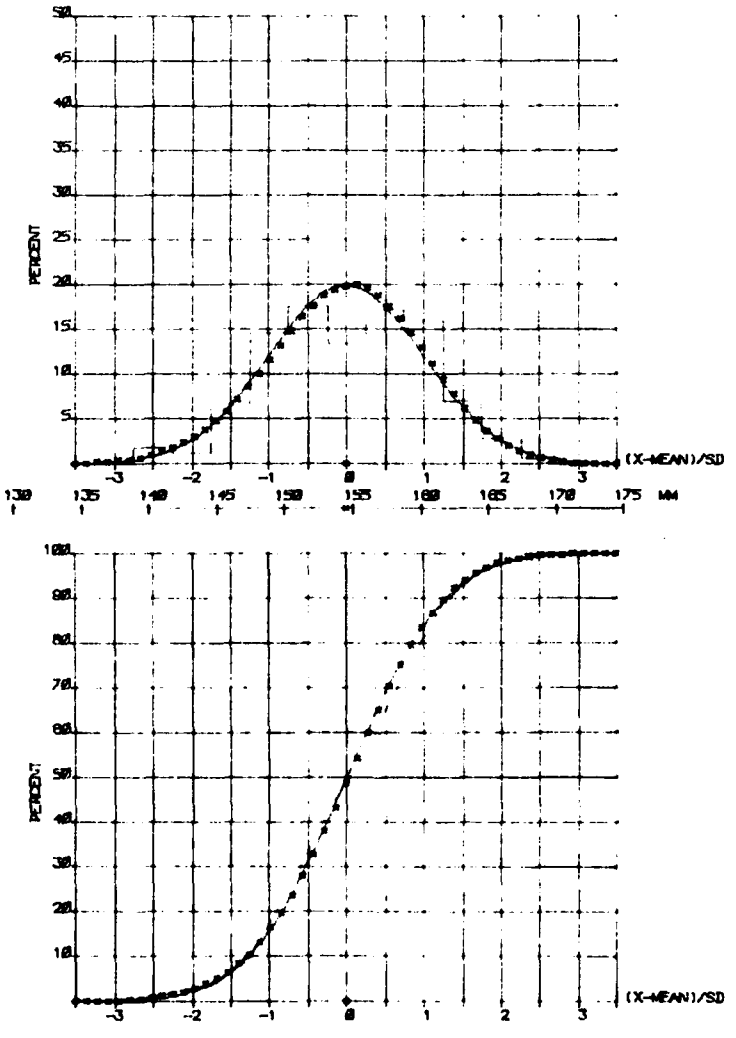
Mean : 154·5

Standard Deviation : 5·7

Coefficient of Skewness: −0·16

Coefficient of Kurtosis : −0·20

Range of Data : 137–169



1st percentile 141
3rd percentile 143
5th percentile 145
10th percentile 147
15th percentile 149
20th percentile 150
25th percentile 151
30th percentile 152
40th percentile 153
50th percentile 155
60th percentile 156
70th percentile 158
75th percentile 158
80th percentile 159
85th percentile 160
90th percentile 162
95th percentile 164
97th percentile 165
99th percentile 167

TABLE 33

Inter-Elbow Breadth

The subject sits erect, upper arms vertical, elbows lightly touching the sides, forearms extended forwards horizontally and palms resting lightly on the support bar. With the sliding calipers measure the horizontal distance between the most distal projections of the lateral epicondyles of the humeri.

TABLE 33

Inter-Elbow Breadth (mm)

Number of Subjects : 312

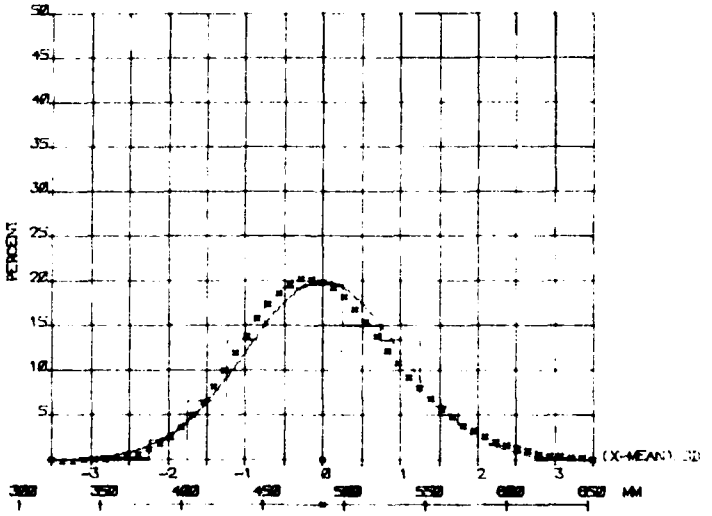
Mean : 486·8

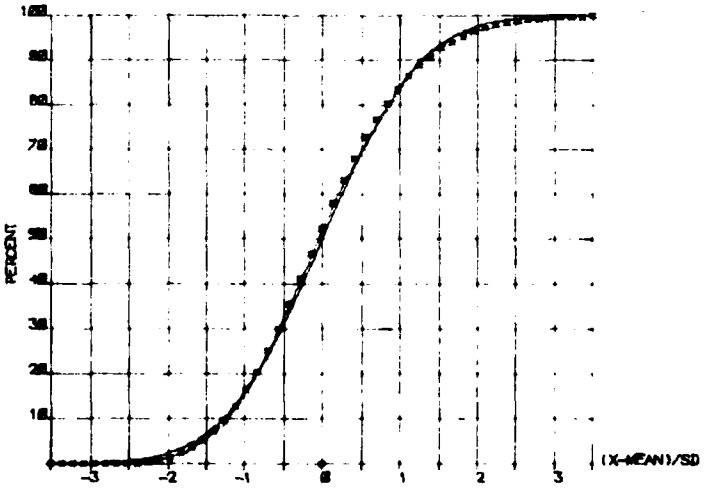
Standard Deviation : 47·6

Coefficient of Skewness: 0·39

Coefficient of Kurtosis : 0·16

Range of Data : 372–658





1st percentile 389
3rd percentile 404
5th percentile 413
10th percentile 427
15th percentile 438
20th percentile 446
25th percentile 453
30th percentile 460
40th percentile 472
50th percentile 484
60th percentile 496
70th percentile 509
75th percentile 517
80th percentile 526
85th percentile 536
90th percentile 550
95th percentile 571
97th percentile 585
99th percentile 610

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