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Technical Report No. 85-12-01

1985 ANTHROPOMETRIC SURVEY  
OF  
CANADIAN FORCES AIRCREW

December, 1985

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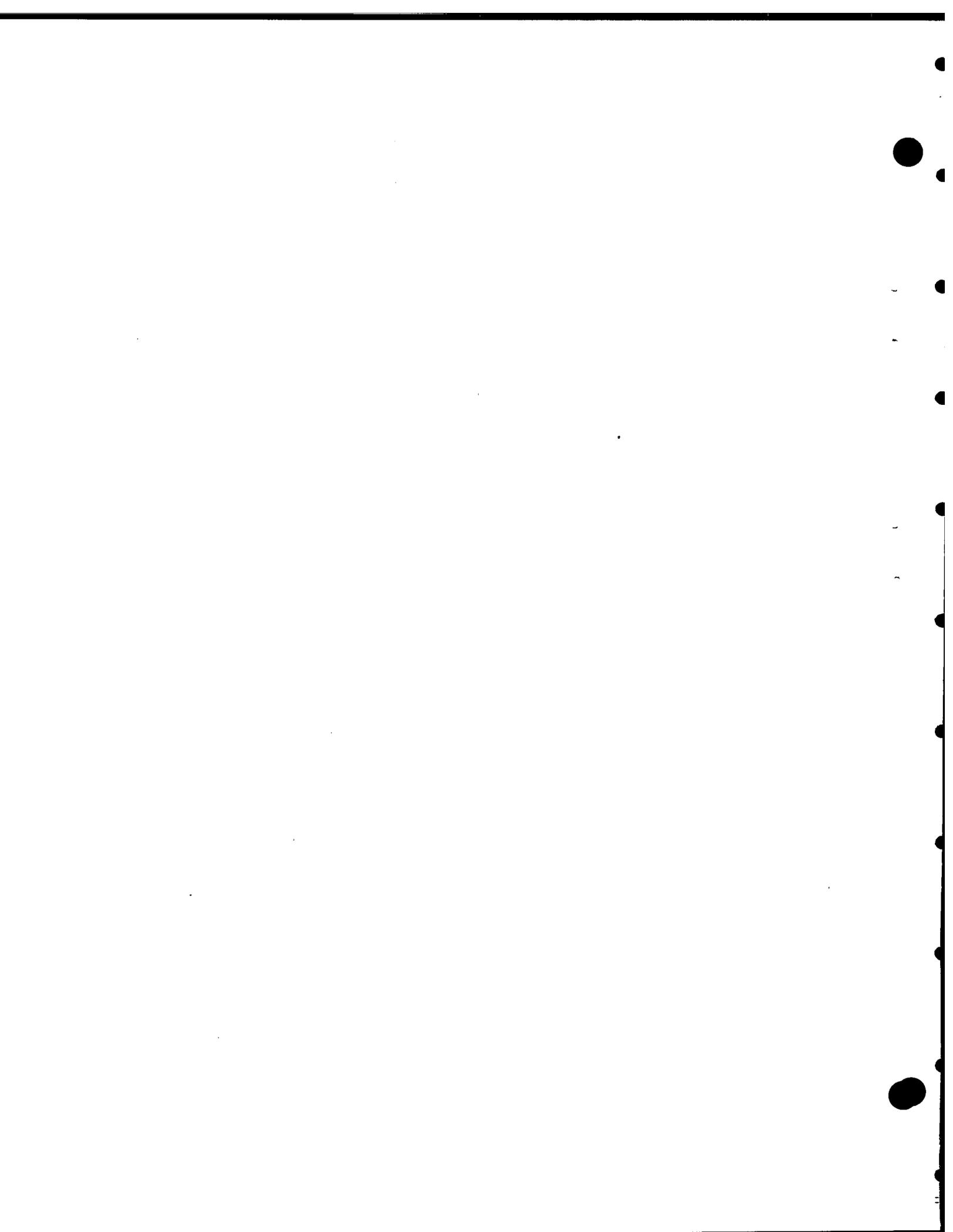
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DSS FILE NO. 01SE.97711-4-8216

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## ACKNOWLEDGEMENTS

This project could not have been completed without the assistance of many people. All four data collectors (Cyndie McHardy, Wilma Davis, Kevin Ball, and Bill Cunliffe) spent many long days travelling to CF Bases located in remote areas across the country. Their professionalism, dedication and patience will not be forgotten. Mr. Richard Adamick of Air Canada organized all of the travel plans for Human Elements personnel, often on very short notice. It was a pleasure doing business with someone so calm and capable, especially when the schedule became hectic.

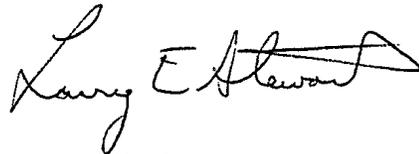
At the onset of data collection the assistance provided by Major Vic Howlett of the Directorate of Air Requirements, NDHQ, Ottawa and Capt Buchard (GALSEO) of the Maritime Air Group Head Quarters in Halifax were greatly appreciated and deserve recognition.

Thanks must go to all the Base Liaisons (listed below), with special thanks to Lt Tim Truant whose efforts went "beyond the call of duty" in recruiting personnel for testing:

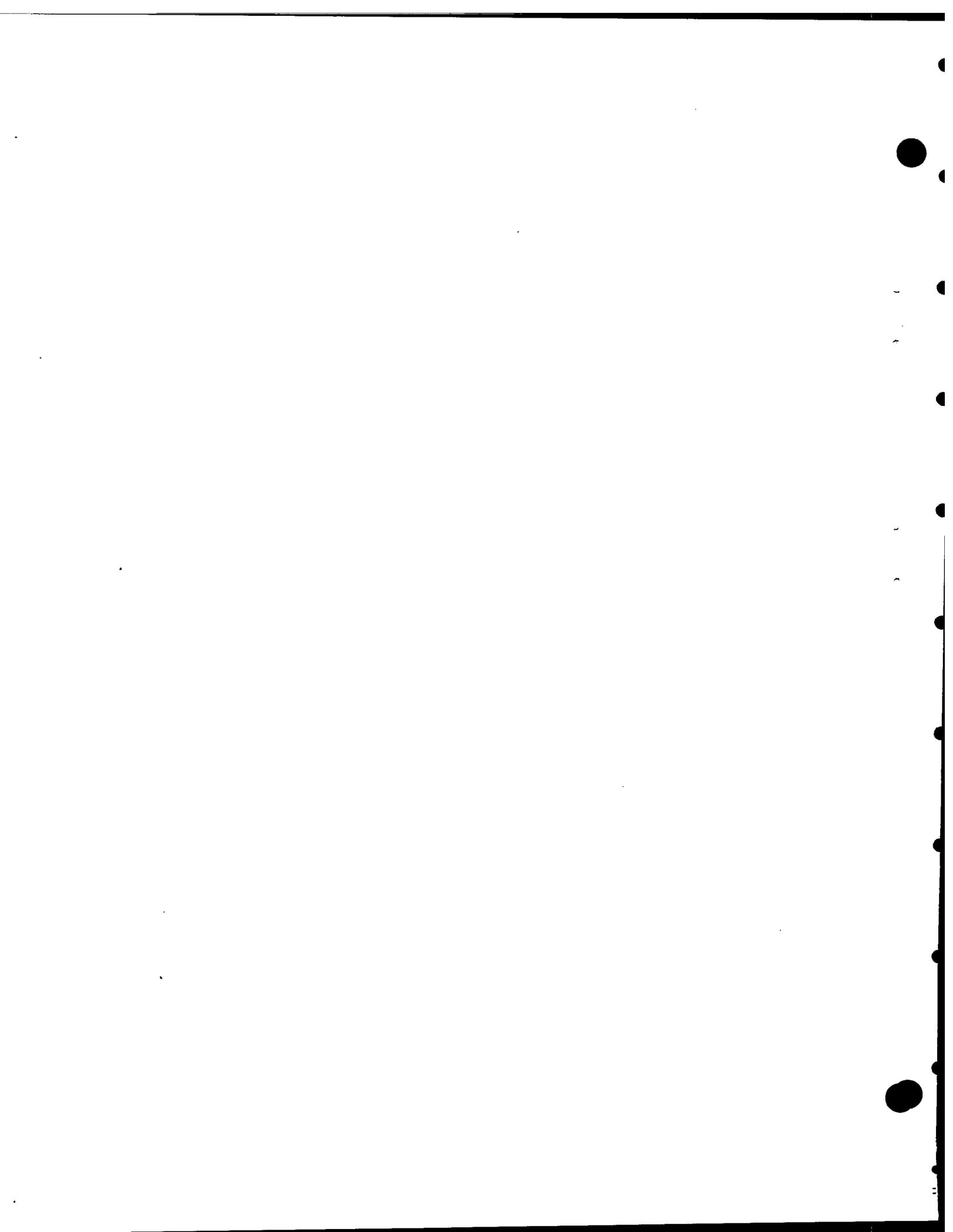
Capt Dan Morley (CFB Cold Lake);  
Major Niles (CFB Edmonton);  
Lt Tim Truant (CFB Greenwood);  
Capt Sunny LaForte (CFB Moose Jaw);  
Capt Peter Graham (CFB Portage);  
Capt Diakiw (CFB Shearwater);  
Capt Ihaksi (CFB Toronto);  
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There is, however, one person that deserves much more than a mere thank you. For tolerating my long absences, and many long nights hiding behind a computer screen, I wish to thank my lovely wife Mrs. Mary-Ann Adamick Stewart.

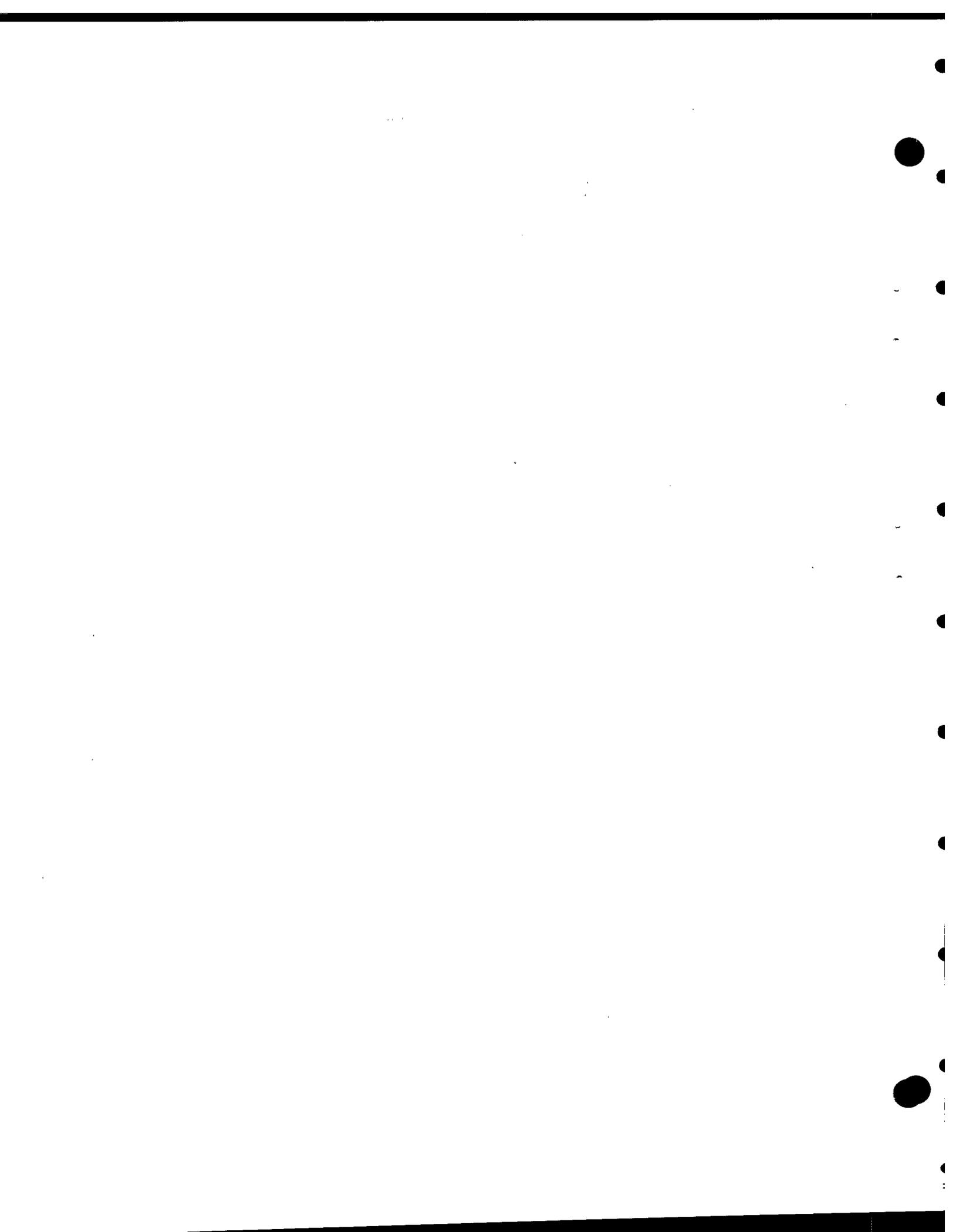


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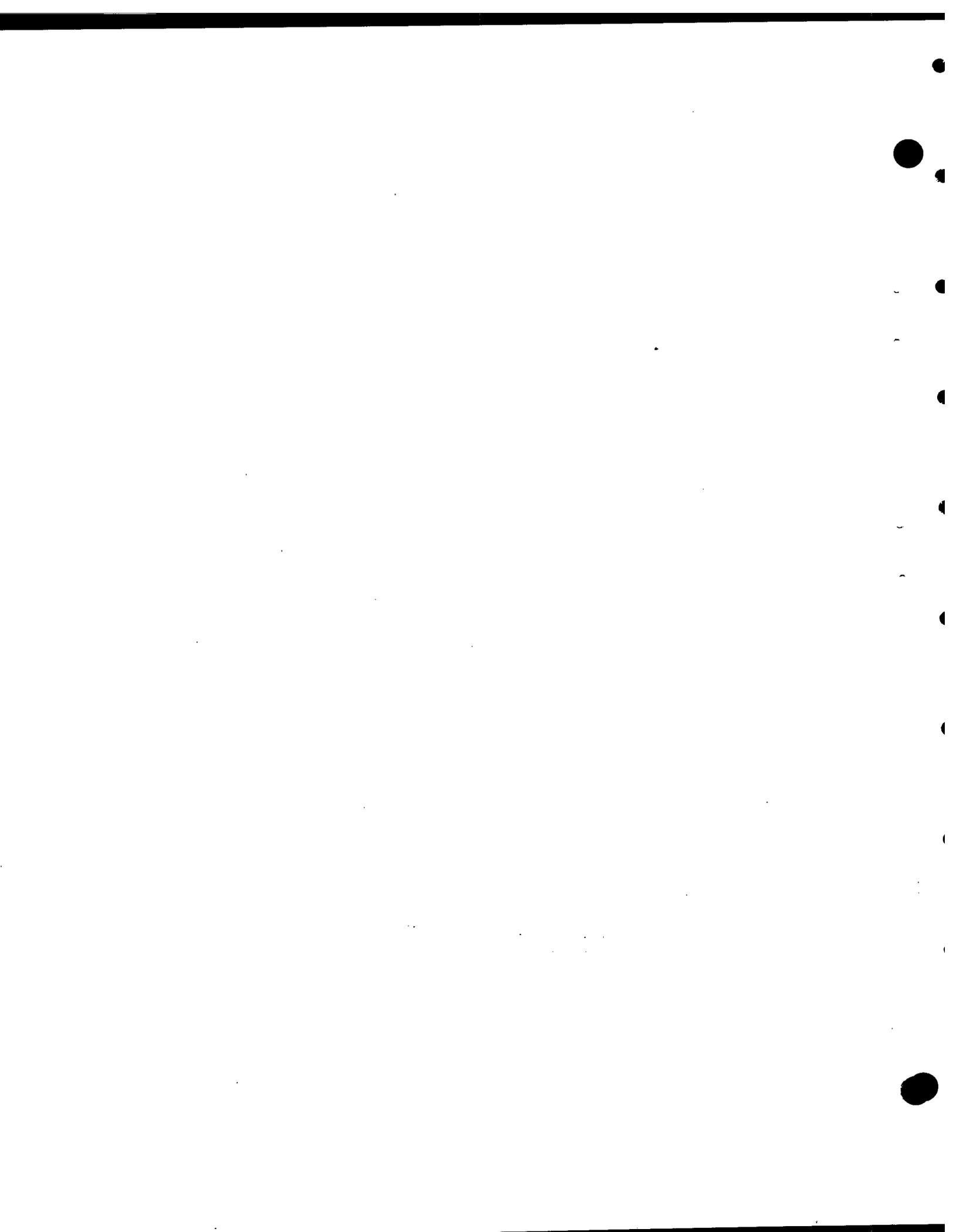
## ABSTRACT

Under DSS contract No. 01SE.97711-4-8216 Human Elements Inc. conducted a survey of Canadian Forces Aircrew Personnel. Seventy-three semi-nude body measurements were recorded for 519 male aircrew. The sample was comprised of 387 pilots and 132 navigators representing 19 aircraft classifications, from three aircraft categories (helicopters, jets & trainers, and multi-engines). Over 30 % of the total CF Aircrew population was measured. Input error checking capabilities were incorporated into the on-site computer database to minimize errors during data collection. The report includes measurement definitions, percentile tables, descriptive statistics, correlations, and photographs for each of the anthropometric measures included in the survey.



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1985 ANTHROPOMETRIC SURVEY  
OF  
CANADIAN FORCES AIRCREW

INTRODUCTION

The Defence and Civil Institute of Environmental Medicine (DCIEM) has been tasked to assess the physical compatibility of Canadian Forces (CF) aircrew with the crew stations of CF aircraft (Ref 1). This necessitates referral to CF aircrew anthropometric data.

The only surveys of CF aircrew anthropometry (Refs 2 and 3) date back to 1958 and 1962, respectively. Unfortunately neither of the final reports for these surveys provide the measurement definitions nor specific anatomical landmarks used, thereby complicating the comparison of these data to that of other surveys.

In 1974 McCann et al conducted the first comprehensive survey of Canadian Forces Personnel. Thirty-two semi-nude body measurements were recorded on 565 personnel, from over 120 different military trades. Although the survey included 31 aircrew (pilots and navigators), a sample size of only 31 is insufficient for valid statistical analysis regarding CF aircrew anthropometry. Since data from all CF trades were combined for presentation in the final report, even basic descriptive statistics are not readily available for the aircrew personnel measured.

Table 1: Summary of CF Aircrew Anthropometric Surveys

Reference	# of Measures	# of Subjects	Definitions Recorded ?
Smiley, 1958 (Ref. 2)	7	998 Pilot Trainees 580 Observer Trainees	NO
Smiley, 1962 (Ref. 3)	68	314 Pilots 290 Navigators	NO
McCann, 1975 (Ref. 4)	32	565 CF Personnel From 123 CF Trades	YES

The lack of current, accurate data regarding the body dimensions of CF aircrew prompted DCIEM to initiate another survey of CF aircrew. In the spring of 1985 Human Elements Inc. was contracted by the Department of Supply and Services to complete that task.

## PROCEDURES

### The CF Aircrew Population

For the purposes of this survey "aircrew" refers to pilots and navigators only. Table 2 (below) presents the estimated distribution of CF aircrew personnel by aircraft and base, as provided by DCIEM at the onset of the contract. These numbers (representing the status of the CF Air Command as of 1984) were used to determine the size and nature of the survey sample. Slight variations from the distribution of personnel as presented in this table were noticed during the data collection phase of the project.

**Table 2: Total Distribution Of CF Aircrew  
As Outlined By DCIEM**

AIRCRAFT	BC	ALB		SAS	MAN			ONTARIO				QUE	NB		PEI	NS		NFD	TOTAL N
	CO	CL	ED	MJ	PO	WI	NB	TO	TR	PE	OT	BA	GT	CH	SU	SH	GR	GA	
<b>HELICOPTERS:</b>																			
CH113 LABRADOR																13			13 P
CH113A VOYAGEUR	15																	12	27 P
CH118 IROQUOIS				9						13		8		5					35 P
CH124 SEA KING: PILOTS																			35 P
NAVIGATORS																			35 N
CH135 TWIN HUEY		5	20						14	18			24						81 P
CH136 KIOWA			13					20											33 P
CH139 JET RANGER					37														37 P
CH147 CHINOOK			12																26 P
<b>JETS AND TRAINERS:</b>																			
CF116 FREEDOM FIGHTER		56											19						75 P
CF188 HORNET		69																	69 P
CT114 TUTOR				120	30														150 P
CT133 T-BIRD	5	22				11	10										9		86 P
CT134-A SUNDOWNER					37														37 P
<b>MULTI-ENGINES:</b>																			
CC109 COSMOPOLITAN																			21 P
CC115 BUFFALO: PILOTS	13								19						15				47 P
NAVIGATORS	6								8						6				20 N
CC117 FALCON: PILOTS								8											15 P
NAVIGATORS								7											7 N
CC129 DAKOTA	4					27													31 P
CC130 HERCULES: PILOTS			60			18			56										134 P
NAVIGATORS			25						29										54 N
CC137 BOEING: PILOTS									36										36 P
NAVIGATORS									24										24 N
CC138 TWIN OTTER			15																15 P
CC144 CHALLENGER											9								9 P
CP 121 TRACKER	9														52				61 P
CP140 AURORA: PILOTS	27																	117	144 P
NAVIGATORS	50																	180	230 N
<b>TOTAL: MALE PILOTS</b>	73	152	120	129	104	56	18	20	125	31	76	31	24	5	80	44	117	12	1217 PILOTS
<b>MALE NAVIGATORS</b>	56		25				7		61						6	35	180		370 NAVIGATORS
<b>FEMALES</b>			3	3	1				11						4				+ 22 FEMALES
<b>OVERALL TOTAL:</b>																			1609 CF AIRCREW

**LEGEND:**

**PROVINCES:**

ALB = ALBERTA, BC = BRITISH COLUMBIA, MAN = MANITOBA, NB = NEW BRUNSWICK, NFD = NEWFOUNDLAND, NS = NOVA SCOTIA, PEI = PRINCE EDWARD ISLAND, QUE = QUEBEC, SAS = SASKATCHEWAN.

**CF BASES:**

BA = CFB BAGOTVILLE, CH = CFB CHATON, CL = CFB COLD LAKE, CO = CFB COMOX, ED = CFB EDMONTON, GA = CFB GANDER, GR = CFB GREENWOOD, GT = CFB GAGETOWN, NB = CFB NORTH BAY, MJ = CFB MOOSE JAW, OT = CFB OTTAWA, PE = CFB PETAWAWA, PO = CFB PORTAGE LA PRAIRIE, TO = CFB TORONTO, TR = CFB TRENTON, SH = CFB SHEARWATER, SU = CFB SUMMERSIDE, WI = CFB WINNIPEG.

## Sampling Strategy

When recruiting military aircrew personnel it is often difficult to obtain a truly random sample. Surveys such as this usually rely on one or more people, per base, to assist in the selection and scheduling of subjects. These individuals must struggle with day-to-day variables such as weather conditions, flight schedules, equipment maintenance and emergency operations which affect the availability of individuals for measurement, thereby preventing each of the aircrew from having an equal chance to participate in the study.

An alternative to random sampling is stratified sampling. In this technique percentages of the population in various categories are predetermined and subjects are chosen to provide equal representation from each category.

For the 1985 survey, an attempt was made to stratify the sample according to two basic parameters; officer classification and aircraft categories (helicopters, jets & trainers and multi-engines). Subjects within each of the aircraft categories were selected to distribute the sample equally over as many aircraft as possible. Although it was desirable to obtain equal representation from each aircraft in the CF, availability of personnel and economic restrictions made this an unrealistic objective. Ultimately, nine CF Bases were chosen to participate in the survey.

There are only 22 female aircrew presently in the Canadian Forces (Table 2). It is not unreasonable to assume that if all were scheduled for testing, less than 18 of these female personnel would have been available to be measured. Since this is too small a number for meaningful statistical analysis, the survey was restricted to male personnel.

According to the statistical sampling techniques of Cohen, J., 1969 (Ref.5), a minimum sample size of 526 subjects is required to provide statistical power of .90 ( $\alpha=.05$ , effect size=.20). Assuming an attrition rate of 10 percent, 600 personnel were requested from the nine CF bases to ensure the minimum sample size would be achieved. Soon into the testing it was realized that attrition would be much higher than the estimated 10 percent. Therefore, additional aircrew personnel were requested from the remaining bases to attempt to achieve the desired sample size of 528 aircrew.

## Measurements

Seventy-three distinct body measurements were recorded for each subject. The measures included in the survey were chosen in order to:

1. Provide a sufficient number of variables to compare CF aircrew anthropometric data to US aviator data outlined in US MIL-STD-1472C, Human Engineering Design Criteria For Military Systems, Equipment and Facilities;
2. Satisfy the recommendations outlined in the Air Standardization Coordinating Committee (ASCC) Draft Advisory Publication 61061/2, A Basis For Common Practices And Goals In The Conduct Of Anthropometric Surveys;
3. Include those measures outlined in CFP 154 and CFAO 34-44 dealing with aircrew selection criteria; and
4. Satisfy the input requirements of three computer aided design programs:
  - (a) "CAR" (Crewstation Assessment of Reach);
  - (b) "COMBIMAN" (Computerized Biomechanical Man-Model); and
  - (c) "SAMMIE" (System For Aiding Man Machine Interaction Evaluation);

which may be used to assess the compatibility of CF aircrew with existing and future CF aircraft cockpits.

Even though the ASCC Draft Advisory Publication recommends that Crotch Height and Sleeve Inseam Length be included in ASCC country anthropometric surveys, these measurements were omitted from this survey on the recommendation of the Scientific Authority from DCIEM. The rationale for the exclusion of these measurements is that they have proven to be very unreliable measures. Although Crotch Length has become a standard measure for anthropometric surveys, several points justifying its exclusion exist. As stated in a letter responding to the appropriateness of Draft Advisory Publication 61061/2, "DCIEM experience with this measure has discouraged its use. It has not proven reliable, and is a source of embarrassment to all concerned" (Ref 13). It appears that clarification of the present definition for this measure is in order since large discrepancies have been demonstrated among surveys of ASCC countries.

At the request of personnel from the Medical Life Support Division at DCIEM, Vertical-Trunk Circumference was taken as three separate measurements (ie. Waist-Front Length, Crotch Length, and Waist-Back Length) to provide specific data for the development of two-piece pressure suits. They also provided the definition for the measurement of Waist Height Sitting which is required for clothing design. Table 9, in Appendix D, lists the variables measured, and indicates why they were included in the survey.

In order to compare the anthropometry of various populations, the measurement definitions and techniques must be consistent among the survey data employed. Prior to the data collection, an extensive review of measurement definitions was conducted. Definitions from References 14 through 20 were compared. Minor variations in the wording of definitions were common, but this did not usually affect the measurement technique. Most of the definitions appeared to originate from Hertzberg et al, 1963; and since the definitions of Hertzberg et al were more specific than many of the other reports, they were used whenever possible (Ref 20).

## Equipment

Pictured below is one of the two sets of anthropometric measuring equipment utilized in the survey. (This equipment, on loan from DCIEM, was used in two previous Canadian Forces anthropometric surveys.) Missing from the photo are standard medical height and weight scales, which were supplied by each CF Base, for measurement of body weight.

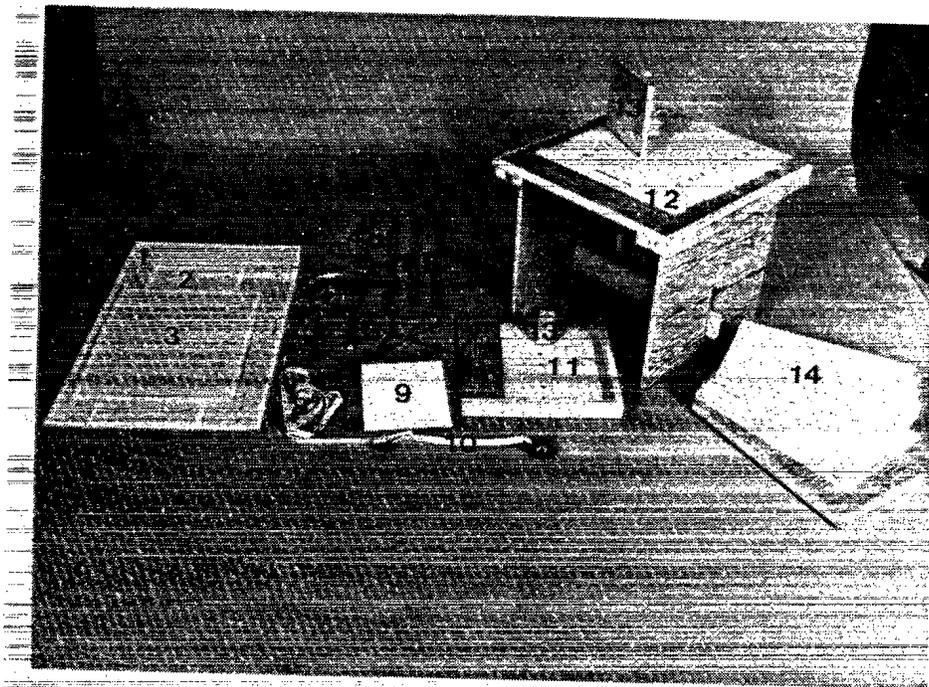


Figure 1: Anthropometric Equipment Used In The Survey

### Legend For Figure 1.

- |  |   |
|--|---|
| 1. Wall Scale For Functional Reach           | 7. Siber Hegner Spreading Calipers        |
| 2. Floor Scale For Buttock-Heel Length       | 8. Plastisized Cloth Measuring Tapes      |
| 3. Wall Scale For Overhead Reach             | 9. Data Sheets                            |
| 4a. Siber Hegner Free Standing Anthropometer | 10. Elastic Waist Band                    |
| 4b. Extension Bars for 4a.                   | 11. Foot-Measuring Box                    |
| 4c. Clear Plastic Base for 4a.               | 12. Measuring Bench                       |
| 5. Siber Hegner Sliding Calipers             | 13. Measuring Blocks                      |
| 6. Wooden Dowel To Identify Center of Grip   | 14. Stacking Boards (Various Thicknesses) |

## Base Liaisons

Nine CF Bases participated in the survey. At each of these locations the Base Air Life Support Equipment Officer (BALSEO) appointed a base liaison. Their responsibilities were to:

1. Oversee the selection, scheduling and arrival of aircrew for measurement;
2. Identify a suitable test site (as specified by Human Elements Inc.);
3. Obtain height and weight medical scales, tables, chairs and portable room dividers for the duration of the testing;
4. Investigate the availability of rations and quarters on base for the measurement team; and
5. Provide for immediate operational requirements of the teams while at the base.

## The Test Site

Each test site consisted of approximately 256 square feet of space in close proximity to the aircrew; usually in an instruction room in one of the hangers. This site was divided into four areas, each approximately 8' X 8' in size; an administration area, change room, and two testing sites. It was requested that these areas be reasonably quiet, have good lighting, electrical outlets and at least one corner wall (90 degree angle) with no base board or other obstructions. Each area required one table and several chairs. Although subjects were measured in their briefs (semi-nude), robes were provided for movement between areas and privacy was optimized at all times.

## Data Collection

The measurement team consisted of 5 individuals; a project manager and four anthropometrists. Each of these individuals possess a university degree in either Kinesiology or Physical Education. Prior to data collection the measurement team underwent two weeks of intensive training.

Throughout the data collection the four anthropometrists worked in pairs, one performing the measures, the other recording the values on the data sheets. In this way two subjects could be measured simultaneously. To avoid fatigue and monotony, they switched tasks with each new subject. The approximate duration for the measurement of one subject was 35 minutes. Total time elapsed for subject involvement was approximately 45-50 minutes.

Upon completion of all measurements, the contents of the data sheets were immediately entered into a 16 bit microcomputer for storage on 5 1/4" floppy disc. A commercially available database management system (called "filePro") was used to create a customized database that incorporated input error-checking capabilities. Based on data from the 1974 Anthropometric Survey of CF Personnel and US-MIL-STD 1472C, acceptable ranges for each variable were entered into the database (Ref 4 and 6). Input values outside the designated range were then rejected by the database. Since the data were entered into the computer immediately following the last measurement, rejected values could be remeasured before the subject departed. In this way, many errors that could arise were avoided (e.g. recording and typing mistakes, measurements taken out of order, and transposed numbers).

## Basic Stages Of Data Collection

1. Subject is introduced to the survey.
2. Background and administrative information is recorded.
3. Subject strips down to his briefs, and dons a bath robe.
4. All landmarks required for measurements are identified and marked on the subject with an eyeliner pencil.
5. All measurements are taken and recorded on data sheets.
6. Data is entered into the computer data base.
7. Eyeliner pencil marks are removed from the subject.
7. Subject gets dressed.

## RESULTS AND DISCUSSIONS

Measurement definitions, percentile tables, descriptive statistics, photographs of the measures, and frequency histograms are presented in Appendix D. Variables are grouped by the posture of the subject and instrument used to take the measurement. To help the reader quickly find a particular measure, a reference guide with the variables listed alphabetically, introduces this Appendix. Appendix E contains a complete Pearson Correlation Matrix for the body measurements in this survey. All statistical analyses were performed using a microcomputer program called SYSTAT.

### Sample Size

Table 3 presents the population versus sample size for pilots and navigators in each aircraft category. A total of 519 subjects were successfully measured. This represents approximately 33 % of the total CF aircrew population. Although an attrition rate of about 17 % was encountered, over 30 % of the personnel in each of the categories participated in the survey.

Table 3: Population Vrs Sample By Aircraft Category

	PILOTS			NAVIGATORS			TOTALS		
	POPULATION	SAMPLE	% OBTAINED	POPULATION	SAMPLE	% OBTAINED	POPULATION	SAMPLE	% OBTAINED
HELICOPTERS	287	91	31.7 %	35	12	34.3 %	322	103	32.0 %
JETS & TRAINERS	417	141	33.8 %	---	---	-----	417	141	33.8 %
MULTI-ENGINES	513	155	30.2 %	335	120	35.8 %	848	275	32.4 %
TOTALS	1217	387	31.8 %	370	132	35.7 %	1587	519	32.7 %

## Rank

Figure 2 presents the percentages for each of the officer classifications represented in the survey. Not surprisingly the majority of the subjects were from the rank of Captain.

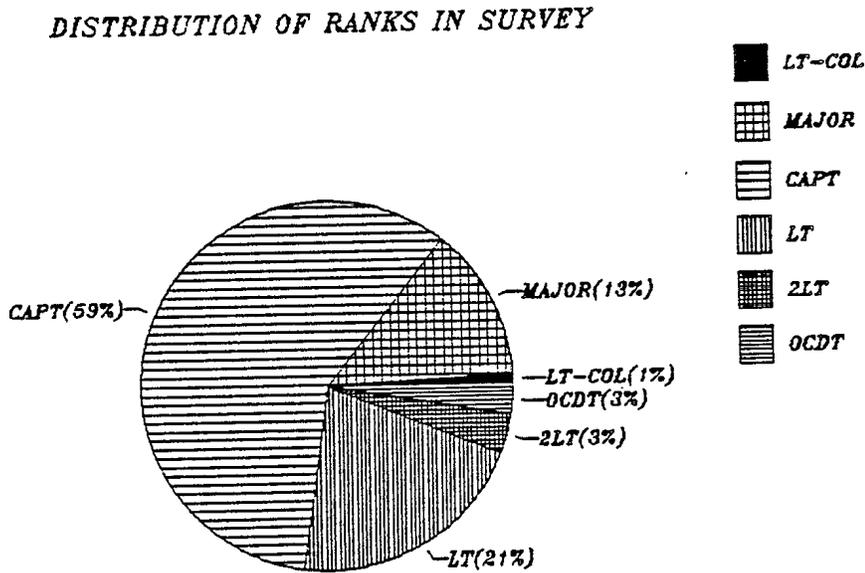


Figure 2: Distribution of Subjects By Rank

For more detail regarding the survey sample refer to Appendix C. Table 6 (in Appendix C) presents the distribution of the sample by province, base and aircraft; and Table 7 compares the population and sample by aircraft. Several frequency histograms illustrate the distribution by aircraft assignment.

## Perceived Vs Actual Measures

It has been suggested that questionnaire surveys for basic physical dimensions, such as height and weight, are sufficiently accurate to replace actual measurement of these variables. In this survey, each subject was asked to report his Perceived Height and Weight prior to testing. The resultant correlation for Perceived Weight and Measured Weight was 0.947 (explained variance = 89.7 %). Similarly, the correlation for Perceived Height and Measured Height was 0.906 (explained variance = 82.1 %). These correlation coefficients are very high and imply that the questionnaire technique may in fact be a reasonable alternative to actually measuring height and weight. Churchill and McConville (1976) argue that correlations between perceived and actual measures are often much stronger when the subjects know that the estimates they are reporting will be verified by measurement, at the end of the questionnaire (Ref 23). When reasonably close estimations for general body size are desired, simple questionnaires such as this will provide sufficient information. However, when the data are critical to equipment design, or will affect selection criteria, we do not recommend estimation as an adequate approach.

Age Distribution

Figures 3 and 4 contain frequency histograms for age and the number of years served in the CF, respectively. It is not surprising that both graphs illustrate the same trend, since most aircrew enter the CF at approximately the same age. The fact that the distributions are bimodal and skewed to the left is, interesting however. We can only speculate the cause for this distribution. It is possible that aircrew personnel in their early 30's are actively recruited from the CF by private industry, resulting in the reduced numbers in this age group; or that the distribution obtained was merely anomalous to the actual population. It is more likely, however, that changes in recruiting policy over the years have affected the population in this manner.

*Frequency Histogram For Age*  
MIN = 20 MAX = 53

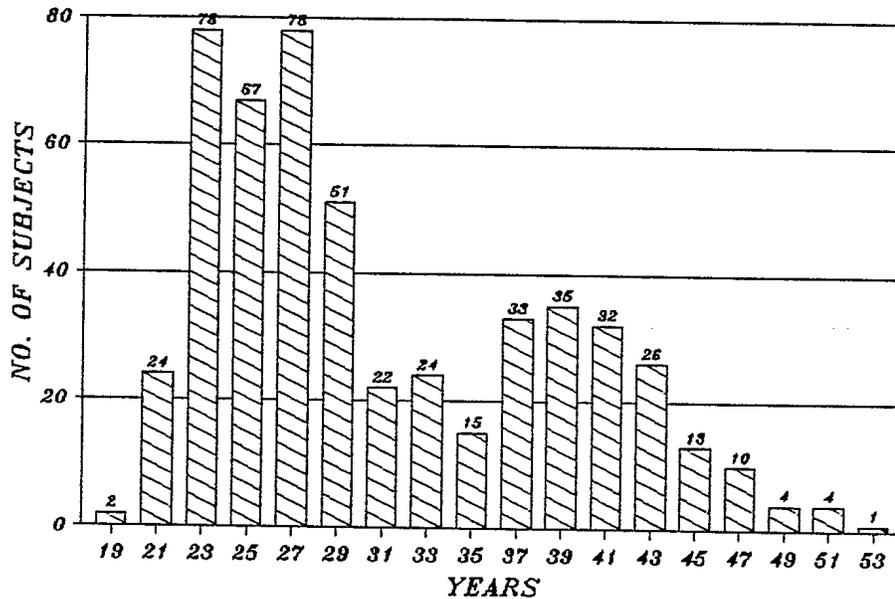


Figure 3: Frequency Histogram Age (in Years)

*Number of Years in Service*  
MIN = 0 MAX = 34

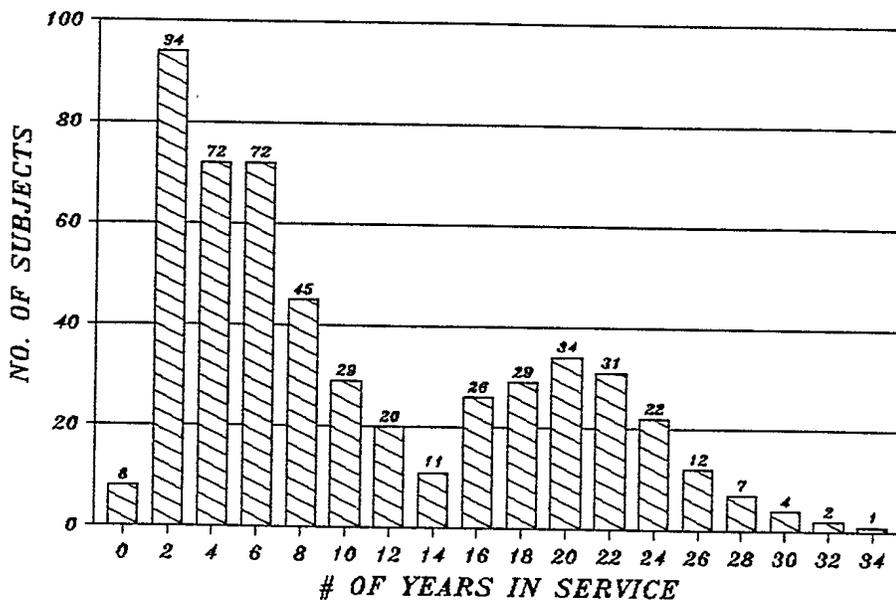


Figure 4: Frequency Histogram for Years in Service

Age, Height, and Weight

The mean age, height and weight of the sample, grouped by Aircraft Category, is tabled below. The multi-engine aircrew personnel in the sample were slightly older and heavier than the other aircrew. Across the three categories height was relatively constant. The mean weight of aircrew increased by approximately 2 kgs between categories where jet and trainer aircrew were the lightest at 76 kgs, helicopter personnel weighed an average of 78 kgs, and multi-engine personnel were the heaviest at 80 kgs. The same trend can be seen when these data are tabled by occupation (i.e. Pilots vs Navigators) (Table 5). For a detailed breakdown of the the mean age, height, and weight for pilots and navigators, by aircraft assignment, consult Table 8 in Appendix C .

Table 4 : Age, Height, And Weight By Aircraft Category  
(Combined Data)

	No. Of Subjects	Age (Yrs)	Ht (Cm)	Wt (Kg)
Helicopters	103	29.3	177.1	78.6
Jets & Trainers	141	29.2	176.0	76.5
Multi-Engines	275	33.6	177.1	80.4

Table 5 : Age, Height, and Weight By Aircraft Category and Officer Classification

	Pilots Total N = 387				Navigators Total N = 132			
	No. Of Pilots	Age (Yrs)	Ht (Cm)	Wt (Kg)	No. Of Navs.	Age (Yrs)	Ht (Cm)	Wt (Kg)
Helicopters	91	29.1	177.1	78.9	12	30.9	176.9	76.1
Jets & Trainers	141	29.2	176.0	76.5	--	--	--	--
Multi-Engines	155	33.9	177.4	81.1	120	33.2	176.5	79.7

## Height and Weight By Age Groups

Two histograms can be found on page 12. The first (Figure 5) compares the mean height of personnel by specified age groups. The second histogram presents mean weight by the same age categories. As would be expected, the youngest aircrew are also the lightest in weight, and the oldest are the heaviest. Aside from the 31-35 year age category, weight increases at approximately the same rate across the categories. This trend is not evident for stature.

Although the absolute difference in height between the shortest and tallest categories is only 4 cm, it is evident that the younger aircrew are taller than the older aircrew. Overall the largest personnel appear to be those between the ages of 31 and 35. This age group is the tallest and the second heaviest of all the age groups.

Figure 7 (below) presents the sample distribution by age group and aircraft category. It is clear from the graph that few of the older aircrew personnel fly in the helicopter, and jets & trainers categories.

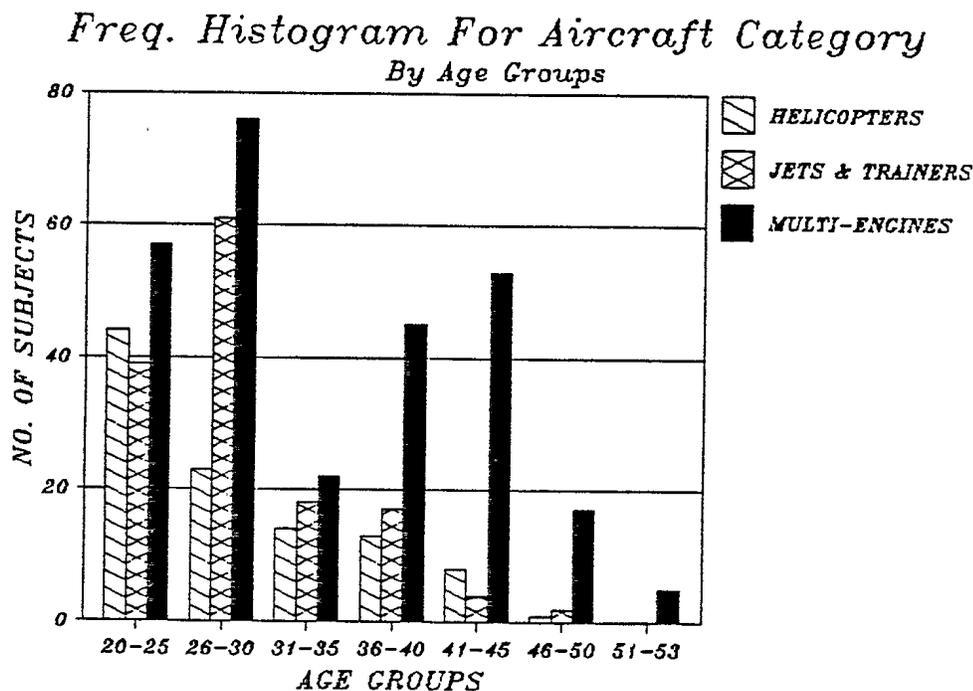


Figure 7: Frequency Histogram For Aircraft Category By Age Group

## COMPARISON OF HEIGHT BY AGE GROUPS

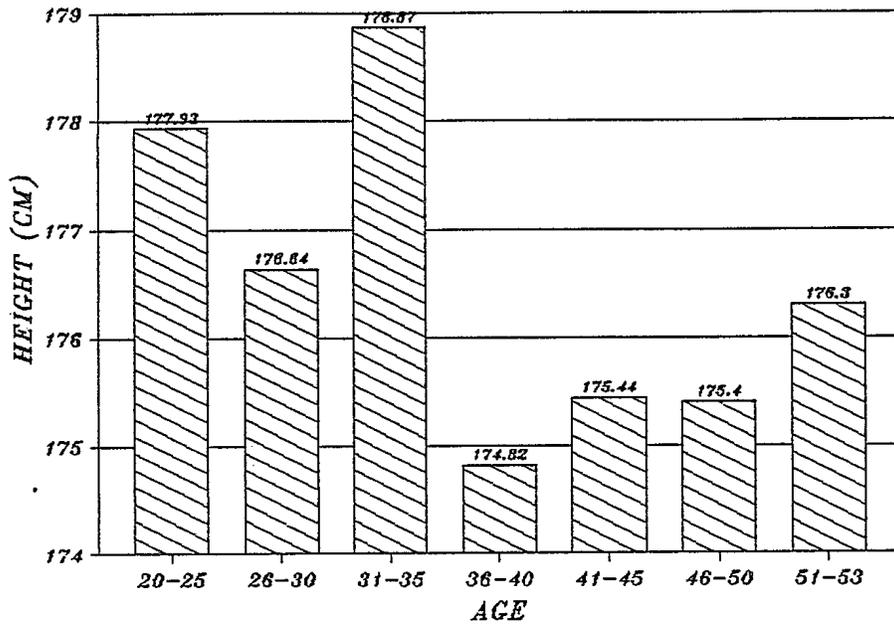


Figure 5: Comparison of Height By Age Group

## COMPARISON OF WEIGHT BY AGE GROUPS

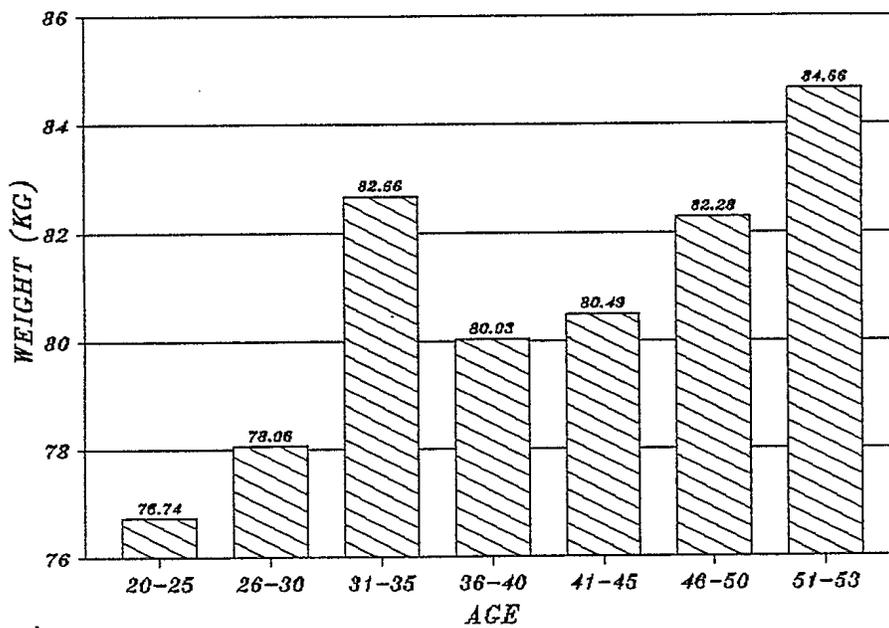


Figure 6: Comparison of Weight By Age Group

## RECOMMENDATIONS AND CONCLUSIONS

This report summarizes the anthropometric data collected on CF aircrew personnel in the summer of 1985. A total of 73 variables were recorded for 519 CF aircrew. The sample contained 387 pilots and 132 navigators. Measurements and their definitions were chosen to: permit the comparison of CF aircrew and US aviator anthropometry as listed in US MIL-STD-1472C; and to obtain the input data necessary to use several computer aided design programs in the assessment of aircrew/cockpit compatibility.

Due to the small number of females presently in the CF aircrew population, only males were measured in this survey. It is recommended that similar data be collected for all current female aircrew, and for females who enter the pilot or navigator classifications in the future. This information will be useful to determine if serious physical incompatibilities exist between female aircrew and present CF aircraft.

The data from this survey are available on computer tape. It is recommended that these data be added to the AMRL Anthropometric Data Bank Library maintained by the US Air Force.

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APPENDIX A

LANDMARK DEFINITIONS

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## LANDMARK DEFINITIONS

**ACROMIAL LANDMARK:** The highest point on the lateral edge of the acromial process of the scapula: also called acromion.

**ANKLE HEIGHT:** The height of the marked point indicating the smallest horizontal circumference of the ankle.

**ANTERIOR:** Pertaining to the front of the body.

**BICEPS CIRCUMFERENCE LANDMARK:** The point at which the maximum circumference of the flexed biceps is measured, with the right arm flexed at 90 degrees and the measuring tape held perpendicular to the long axis of the upper arm.

**CALF HEIGHT:** The height of the landmark that indicates the maximum circumference of the right calf.

**CERVICAL LANDMARK:** The protrusion of the spinal column at the base of the neck caused by the tip of the 7th cervical vertebra.

**DELTOID:** The large muscle on the lateral border of the upper arm in the shoulder region.

**DISTAL:** The end of a body segment farthest from the head; opposed to proximal.

**EXTERNAL CANTHUS:** The outside corner or angle formed by the meeting of the eyelids.

**FRANKFORT PLANE:** A standard plane for orientation of the head. Established by a line passing through the right tragion (the notch located just above the small cartilaginous flap of flesh in front of the the ear), and the lowest point of the right eye socket. Can be approximated by having the subject stand so that his line of sight is horizontal.

**GLABELLA LANDMARK:** The most anterior (forward) point of the forehead between the brow ridges in the mid-sagittal plane.

**GREATER TUBEROSITY:** The bony prominence on the head of the humerus at the point of insertion with the scapula (shoulder blade).

**HUMEROUS:** The bone of the upper arm.

**ILLIAC CRESTS:** The highest lateral points of the hip bones, palpable from the lateral posterior edges of the torso, at the level of the L4-L5 lumbar vertebra.

**LANDMARK FOR THE BASE OF THE HAND:** The point at which the first major skinfold proximal to the thumb pad creases the wrist.

**LATERAL:** Pertaining to the part of the body or body segment furthest from the median plane or midline of the body, as opposed to medial.

**LATERAL FEMORAL EPICONDYLE:** The lateral surface of the condyles of the femur just proximal to the patella.

**LOWER THIGH LANDMARK:** The level above the knee of the lower edge of the vastus lateralis muscle, when the thigh is relaxed.

**MALLEOLUS:** The bony protrusion, either lateral or medial, of the ankle.

**MEDIAL:** Pertaining to the part of the body or body segment closest to the median plane or midline of the body, as opposed to lateral.

**MENTON:** A point in the center plane of the body on the curvature of the lower jaw approximately 45 degrees from vertical.

**METACARPAL BONE:** A bone of the palm of the hand.

**MIDSAGITTAL PLANE:** The vertical plane which divides the body into symmetrical right and left sections.

**NATURAL WAIST LANDMARK:** The position of a 1/2" wide belt which is placed by the subject in the position in which it is normally worn for the non-operational uniform. The measurer marks the top and bottom edges of the belt, on the torso of the subject. The landmark is at the midpoint of these two lines.

**OCCIPUT:** The bone at the back of the skull; the region of the back of the head.

**OLECRANON PROCESS:** The proximal bony projection of the ulna, at the elbow.

**OMPHALION:** Center of the navel.

**PHALANGEAL:** Pertaining to a phalanx or the phalanges; referring to fingers or toes.

**POPLITEAL:** The hollowed out region of the leg directly behind the knee, involving both the bottom of the thigh and the top of the calf.

**POSTERIOR:** Pertaining to the back of the body.

**PROXIMAL:** The end of a body segment nearest the head; opposed to distal.

**RADIAL LANDMARK:** The highest point on the proximal head of the radius, near the midpoint of the elbow joint on the posterior side of the arm.

**SEMI-NUDE:** Subject wears only underpants. Everything else is removed.

**STANDS ERECT:** Subject stands on a flat surface, his weight distributed equally, shoulders held back and legs fully straightened. This position requires holding the body straight but not rigid.

**STYLION:** The point at the anterior distal end of the radius.

**SUPRASTERNAL LANDMARK:** The lowest point in the notch in the upper edge of the breast bone.

TRAGION: A point located at the notch just above the small cartilaginous flap of flesh in front of the ear hole (tragus). This point corresponds approximately to the upper edge of the ear hole.

TROCHANTERIC LANDMARK: The top of the bony lateral protrusion of the proximal end of the femur.

VERTEX: The top of the head in the midsagittal plane when the head is held in the Frankfort Plane.

ULNA: The inner and larger bone of the forearm on the side opposite to that of the thumb.

APPENDIX B

STATISTICAL DEFINITIONS

## STATISTICAL DEFINITIONS

### RANGE:

The Range is a quick measure of the variability in a distribution. It is the difference between the highest and lowest scores. It may be misleading in distributions with a few extreme values.

### MEAN:

The Mean is a measure of the central tendency in a distribution. It is calculated by summing all the values in the distribution and dividing the resultant by the number of values.

### VARIANCE:

Variance is a two-dimensional measure of dispersion. It is the average of the squared deviations of a set of scores from their means.

$$s^2 = \frac{\sum (x_i - \bar{x})^2}{n-1}$$

### STANDARD DEVIATION:

Standard Deviation is a linear measure of dispersion of the data about the mean. It is the square root of the average squared deviations, of a set of scores, from their mean. Computationally, standard deviation is simply the square root of the variance.

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$

### STANDARD ERROR OF THE MEAN (SEM):

The Standard Error of the Mean is an estimate of the standard deviation of the theoretical sampling distribution of sample means:

$$s_{\bar{x}} = \frac{S}{\sqrt{n}}$$

where S equals an estimate of the population standard deviation derived from the sample, and n is the number of observations in the sample.

### SKEWNESS COEFFICIENT:

The Skewness Coefficient is a measure of symmetry. If the coefficient is greater than zero the distribution is skewed to the right. If the coefficient is negative the distribution is skewed to the left. Perfect symmetry results in a coefficient of zero. Consult White and Churchill (1971) for more information (Ref 15).

### KURTOSIS COEFFICIENT:

The Kurtosis Coefficient is the measure of peakedness of the distribution. If the distribution curve has a high peak the coefficient is greater than zero. If the distribution curve is relatively flattened, the coefficient is less than zero. For distributions which are neither peaked nor flattened the coefficient is equal to zero. Consult White and Churchill (1971) for more information (Ref 15).

### PERCENTILES:

A Percentile is a point on a scale below which a specified percentage of the total number of measurements is located. For instance, the 50th percentile for Weight is that point which divides the distribution exactly in half. The 90th percentile for Weight is that value for which 90 % of the sample was either lighter or the same weight. Selected percentile values were calculated for each variable using a short SYSTAT Basic program and simple linear interpolation when necessary.

#### SYSTAT Program Listing:

```
USE "Filename"  
SAVE "Sortdata"  
SORT "Variable"  
RUN  
USE "Sortdata"  
HOLD  
LET N=CASE  
RUN  
LET Q=CASE/(N+1)  
LIST "Variable", Q  
RUN
```

where CASE is the number of the occurrence in the sorted listing, and Q is the Percentile Equivalent (Quantile). HOLD retains the values computed from one observation to use on the following observation. The reader is referred to Roebuck et al "Engineering Anthropometry Methods" for more information regarding the use and misuse of percentiles (Ref 25).

### CORRELATION COEFFICIENT:

A Correlation is a measure of the relationship between two variables. This report utilizes the Pearson Product Moment Correlation Coefficient, the most common measure of the degree of relationship between two variables (Appendix E ). Correlation coefficients can vary between  $\pm 1$  with zero representing no relationship and  $\pm 1$  representing the strongest relationship. When the coefficient is greater than zero, the relationship between the variables is in a positive direction (ie. as one variable increases, so does the other). When the coefficient is negative, the relationship is in opposite directions (ie. as one increases the other decreases). The sign of the correlation coefficient indicates the direction of the relationship, and the absolute value of the coefficient indicates the magnitude of the relationship.

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## APPENDIX C

### SAMPLE DISTRIBUTION

CONTAINS THE FOLLOWING:

1. TABLE OF SAMPLE BY PROVINCE, BASE AND AIRCRAFT
2. TABLE COMPARING POPULATION AND SAMPLE
3. HISTOGRAMS FOR THE THREE AIRCRAFT CATEGORIES
4. MEAN AGE, HEIGHT AND WEIGHT  
BY OFFICER CLASSIFICATION AND AIRCRAFT

Table 6: Distribution of Sample By Province, Base, and Aircraft Assignment  
(Compare to Table 2 on Page 2)

AIRCRAFT	ALBERTA		SAS	MANITOBA		ONTARIO		NOVA SCOTIA		TOTAL #
	CL	ED	MJ	PO	WI	TO	TR	SH	GR	
<b>HELICOPTERS:</b>										
CH118 IROQUOIS			4							4 P
CH124 SEA KING: PILOTS NAVIGATORS								30 12 N		30 P 12 N
CH135 TWIN HUEY		16								16 P
CH136 KIOWA		3				6				9 P
CH139 JET RANGER				31						31 P
CH147 CHINOOK		1								1 P
<b>JETS AND TRAINERS:</b>										
CF116 FREEDOM FIGHTER	24									24 P
CF188 HORNET	35									35 P
CT114 TUTOR			55	10					1	66 P
CT133 T-BIRD	5				5					10 P
CT134-A SUNDOWNER				5						5 P
CF104 (Not Current)									1	1 P
<b>MULTI-ENGINES:</b>										
CC115 BUFFALO: PILOTS NAVIGATORS							6 2 N			6 P 2 N
CC129 DAKOTA					11					11 P
CC130 HERCULES: PILOTS NAVIGATORS		34 12 N			8		21 6 N		1 N	63 P 19 N
CC137 BOEING: PILOTS NAVIGATORS							13 3 N			13 P 3 N
CC138 TWIN OTTER		6								6 P
CP140 AURORA: PILOTS NAVIGATORS									56 93 N	56 P 93 N
CP107 ARGUS:(Not Current) NAVIGATORS									3 N	3 N
TOTAL: MALE PILOTS MALE NAVIGATORS	64	60 12	59	46	24	6	40 11	30 12	58 97	387 PILOTS 132 NAVIGATORS
<b>OVERALL TOTAL:</b>										519 CF AIRCREW

LEGEND:

PROVINCES:

SAS = SASKATCHEWAN.

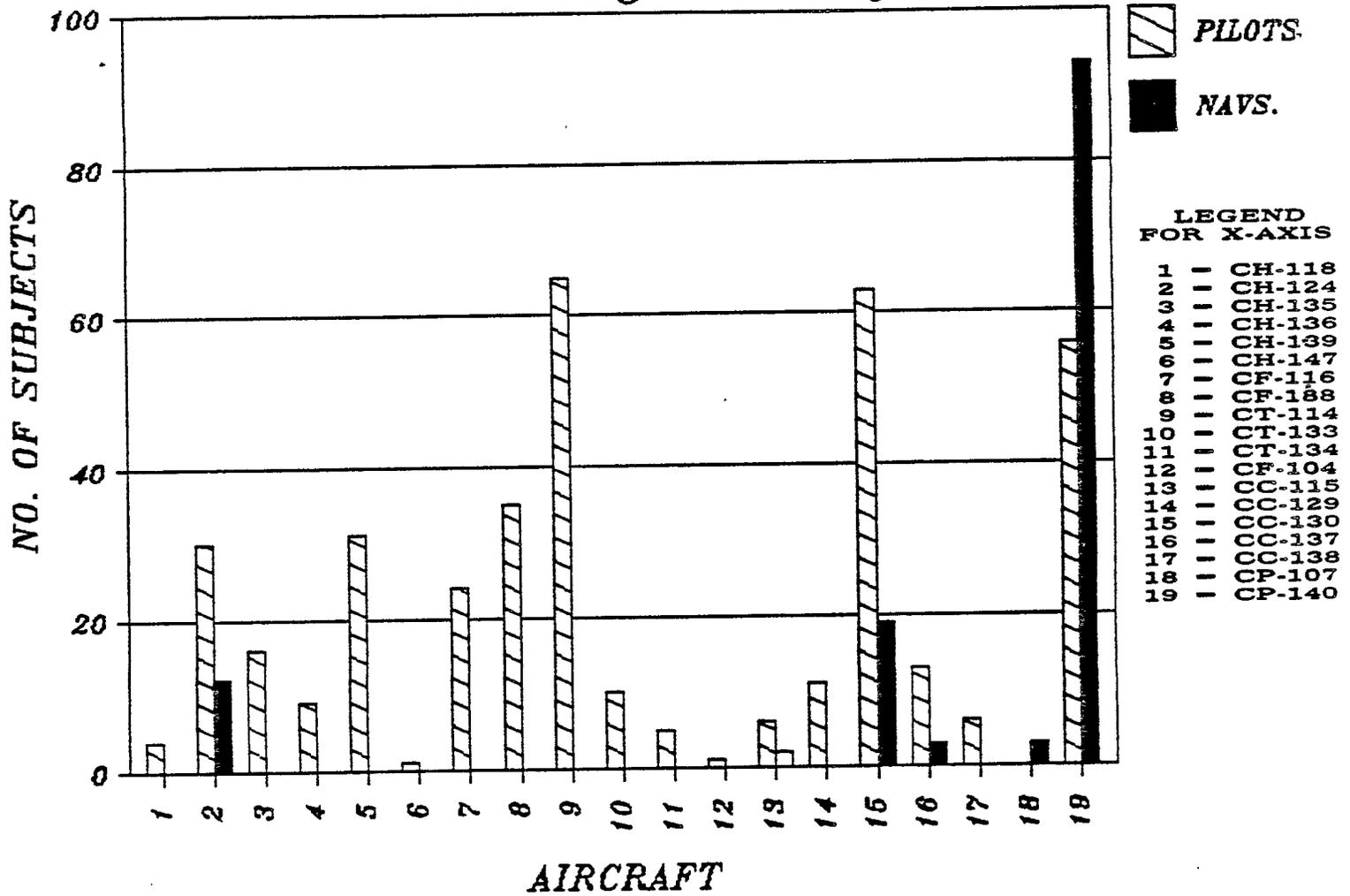
CF BASES:

CL = CFB COLD LAKE, ED = CFB EDMONTON, GR = CFB GREENWOOD, MJ = MOOSE JAW, PO = PORTAGE LA PRAIRIE,  
TO = CFB TORONTO, TR = CFB TRENTON, SH = CFB SHEARWATER, WI = WINNIPEG.

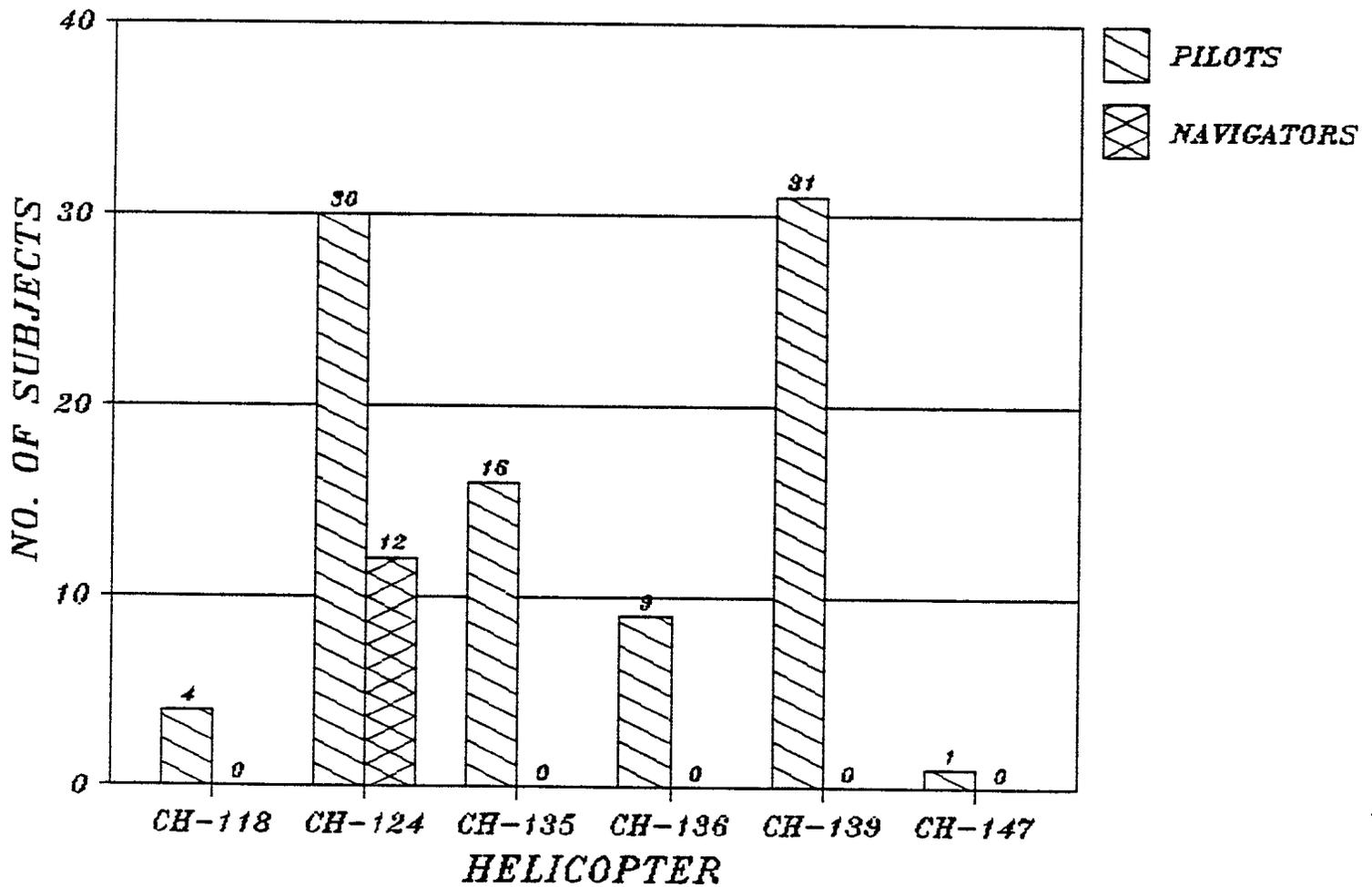
Table 7: Population Vs Sample Size  
By Officer Classification and Aircraft Assignment

AIRCRAFT	PILOTS		NAVIGATORS	
	Total N	Sample N	Total N	Sample N
<b>HELICOPTERS</b>				
CH 113 Labrador	13	0		
CH 113A Voyageur	27	0		
CH 118 Iroquois	35	4		
CH124 Sea King	35	30	35	12
CH135 Twin Huey	81	16		
CH 136 Kiowa	33	9		
CH139 Jet Ranger	37	31		
CH147 Chinook	26	1		
SUBTOTAL	287	91	35	12
<b>JETS and TRAINERS</b>				
CF 116 Freedom Fighter	75	24		
CF 188 Hornet	69	35		
CT 114 Tutor	150	66		
CT 133 T-Bird	86	10		
CT 134A Sundowner	37	5		
CF 104 Star Fighter	0	1		
SUBTOTAL	417	141		
<b>MULTI-ENGINES</b>				
CC 109 Cosmopolitan	21	0		
CC 115 Buffalo	47	6	20	2
CC 117 Falcon	15	0	7	0
CC 129 Dakota	31	11		
CC 130 Hercules	134	63	54	19
CC 137 Boeing	36	13	24	3
CC 138 Twin Otter	15	6		
CC 144 Challenger	9	0		
CP 121 Tracker	61	0		
CP 140 Aurora	144	56	230	93
CP 107 Argus	0	0	0	3
SUBTOTAL	513	155	335	120
TOTAL	1217	387	370	132
<p>TOTAL MALE POPULATION = (1217 PILOTS + 370 NAVIGATORS) = 1587  SAMPLE SIZE (ALL MALES) = (387 PILOTS + 132 NAVIGATORS) = 519  NOTE: THERE ARE ALSO 22 FEMALE AIRCREW IN AIR COMAND. THIS SURVEY INVOLVED ONLY MALE PERSONNEL.</p>				

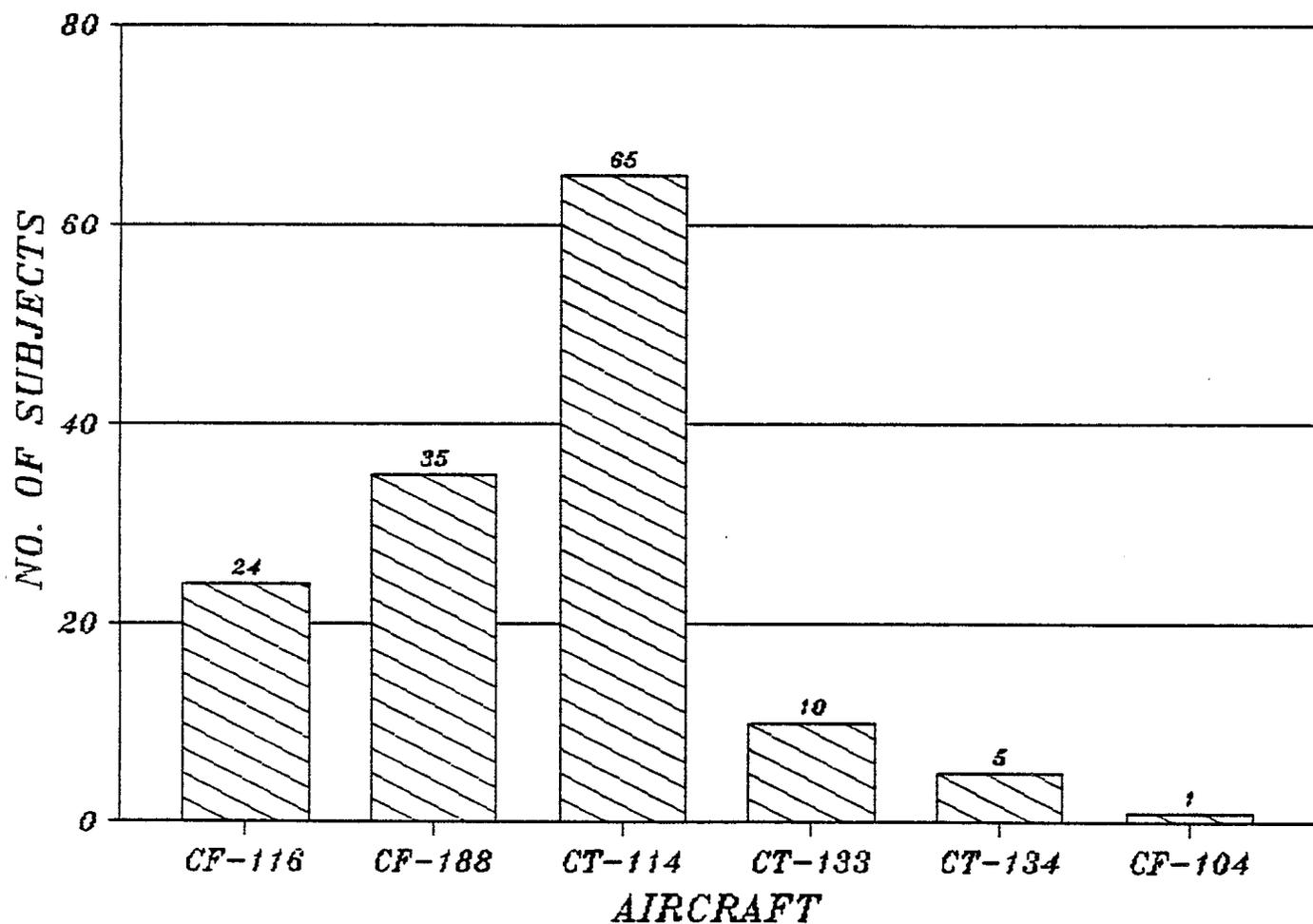
# Pilots and Navigators by Aircraft



# Helicopter Pilots And Navigators In Survey



## Pilots For Jets & Trainers



# Pilots & Navigators For Multi-Engines

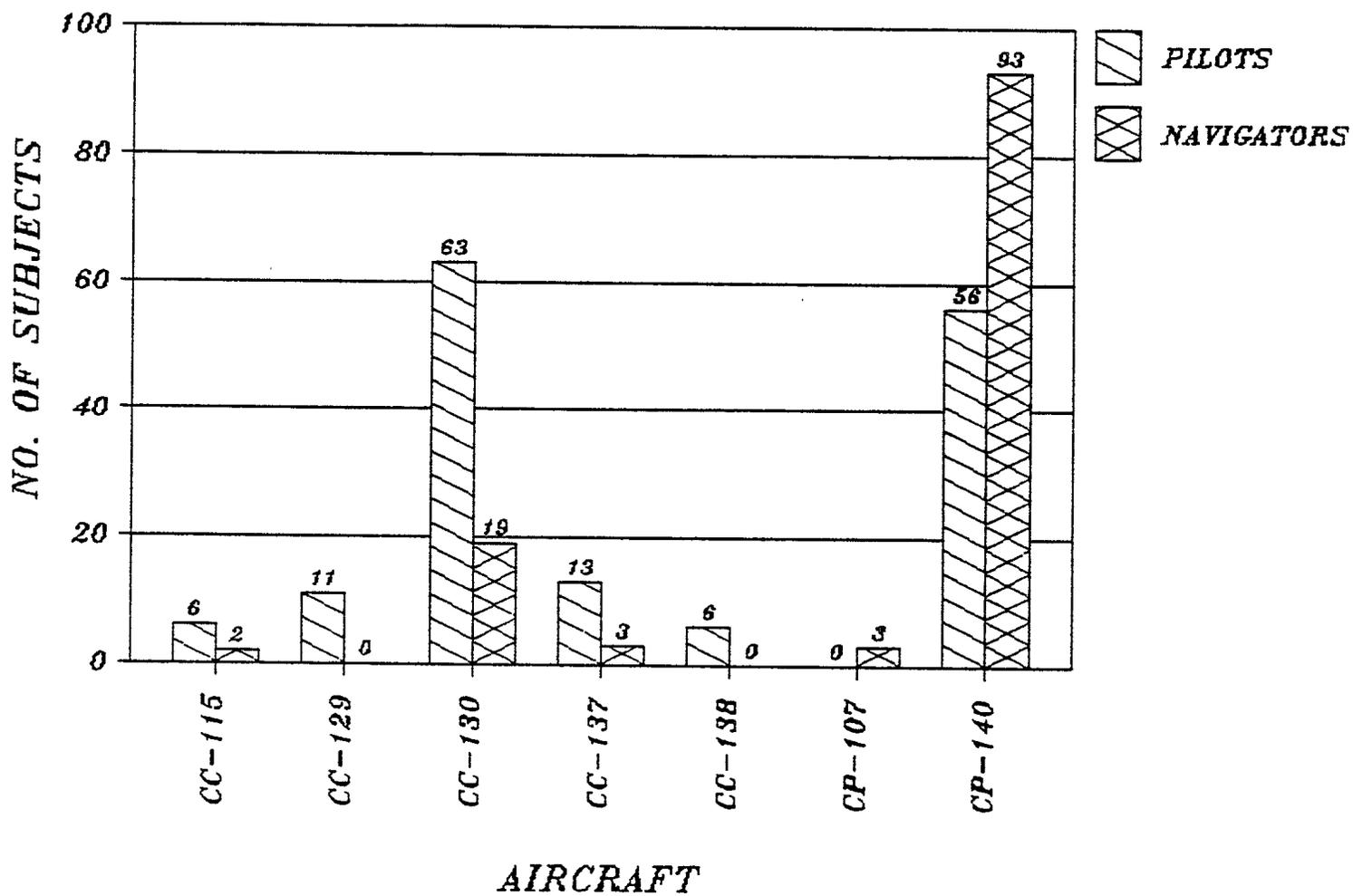


Table 8: Mean Age, Height, and Weight Of Pilots and Navigators  
By Aircraft Assignment

		PILOTS TOTAL N = 387				NAVIGATORS TOTAL N = 132			
		NO. OF CASES	AGE (YRS)	HT (CM)	WT (KG)	NO. OF CASES	AGE (YRS)	HT (CM)	WT (KG)
<b>HELICOPTERS</b>									
IROQUOIS	CH-118	4	42.25	171.05	75.38	--	--	--	--
SEA KING	CH-124	30	27.93	178.18	77.75	12	30.92	176.87	76.12
TWIN HUEY	CH-135	16	26.75	178.21	81.23	--	--	--	--
KIOWA	CH-136	9	35.11	174.87	78.97	--	--	--	--
JET RANGER	CH-139	31	27.77	177.12	79.12	--	--	--	--
CHINOOK	CH-147	1	38.0	171.0	80.6	--	--	--	--
<b>CATEGORY STATISTICS</b>		91	29.12	177.1	78.88	12	30.9	176.87	76.12
<b>JETS &amp; TRAINERS</b>									
FREEDOM FIGHTER	CF-5	24	28.88	176.18	75.75	--	--	--	--
HORNET	CF-18	35	31.46	175.10	75.23	--	--	--	--
TUTOR	CT-114	66	26.79	176.61	77.85	--	--	--	--
T-BIRD	CT-133	10	36.70	176.38	77.51	--	--	--	--
SUNDOWNER	CT-143	5	28.40	174.78	71.08	--	--	--	--
STARFIGHTER	CF-104	1	40.0	161.80	67.80	--	--	--	--
<b>CATEGORY STATISTICS</b>		141	29.16	175.98	76.51	--	--	--	--
<b>MULTI-ENGINES</b>									
BUFFALO	CC-115	6	30.0	178.10	73.42	2	34.0	175.25	80.3
DAKOTA	CC-129	11	40.82	172.70	77.09	--	--	--	--
HERCULES	CC-130	63	32.65	177.65	81.32	19	32.0	176.93	82.02
BOEING	CC-137	13	38.0	173.8	79.14	3	37.7	176.34	79.64
TWIN OTTER	CC-138	6	30.7	180.05	88.32	--	--	--	--
ARGUS	CP-107	--	--	--	--	3	44.0	171.60	80.77
AURORA	CP-140	56	33.8	178.65	81.99	93	32.94	176.61	79.11
<b>CATEGORY STATISTICS</b>		155	33.92	177.44	81.05	120	33.2	176.51	79.65

APPENDIX D

MEASUREMENT DEFINITIONS, PERCENTILE TABLES

AND

DESCRIPTIVE STATISTICS

FOR

ALL MEASUREMENTS

IN 1985 ANTHROPOMETRIC SURVEY

OF CANADIAN FORCES AIRCREW

Table 9 : List Of Measures By Survey Requirement

	CAR	COMBINAN	SAMMIE	ASCC	1472C	CFP 154 CFAO 34-44
1.Weight		*****	*****	*****	*****	*****
2.Stature	*****		*****	*****	*****	*****
3.Cervical Height			*****	*****		
4.L4-L5 Height				*****	*****	
5.Acromial Height Standing			*****			
6.Shoulder Height					*****	
7.Elbow Height				*****		
8.Wrist Height Standing						
9.Trochanteric Height			*****			
10.Knee Height Standing			*****			
11.Calf Height					*****	
12.Ankle Height			*****			
13.Waist Height (Omphalion)	*****			*****	*****	
14.Waist Height (Natural)	*****			*****	*****	
15.Suprasternal Height			*****			
16.Popliteal Height	*****			*****	*****	
17.Knee Height Sitting		*****	*****	*****	*****	
18.Sitting Height Relaxed				*****	*****	
19.Buttock-Popliteal Length				*****	*****	*****
20.Sitting Height	*****	*****	*****	*****	*****	*****
21.Eye Height Sitting	*****	*****		*****	*****	
22.Acromial Height Sitting		*****			*****	
23.Elbow Rest Height Sitting				*****	*****	
24.Waist Height Sitting (MLSD)					*****	
25.Thigh Clearance			*****	*****		
26.Vertical Reach Down	*****	*****		*****		
27.Shoulder-Elbow Length	*****	*****			*****	
28.Elbow to Finger Tip Length	*****				*****	
29.Elbow to Center of Grip			*****	*****		
30.Elbow-Wrist Length			*****	*****	*****	*****
31.Buttock-Knee Length	*****	*****	*****	*****	*****	*****
32.Hip Breadth Sitting	*****	*****		*****	*****	
33.Elbow-Elbow Breadth			*****	*****	*****	
34.Bideltoid Breadth	*****	*****	*****	*****		
35.Biacromial Breadth		*****	*****	*****		
36.Head Length			*****			
37.Menton-Vertex Length			*****		*****	
38.Head Height (Tragion-Vertex)			*****	*****	*****	
39.Head Breadth			*****	*****	*****	
40.Hand Length	*****	*****	*****	*****	*****	*****
41.Palm Length			*****	*****	*****	
42.Hand Breadth-Metacarpal			*****	*****	*****	
43.Hand Thickness-Metacarpal					*****	
44.Head Circumference			*****	*****	*****	
45.Biceps Circumference Flexed			*****		*****	
46.Biceps Circumference Relaxed			*****		*****	
47.Forearm Circumference Flexed			*****		*****	
48.Forearm Circumference Relaxed			*****		*****	
49.Wrist Circumference			*****	*****	*****	
50.Hand Circumference-Metacarpal			*****	*****	*****	
51.Neck Circumference			*****		*****	
52.Shoulder Circumference			*****	*****	*****	
53.Chest Circumference			*****		*****	
54.Waist Circumference Omphalion				*****	*****	
55.Waist Circumference Natural			*****	*****	*****	
56.Buttock Circumference			*****	*****	*****	
57.Upper Thigh Circumference			*****		*****	
58.Lower Thigh Circumference			*****		*****	
59.Calf Circumference			*****		*****	
60.Ankle Circumference			*****		*****	
61.Waist Front Length					*****	
62.Crotch Length (MLSD)					*****	
63.Waist Back Length						
64.Arm Span			*****			
65.Chest Breadth		*****			*****	
66.Chest Depth		*****			*****	
67.Hip Breadth Standing	*****	*****	*****		*****	
68.Overhead Reach		*****	*****	*****	*****	
69.Functional Reach (Thumb-Tip)		*****	*****	*****	*****	
70.Foot Length	*****	*****	*****	*****	*****	
71.Foot Breadth		*****	*****	*****	*****	
72.Buttock-Heel Length					*****	
73.Functional Leg Length	*****	*****			*****	

Reference Guide To Definitions, Percentiles And Descriptive Statistics  
In Appendix D

(Variables Listed Alphabetically)

	Page #		Page #
1. Acromial Height Sitting.....	88	38. Head Breadth.....	128
2. Acromial Height Standing.....	52	39. Head Circumference.....	142
3. Ankle Circumference .....	176	40. Head Height (Tragion-Vertex)....	126
4. Ankle Height.....	66	41. Head Length.....	120
5. Arm Span.....	184	42. Hip Breadth Sitting.....	110
6. Biacromial Breadth .....	116	43. Hip Breadth Standing.....	192
7. Biceps Circumference Flexed.....	144	44. Knee Height Sitting.....	78
8. Biceps Circumference Relaxed.....	146	45. Knee Height Standing.....	62
9. Bideltoid Breadth.....	114	46. L4-L5 Height (Lumbar Height)....	50
10. Buttock Circumference.....	168	47. Lower Thigh Circumference.....	172
11. Buttock-Heel Length.....	204	48. Menton-Vertex Length.....	124
12. Buttock-Knee Length.....	108	49. Neck Circumference.....	158
13. Buttock-Popliteal Length.....	82	50. Overhead Reach.....	196
14. Calf Circumference.....	174	51. Palm Length.....	134
15. Calf Height.....	64	52. Popliteal Height.....	76
16. Cervical Height.....	48	53. Sitting Height.....	84
17. Chest Breadth.....	188	54. Sitting Height Relaxed.....	80
18. Chest Circumference.....	162	55. Shoulder Circumference.....	160
19. Chest Depth.....	190	56. Shoulder-Elbow Length.....	98
20. Crotch Length.....	180	57. Shoulder Height.....	54
21. Elbow-Elbow Breadth.....	112	58. Stature (Height).....	46
22. Elbow Height.....	56	59. Suprasternal Height.....	72
23. Elbow Rest Height Sitting.....	90	60. Thigh Clearance.....	94
24. Elbow To Center Of Grip.....	102	61. Trochanteric Height.....	60
25. Elbow to Finger Tip Length.....	100	62. Upper Thigh Circumference.....	170
26. Elbow-Wrist Length.....	104	63. Vertical Reach Down.....	96
27. Eye Height Sitting.....	86	64. Waist Back Length.....	182
28. Foot Breadth.....	202	65. Waist Circumference Natural.....	166
29. Foot Length.....	200	66. Waist Circumference Omphalion....	164
30. Forearm Circumference Flexed.....	148	67. Waist Front Length.....	178
31. Forearm Circumference Relaxed.....	150	68. Waist Height (Natural).....	70
32. Functional Leg Length.....	208	69. Waist Height (Omphalion).....	68
33. Functional Reach (Thumb-Tip).....	198	70. Waist Height Sitting.....	92
34. Hand Breadth - Metacarpal.....	136	71. Weight (Mass).....	42
35. Hand Circumference - Metacarpale...	154	72. Wrist Circumference.....	152
36. Hand Length.....	132	73. Wrist Height Standing.....	58
37. Hand Thickness - Metacarpale III...	138		

AGE:

Reported in years as of the date of testing.

PERCENTILE TABLE

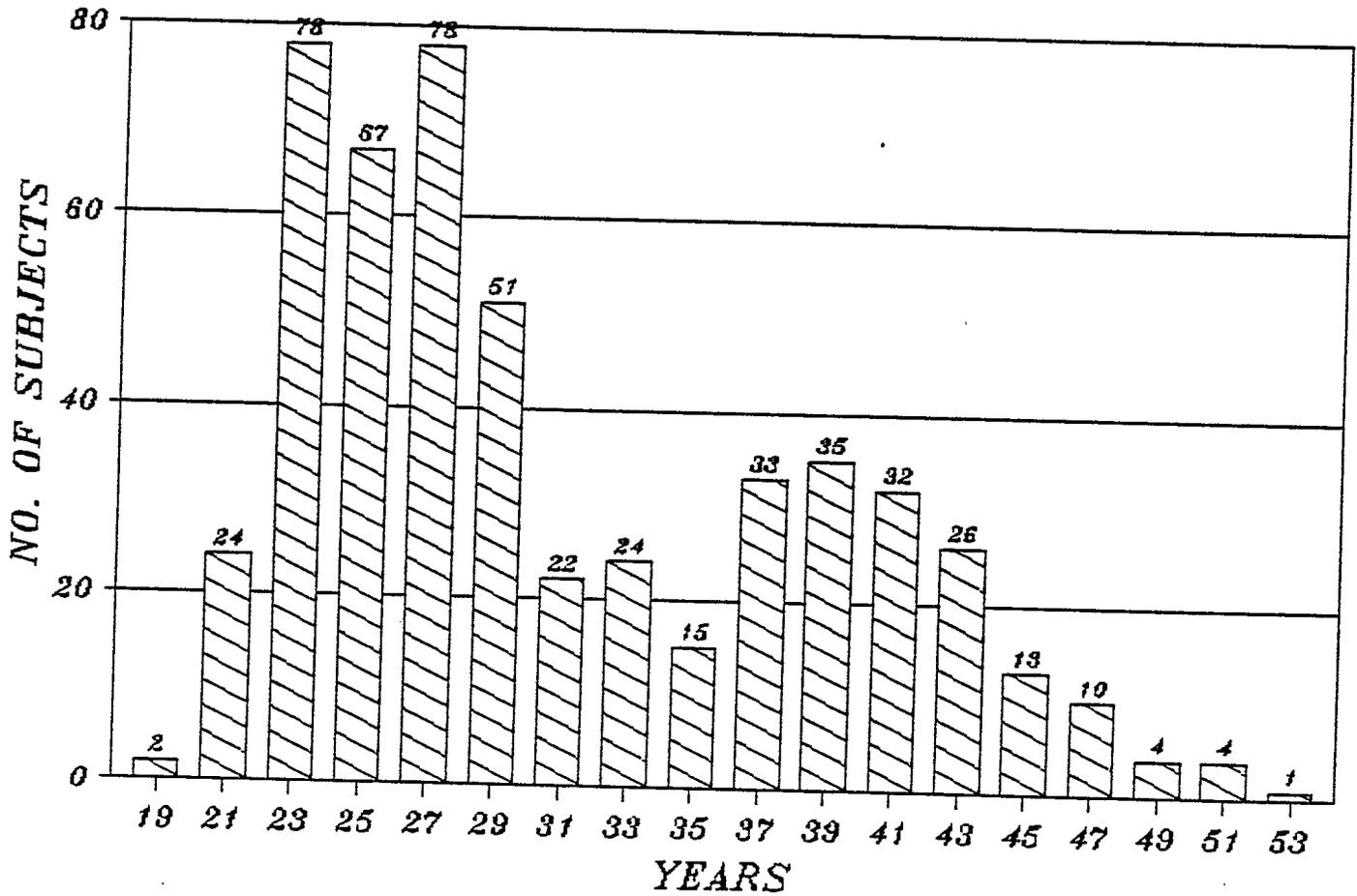
YEARS	%ILE
21.0	1
22.0	2
22.0	3
22.0	4
22.0	5
23.0	10
24.0	15
24.0	20
25.0	25
26.0	30
27.0	35
27.0	40
28.0	45
29.0	50
30.0	55
31.0	60
34.0	65
37.0	70
38.0	75
40.0	80
42.0	85
43.0	90
45.0	95
46.0	96
47.0	97
48.0	98
51.0	99

DESCRIPTIVE STATISTICS

	YEARS
NUMBER OF CASES	519
MINIMUM VALUE	20.00
MAXIMUM VALUE	53.00
RANGE	33.00
MEAN	31.54
STANDARD DEVIATION	7.70
STANDARD ERROR (SEM)	0.33
VARIANCE	59.37
SKEWNESS	0.65
KURTOSIS	-0.72

# Frequency Histogram For Age

MIN = 20 MAX = 53



PERCEIVED HEIGHT:

As reported by the subject prior to the start of testing on the day of measurement.

PERCENTILE TABLE

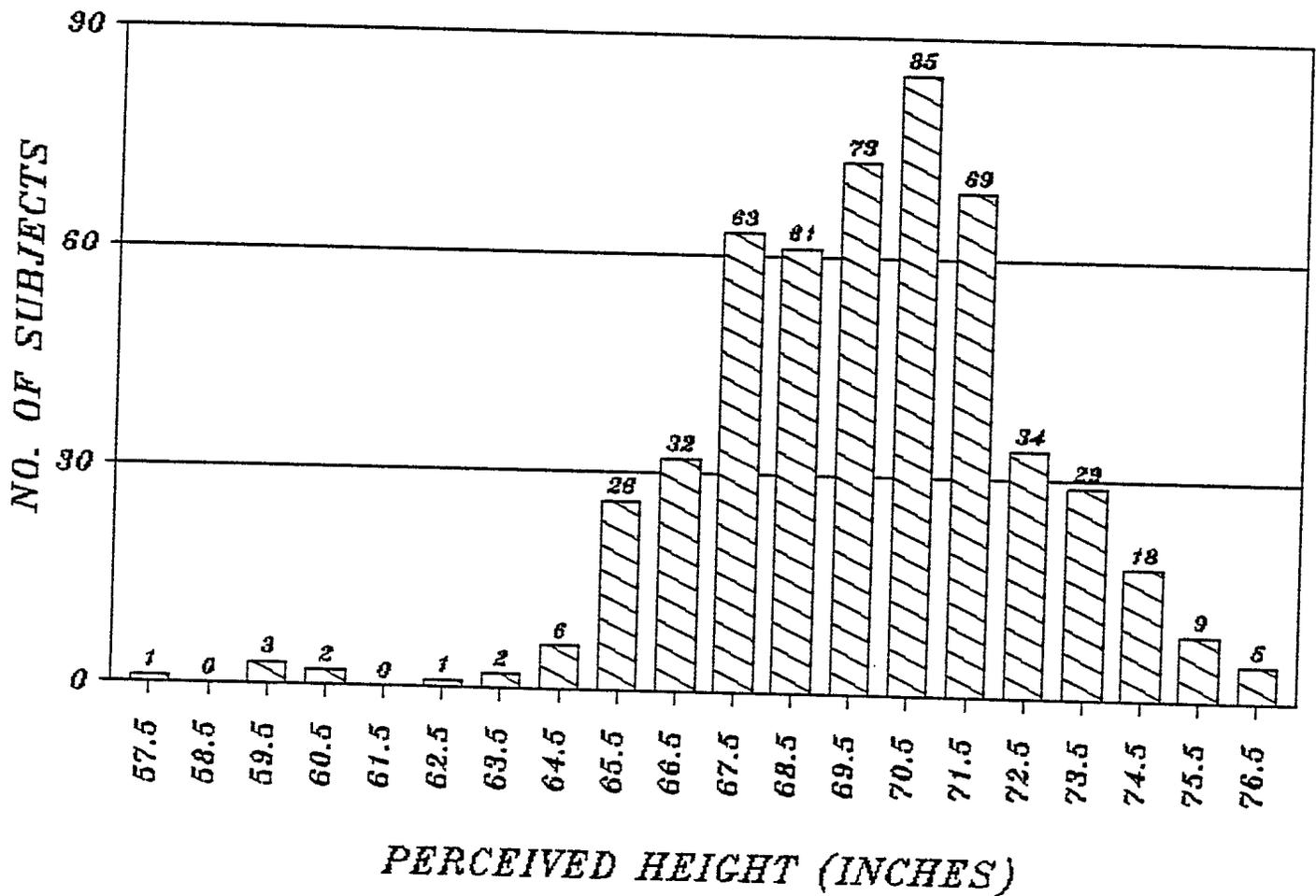
CM.	%ILE	IN.
153.04	1	60.25
163.83	2	64.50
165.74	3	65.25
167.64	4	66.00
167.64	5	66.00
170.18	10	67.00
171.45	15	67.50
172.72	20	68.00
172.72	25	68.00
174.63	30	68.75
175.26	35	69.00
177.17	40	69.75
177.80	45	70.00
177.80	50	70.00
179.71	55	70.75
180.34	60	71.00
180.34	65	71.00
182.12	70	71.70
182.88	75	72.00
182.88	80	72.00
185.42	85	73.00
187.96	90	74.00
190.50	95	75.00
190.50	96	75.00
190.50	97	75.00
193.04	98	76.00
194.31	99	76.50

DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
144.78	MINIMUM VALUE	57.00
195.58	MAXIMUM VALUE	77.00
50.80	RANGE	20.00
178.14	MEAN	70.13
7.10	STANDARD DEVIATION	2.79
0.31	STANDARD ERROR (SEM)	0.12
50.40	VARIANCE	7.81
-0.43	SKEWNESS	-0.43
1.50	KURTOSIS	1.50

# Frequency Histogram For Perceived Height

MIN = 57 MAX = 77



PERCEIVED WEIGHT:

As reported by the subject prior to the start of testing on the day of measurement.

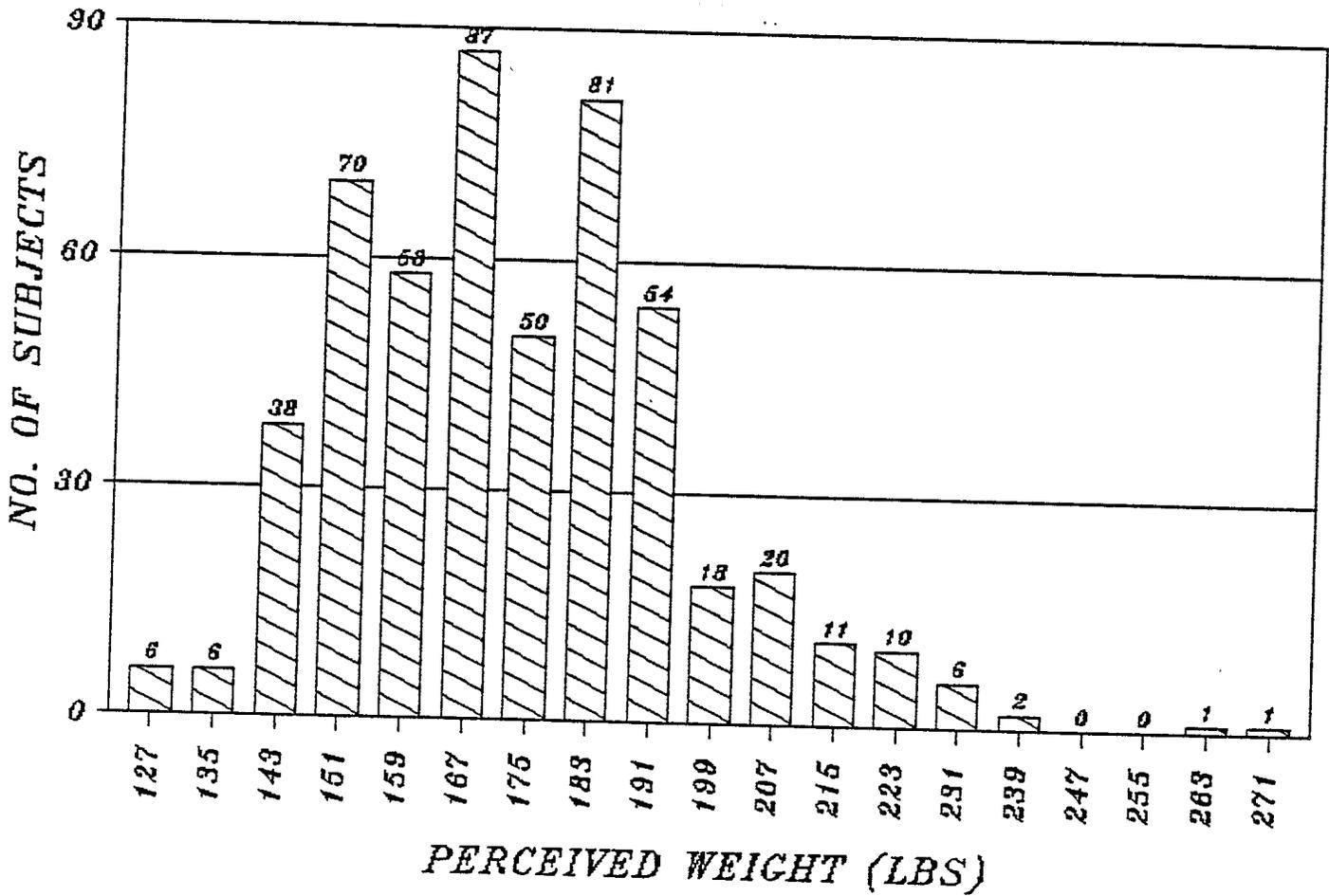
PERCENTILE TABLE

KG	%ILE	LBS.
58.97	1	130.00
61.69	2	136.00
63.50	3	140.00
63.96	4	141.00
65.32	5	144.00
67.13	10	148.00
68.95	15	152.00
70.31	20	155.00
71.67	25	158.00
72.58	30	160.00
74.84	35	165.00
74.84	40	165.00
77.11	45	170.00
77.11	50	170.00
79.38	55	175.00
80.74	60	178.00
81.65	65	180.00
83.92	70	185.00
83.92	75	185.00
86.18	80	190.00
88.45	85	195.00
92.08	90	203.00
97.52	95	215.00
98.88	96	218.00
100.24	97	221.00
102.97	98	227.00
106.60	99	235.00

DESCRIPTIVE STATISTICS

KG.		LB.
519	NUMBER OF CASES	519
56.70	MINIMUM VALUE	125.00
122.47	MAXIMUM VALUE	270.00
65.77	RANGE	145.00
78.88	MEAN	173.91
10.01	STANDARD DEVIATION	22.07
0.43	STANDARD ERROR (SEM)	0.96
100.23	VARIANCE	487.17
0.70	SKEWNESS	0.70
0.91	KURTOSIS	0.91

Frequency Histogram For Perceived Weight  
MIN = 125 MAX = 270

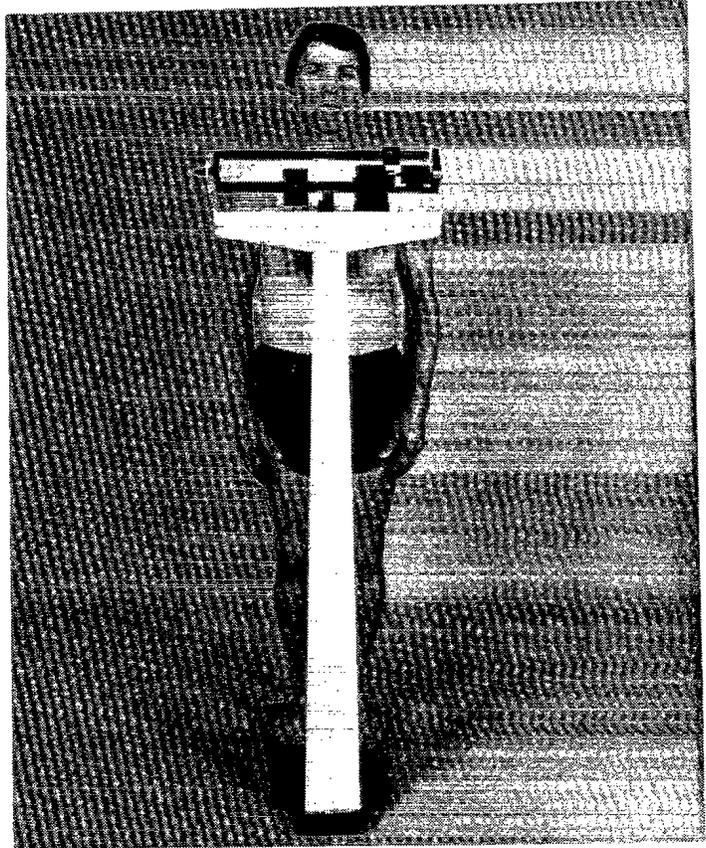


**WEIGHT:**

The semi-nude subject stands erect on medical weigh scales. The weight of the subject is measured to the nearest 0.1 kg.

**PERCENTILE TABLE**

KG.	%ILE	LBS.
58.80	1	129.63
60.60	2	133.60
62.00	3	136.69
63.80	4	140.65
64.40	5	141.98
67.20	10	148.15
68.40	15	150.79
69.60	20	153.44
71.00	25	156.53
72.50	30	159.83
73.60	35	162.26
75.00	40	165.35
76.50	45	168.65
78.00	50	171.96
79.30	55	174.82
80.90	60	178.35
82.30	65	181.44
83.50	70	184.08
85.20	75	187.83
87.20	80	192.24
89.20	85	196.65
92.90	90	204.81
98.20	95	216.49
101.50	96	223.77
102.40	97	225.75
103.20	98	227.51
108.60	99	239.42

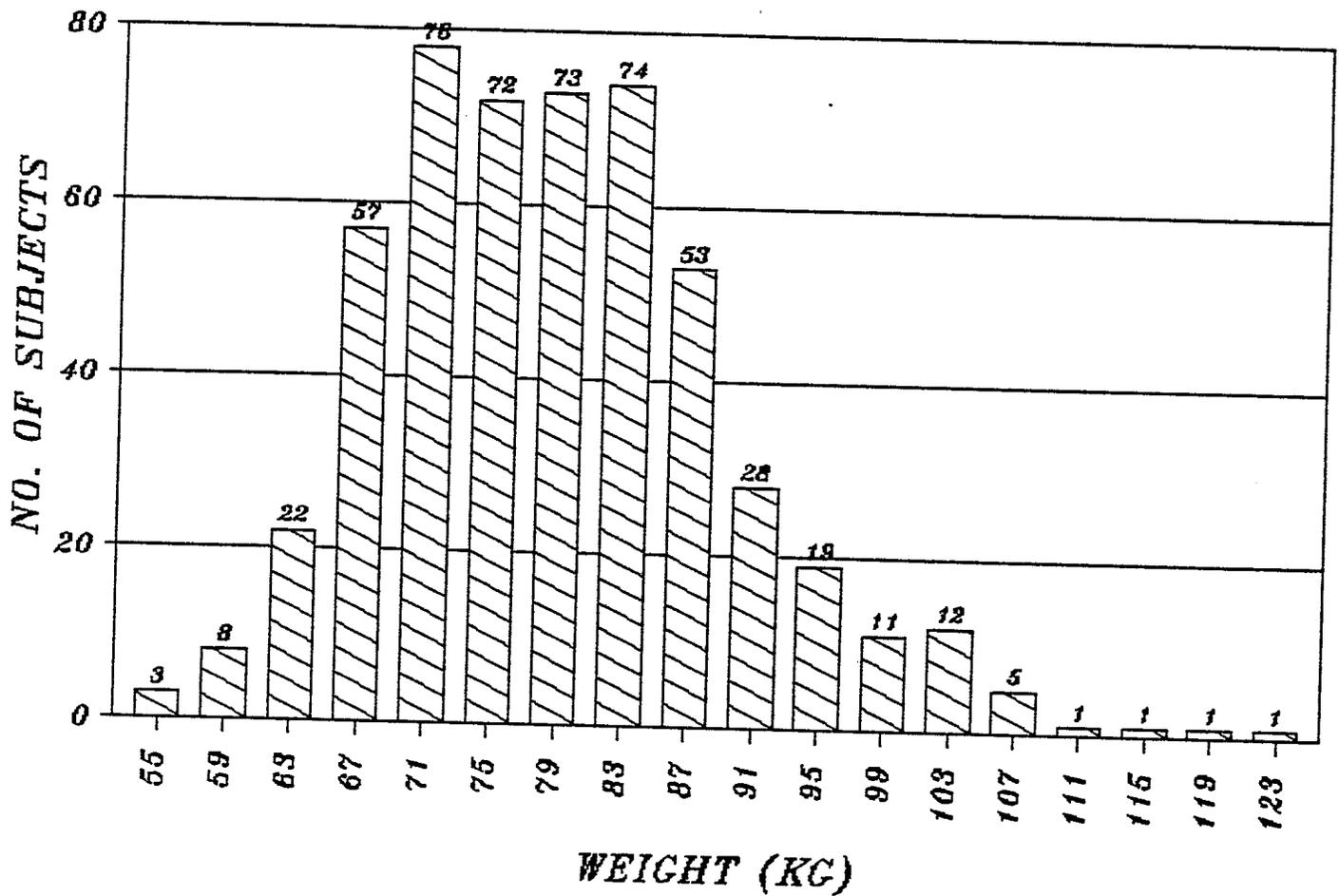


**DESCRIPTIVE STATISTICS**

KG.		LB.
519	NUMBER OF CASES	519
55.50	MINIMUM VALUE	122.36
122.70	MAXIMUM VALUE	270.50
67.20	RANGE	148.15
78.99	MEAN	174.15
10.63	STANDARD DEVIATION	23.44
0.47	STANDARD ERROR (SEM)	1.03
113.06	VARIANCE	549.49
0.69	SKEWNESS	0.69
0.72	KURTOSIS	0.72

# Frequency Histogram For Weight

MIN = 55.5    MAX = 122.7



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STANDING HEIGHT MEASUREMENTS  
USING THE  
"FREE STANDING ANTHROPOMETER"

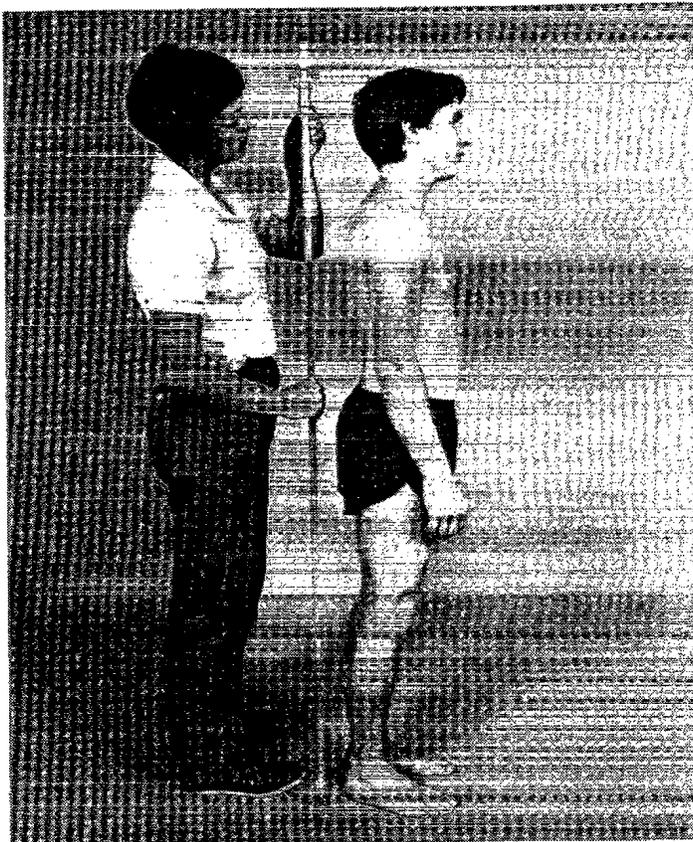
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STATURE:

Subject stands erect looking directly forward (head oriented in the Frankfort Plane). Measure the vertical distance from the standing surface to the top of the head.

PERCENTILE TABLE

CM.	%ILE	IN.
162.80	1	64.09
163.70	2	64.45
164.75	3	64.86
165.70	4	65.24
166.20	5	65.43
168.20	10	66.22
169.80	15	66.85
171.10	20	67.36
172.40	25	67.87
173.30	30	68.23
174.00	35	68.50
174.60	40	68.74
175.30	45	69.02
176.30	50	69.41
177.40	55	69.84
178.30	60	70.20
179.10	65	70.51
180.00	70	70.87
181.00	75	71.26
182.10	80	71.69
183.60	85	72.28
185.40	90	72.99
188.90	95	74.37
189.30	96	74.53
190.35	97	74.94
191.80	98	75.51
193.20	99	76.06

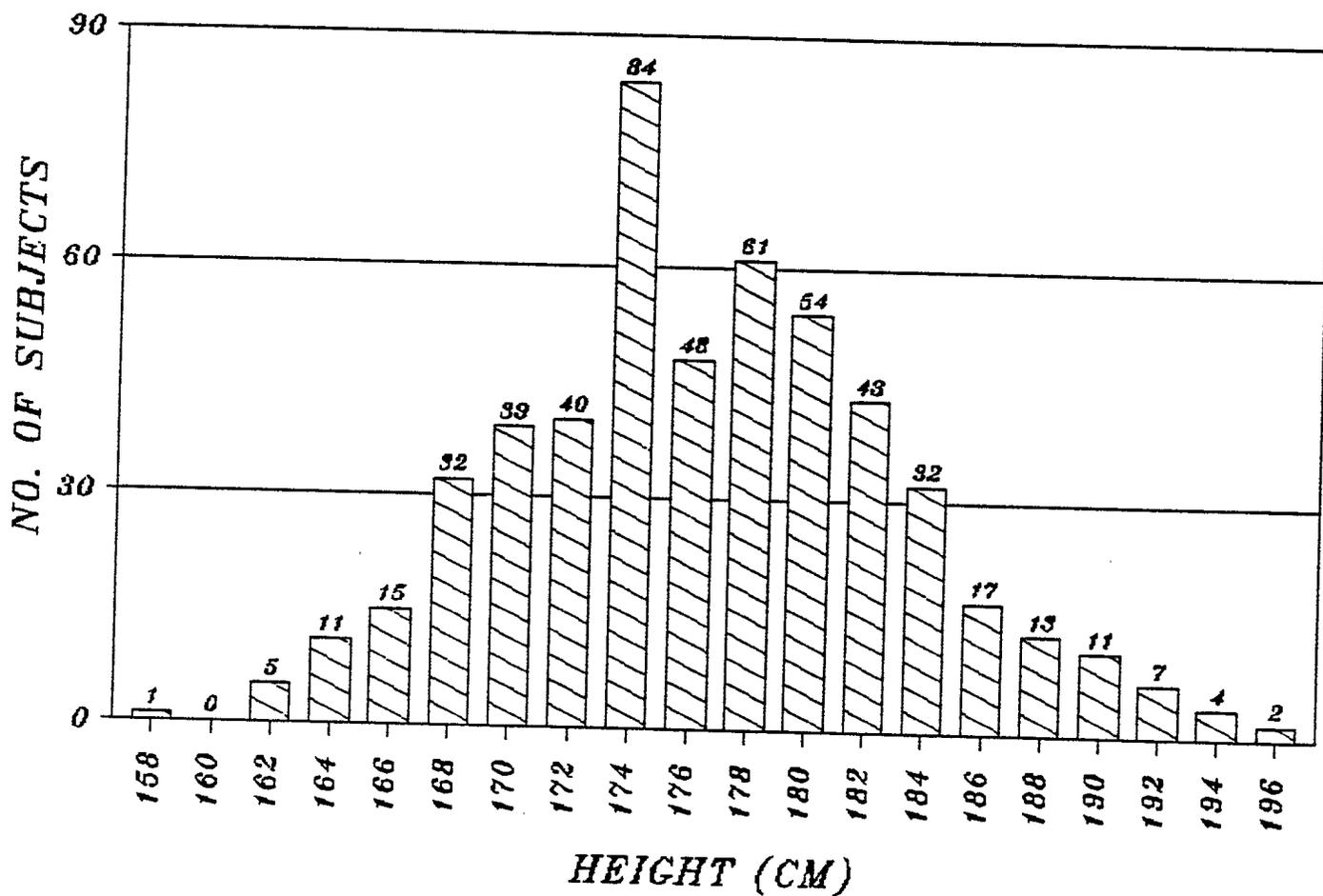


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
158.800	MINIMUM VALUE	62.520
196.100	MAXIMUM VALUE	77.205
37.300	RANGE	14.685
176.755	MEAN	69.589
6.614	STANDARD DEVIATION	2.604
0.290	STANDARD ERROR (SEM)	0.114
43.746	VARIANCE	6.781
0.244	SKEWNESS	0.244
-0.127	KURTOSIS	-0.127

# Frequency Histogram For Stature

MIN = 158.8    MAX = 196.1



CERVICAL HEIGHT:

Subject stands erect, his head in the Frankfort Plane. Measure the vertical distance from the standing surface to the cervical landmark indicating the protrusion of the spinous process of the 7th cervical vertebra.

PERCENTILE TABLE

CM.	%ILE	IN.
138.50	1	54.53
140.10	2	55.16
140.85	3	55.45
141.60	4	55.75
141.90	5	55.87
143.80	10	56.61
145.00	15	57.09
146.30	20	57.60
147.40	25	58.03
148.20	30	58.35
149.10	35	58.70
149.90	40	59.02
150.60	45	59.29
151.20	50	59.53
152.30	55	59.96
153.20	60	60.31
153.80	65	60.55
154.50	70	60.83
155.80	75	61.34
156.70	80	61.69
158.10	85	62.24
160.20	90	63.07
163.10	95	64.21
163.70	96	64.45
164.45	97	64.74
165.40	98	65.12
167.30	99	65.87

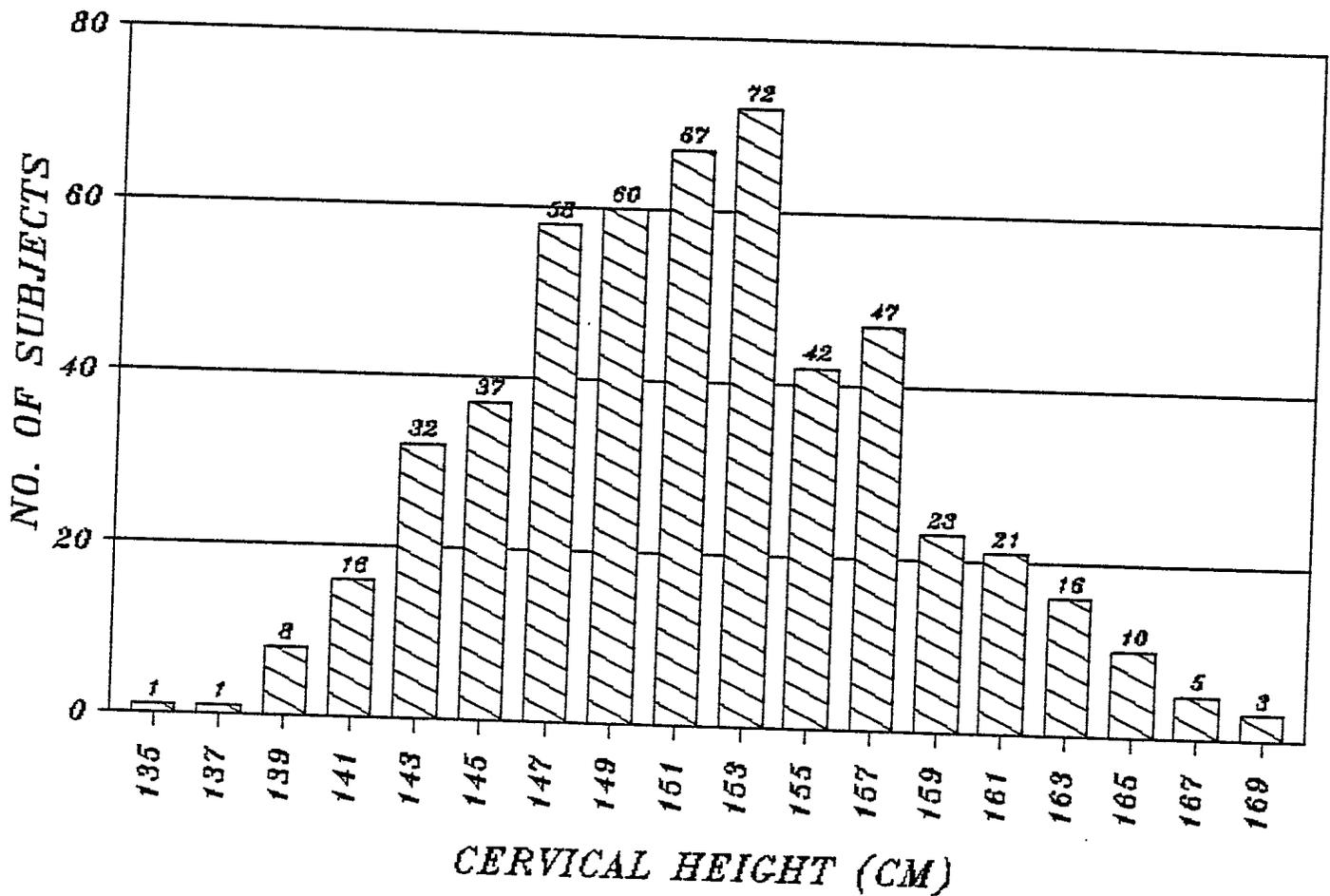


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
135.700	MINIMUM VALUE	53.425
169.500	MAXIMUM VALUE	66.732
33.800	RANGE	13.307
151.711	MEAN	59.729
6.232	STANDARD DEVIATION	2.453
0.274	STANDARD ERROR (SEM)	0.108
38.833	VARIANCE	6.019
0.275	SKEWNESS	0.275
-0.182	KURTOSIS	-0.182

# Frequency Histogram For Cervical Height

MIN = 135.7 MAX = 169.5

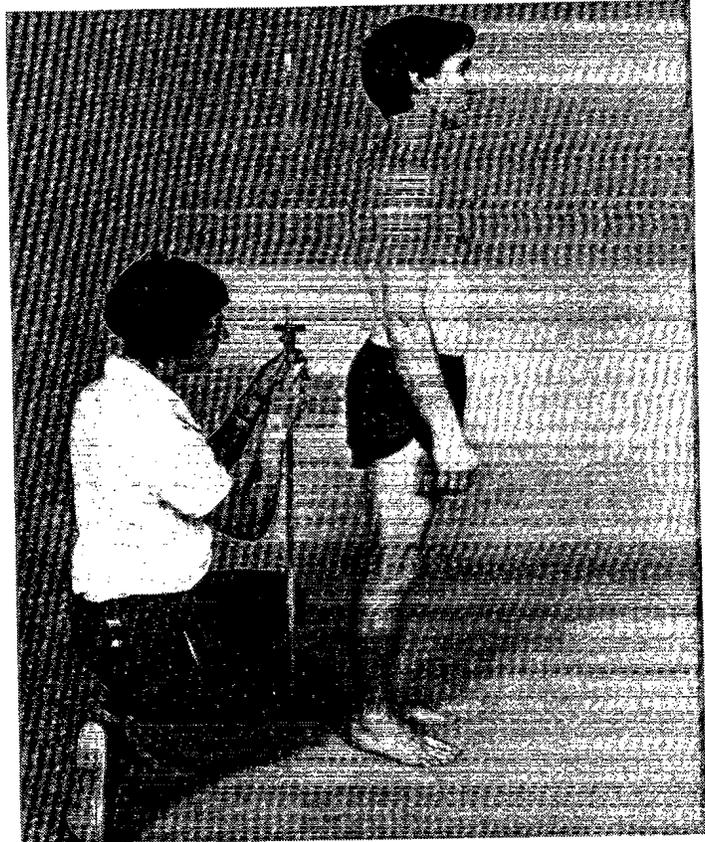


LUMBAR VERTEBRAE HEIGHT (L4-L5):(Ref. 25)

The subject stands erect initially then bends the upper body forward at the waist. From the rear of the subject locate both Iliac crests. Place the index finger of both hands on the crests and locate the thumb of each hand on the lumbar vertebrae forming a horizontal line between all landmarks. Mark the L4-L5 vertebrae below the thumb. From this mark, measure the vertical distance to the standing surface.

PERCENTILE TABLE

CM.	%ILE	IN.
94.80	1	37.32
97.00	2	38.19
97.35	3	38.33
97.90	4	38.54
98.10	5	38.62
100.10	10	39.41
101.10	15	39.80
102.40	20	40.31
103.40	25	40.71
104.00	30	40.94
104.70	35	41.22
105.40	40	41.50
106.30	45	41.85
106.80	50	42.05
107.50	55	42.32
108.20	60	42.60
108.70	65	42.80
109.40	70	43.07
110.00	75	43.31
110.90	80	43.66
112.00	85	44.09
113.10	90	44.53
115.70	95	45.55
116.60	96	45.91
117.05	97	46.08
117.55	98	46.28
118.40	99	46.61

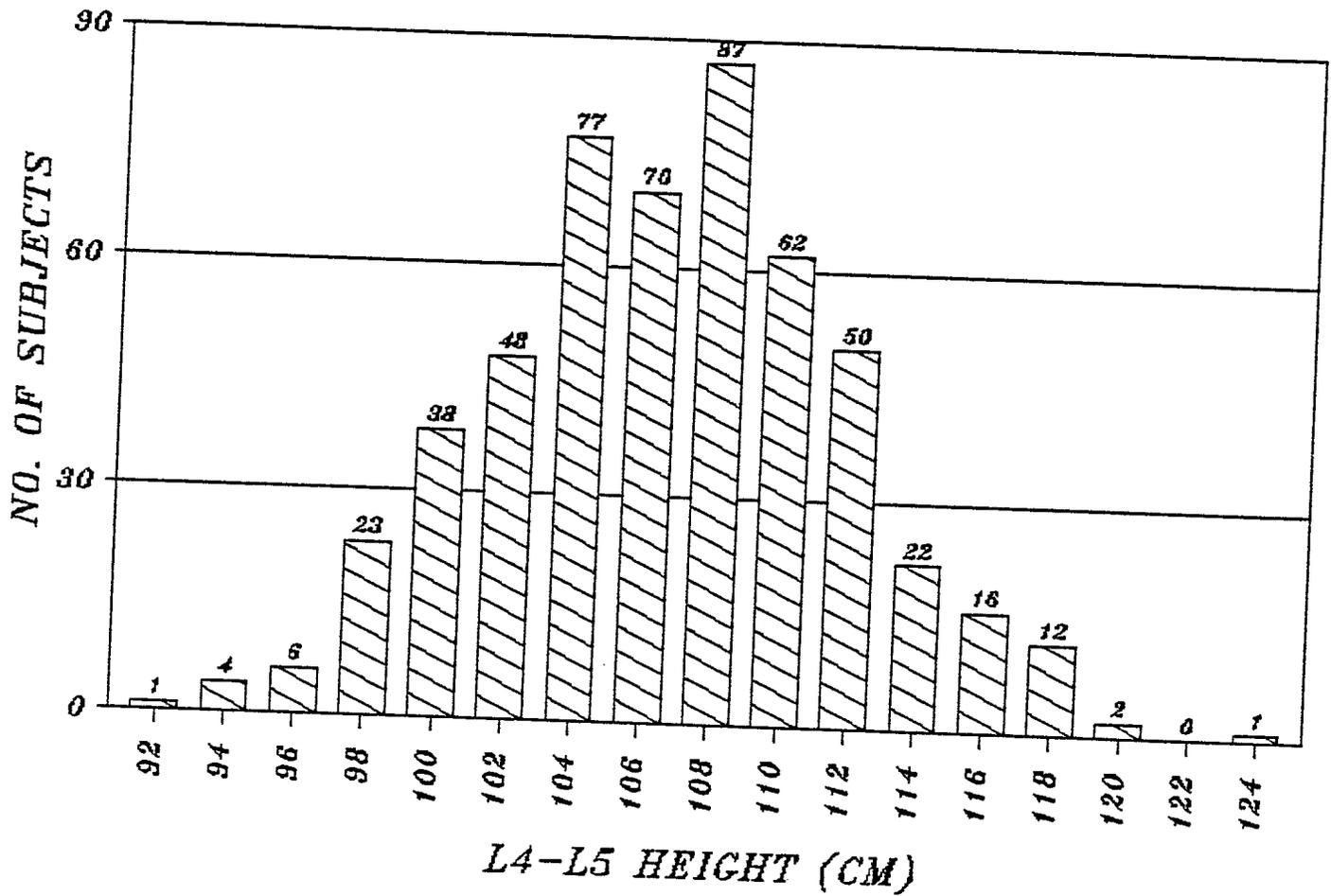


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
92.700	MINIMUM VALUE	36.496
124.600	MAXIMUM VALUE	49.055
31.900	RANGE	12.559
106.774	MEAN	42.037
5.127	STANDARD DEVIATION	2.019
0.225	STANDARD ERROR (SEM)	0.089
26.287	VARIANCE	4.074
0.066	SKEWNESS	0.066
-0.039	KURTOSIS	-0.039

# Frequency Histogram For L4-L5 Height

MIN = 92.7 MAX = 124.6

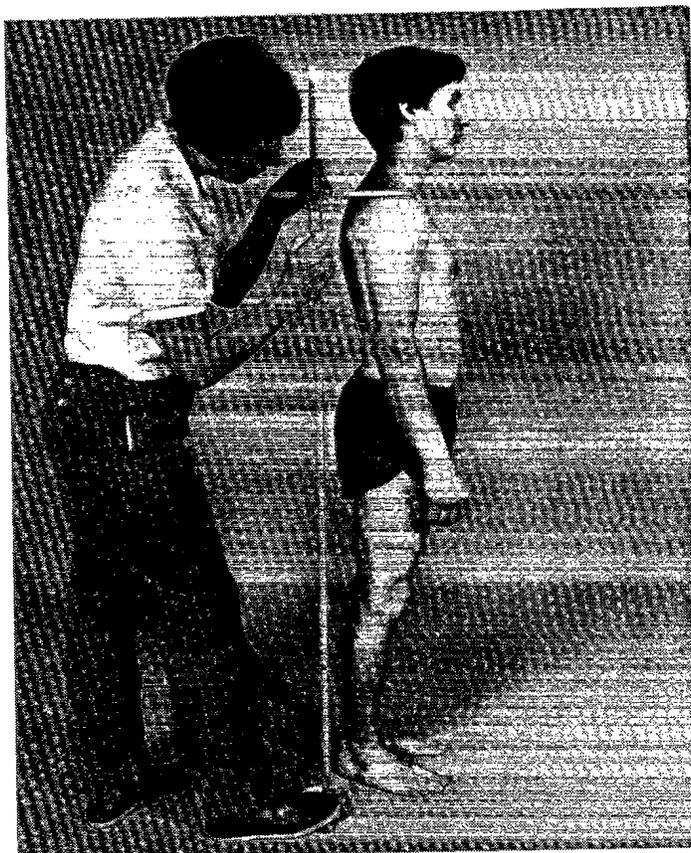


ACROMIAL HEIGHT (STANDING):

The subject stands erect. Measure the vertical distance from the standing surface to the right acromial landmark.

PERCENTILE TABLE

CM.	ZILE	IN.
131.50	1	51.77
133.50	2	52.56
134.15	3	52.81
134.80	4	53.07
135.60	5	53.39
137.40	10	54.09
139.00	15	54.72
140.00	20	55.12
140.90	25	55.47
141.70	30	55.79
142.60	35	56.14
143.60	40	56.54
144.10	45	56.73
144.80	50	57.01
145.90	55	57.44
146.40	60	57.64
147.30	65	57.99
148.00	70	58.27
149.00	75	58.66
150.10	80	59.09
151.40	85	59.61
153.00	90	60.24
156.30	95	61.54
156.90	96	61.77
157.95	97	62.18
159.40	98	62.76
161.00	99	63.39

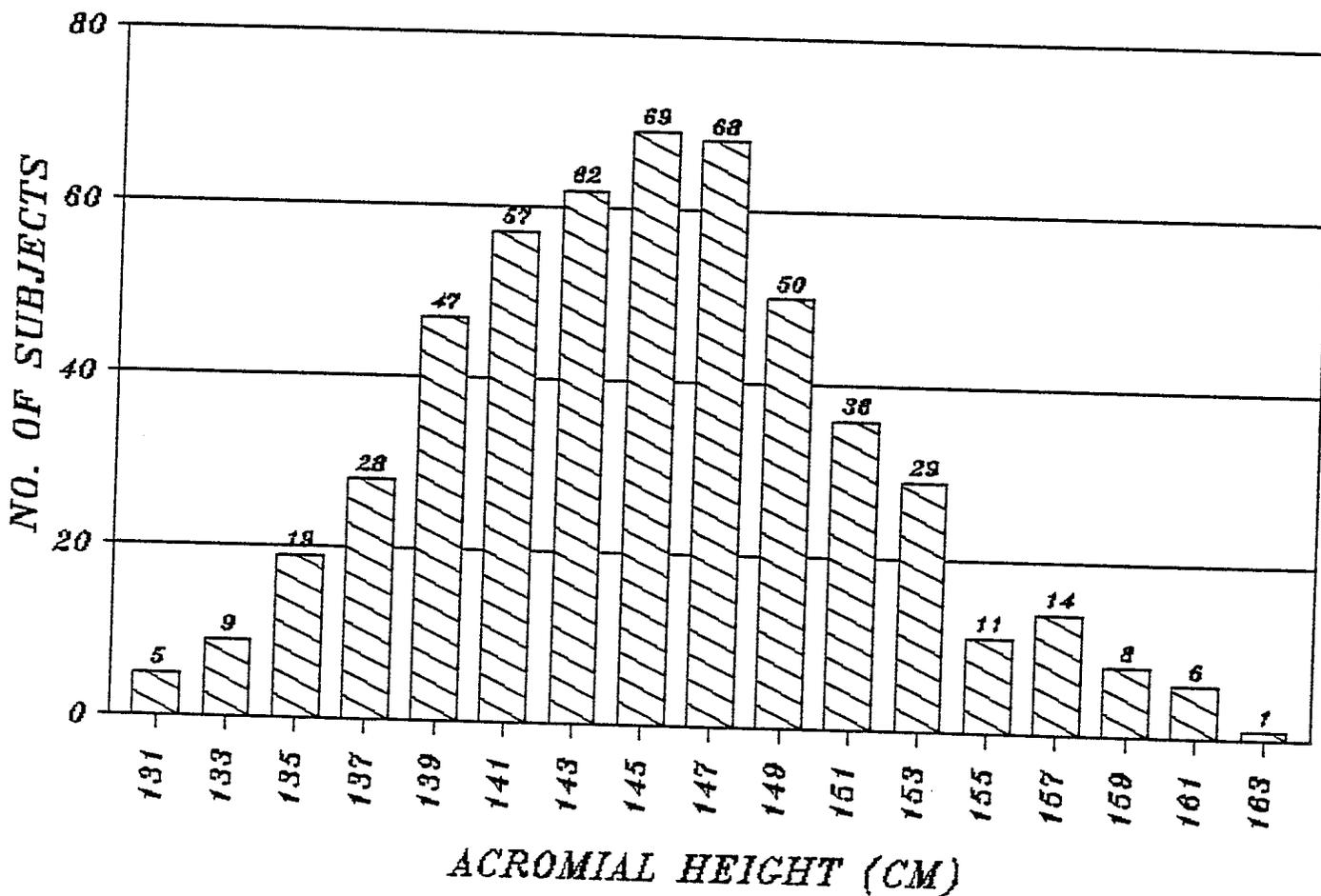


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
130.700	MINIMUM VALUE	51.457
163.600	MAXIMUM VALUE	64.409
32.900	RANGE	12.953
145.166	MEAN	57.152
6.088	STANDARD DEVIATION	2.397
0.267	STANDARD ERROR (SEM)	0.105
37.068	VARIANCE	5.746
0.276	SKEWNESS	0.276
-0.042	KURTOSIS	-0.042

# Frequency Histogram For Acromial Height

MIN = 130.7    MAX = 163.6

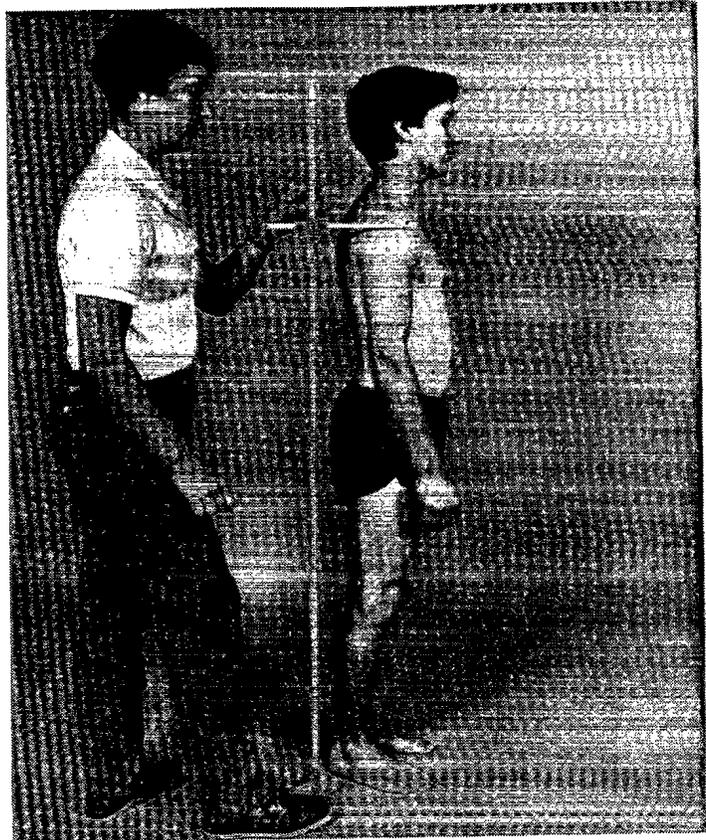


SHOULDER HEIGHT:

The subject stands erect. Measure the vertical distance from the standing surface to the greater tuberosity of the Humerous.

PERCENTILE TABLE

CM.	%ILE	IN.
129.00	1	50.79
130.50	2	51.38
131.00	3	51.57
131.70	4	51.85
132.20	5	52.05
134.10	10	52.80
135.70	15	53.43
136.70	20	53.82
137.70	25	54.21
138.50	30	54.53
139.40	35	54.88
140.10	40	55.16
140.80	45	55.43
141.60	50	55.75
142.20	55	55.98
143.10	60	56.34
143.80	65	56.61
144.80	70	57.01
145.70	75	57.36
146.80	80	57.80
148.00	85	58.27
149.70	90	58.94
153.10	95	60.28
153.40	96	60.39
154.95	97	61.00
156.50	98	61.61
158.00	99	62.20

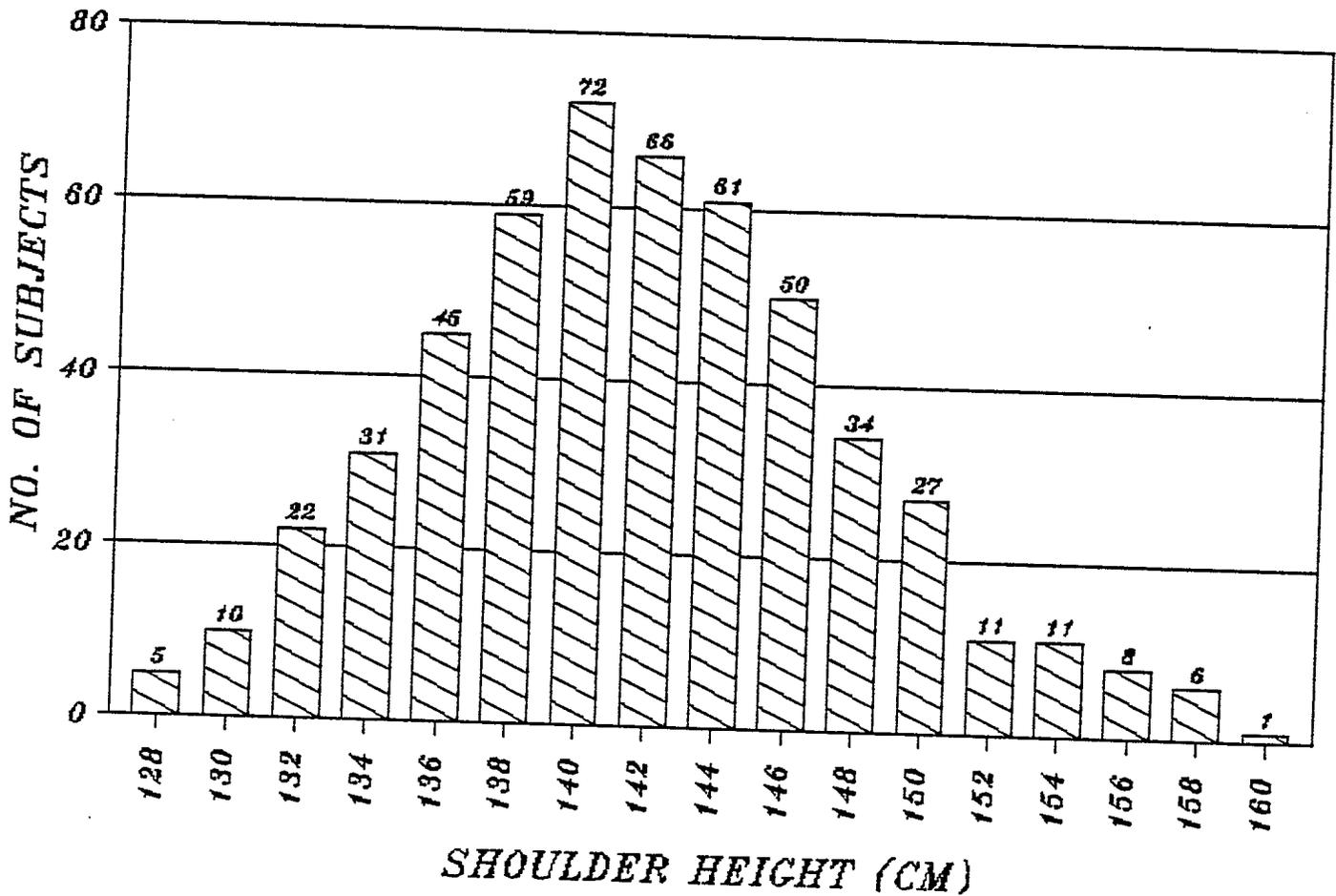


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
127.800	MINIMUM VALUE	50.315
161.000	MAXIMUM VALUE	63.386
33.200	RANGE	13.071
141.886	MEAN	55.861
6.097	STANDARD DEVIATION	2.400
0.268	STANDARD ERROR (SEM)	0.105
37.174	VARIANCE	5.762
0.321	SKEWNESS	0.321
-0.009	KURTOSIS	-0.009

# Frequency Histogram For Shoulder Height

MIN = 127.8 MAX = 161.0



ELBOW HEIGHT (RADIAL HEIGHT):

Subject stands erect, his arms hanging naturally at his sides. Measure the vertical distance from the standing surface to the radial landmark on the right elbow.

PERCENTILE TABLE

CM.	%ILE	IN.
100.70	1	39.65
102.15	2	40.22
102.65	3	40.41
103.50	4	40.75
104.00	5	40.94
105.80	10	41.65
106.90	15	42.09
107.60	20	42.36
108.30	25	42.64
108.80	30	42.83
109.50	35	43.11
110.20	40	43.39
110.90	45	43.66
111.40	50	43.86
112.00	55	44.09
112.60	60	44.33
113.20	65	44.57
113.80	70	44.80
114.80	75	45.20
115.50	80	45.47
116.90	85	46.02
118.20	90	46.54
120.20	95	47.32
120.90	96	47.60
121.80	97	47.95
123.20	98	48.50
123.80	99	48.74

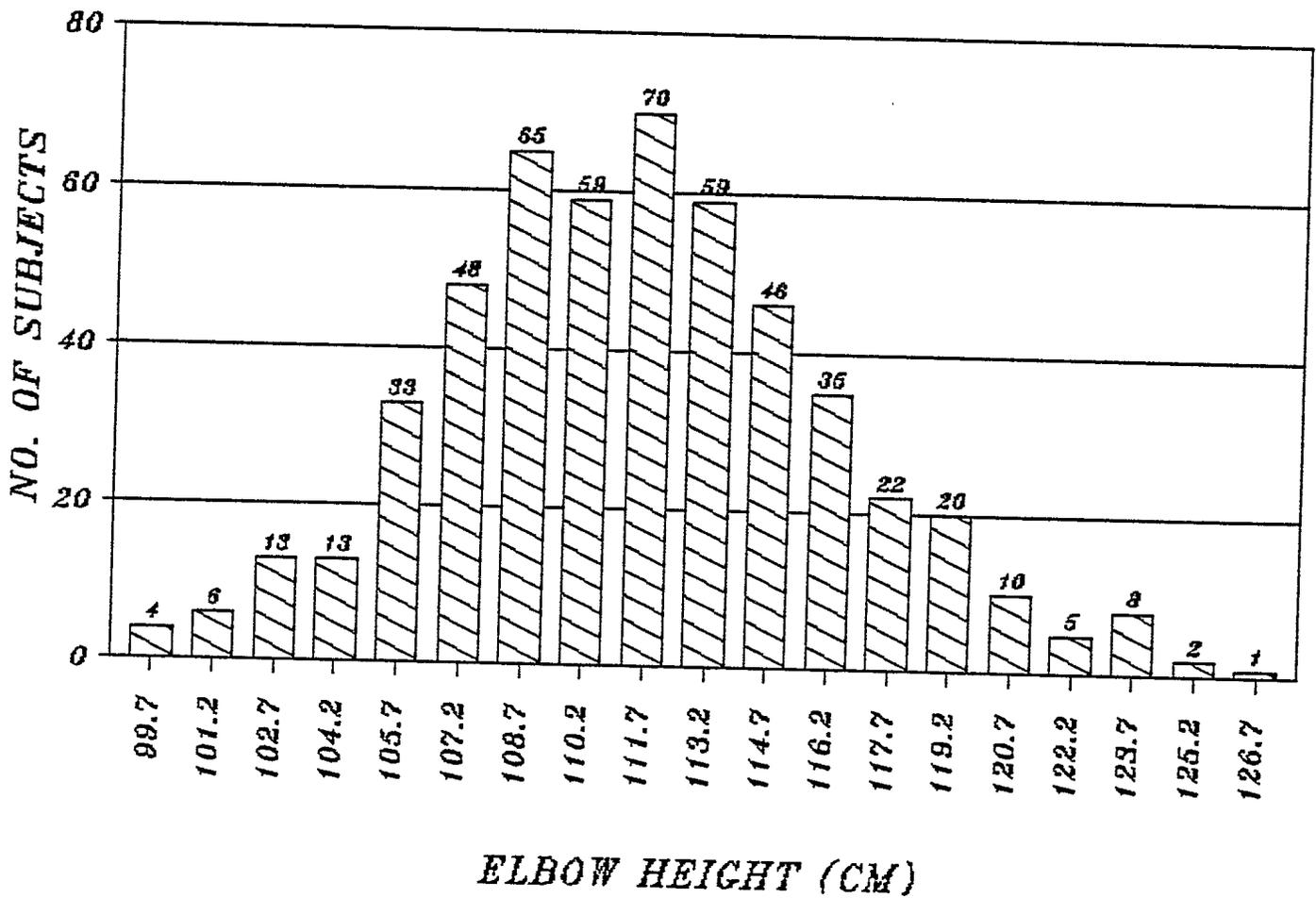


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
99.800	MINIMUM VALUE	39.291
126.900	MAXIMUM VALUE	49.961
27.100	RANGE	10.669
111.655	MEAN	43.958
4.835	STANDARD DEVIATION	1.903
0.212	STANDARD ERROR (SEM)	0.084
23.374	VARIANCE	3.623
0.290	SKEWNESS	0.290
0.030	KURTOSIS	0.030

# Frequency Histogram For Elbow Height

MIN = 99.8    MAX = 126.9

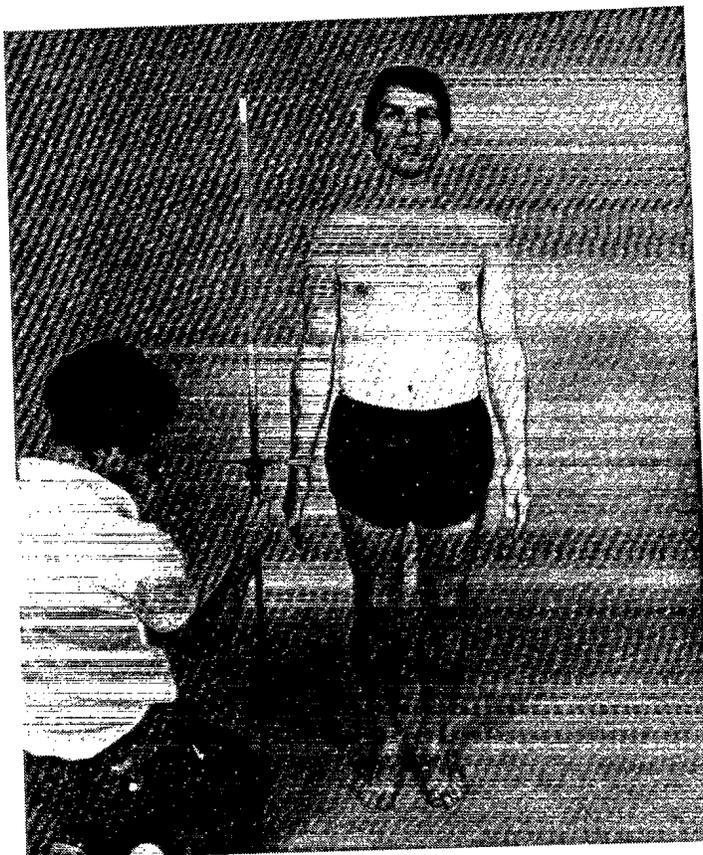


WRIST HEIGHT (STANDING): (Also called Stylium Height):

Subject stands erect, his arms hanging naturally at his sides. Measure the vertical distance from the standing surface to the stylium landmark on the right wrist.

PERCENTILE TABLE

CM.	%ILE	IN.
78.70	1	30.98
79.35	2	31.24
80.05	3	31.52
80.40	4	31.65
81.10	5	31.93
82.60	10	32.52
83.30	15	32.80
84.00	20	33.07
84.60	25	33.31
85.20	30	33.54
85.70	35	33.74
86.30	40	33.98
87.00	45	34.25
87.50	50	34.45
87.90	55	34.61
88.30	60	34.76
88.80	65	34.96
89.70	70	35.31
90.20	75	35.51
91.20	80	35.91
91.90	85	36.18
93.10	90	36.65
94.50	95	37.20
95.70	96	37.68
96.50	97	37.99
96.95	98	38.17
98.60	99	38.82

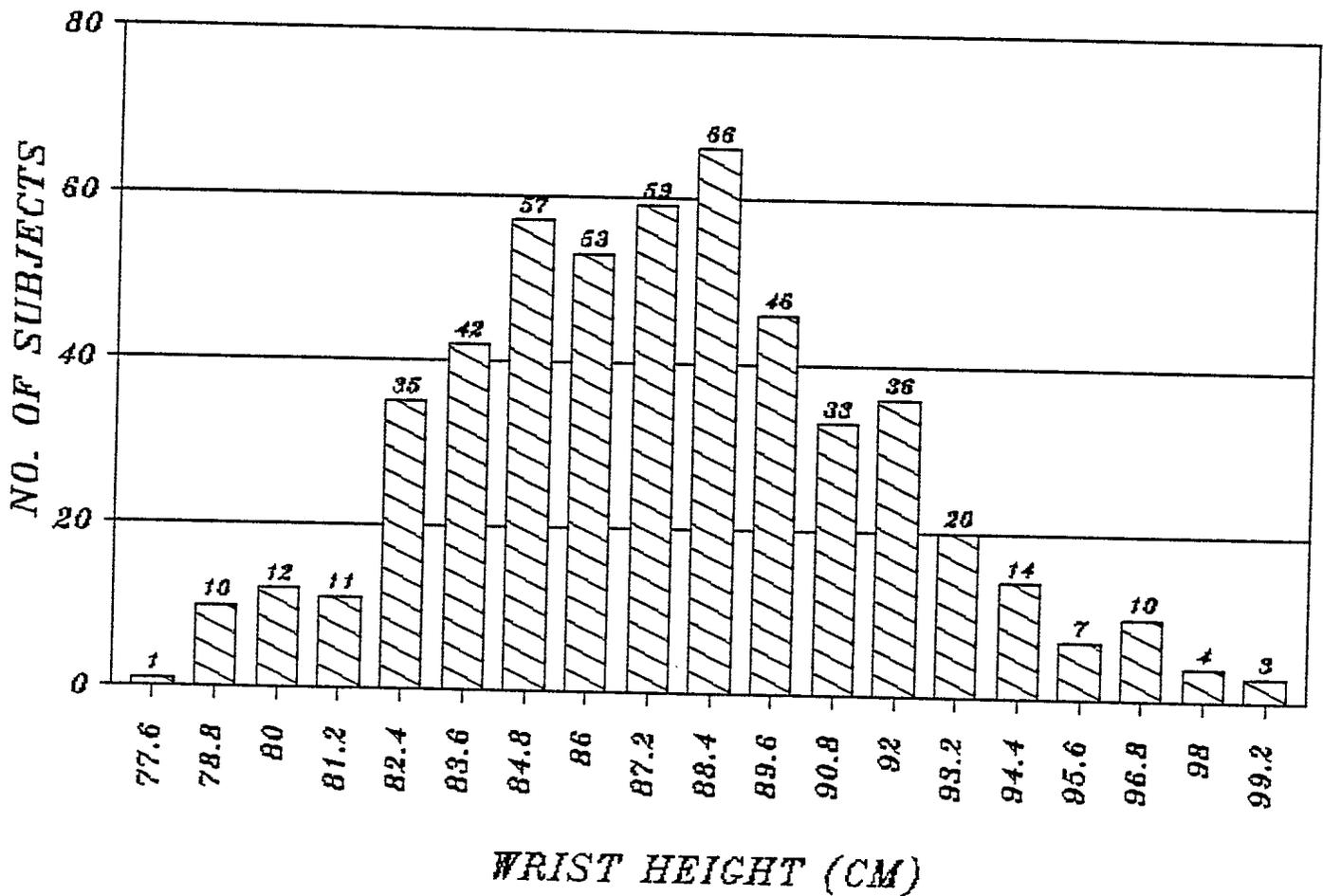


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
77.000	MINIMUM VALUE	30.315
99.100	MAXIMUM VALUE	39.016
22.100	RANGE	8.701
87.578	MEAN	34.480
4.132	STANDARD DEVIATION	1.627
0.181	STANDARD ERROR (SEM)	0.071
17.071	VARIANCE	2.646
0.255	SKEWNESS	0.255
-0.123	KURTOSIS	-0.123

# Frequency Histogram For Wrist Height

MIN = 77.0 MAX = 99.1

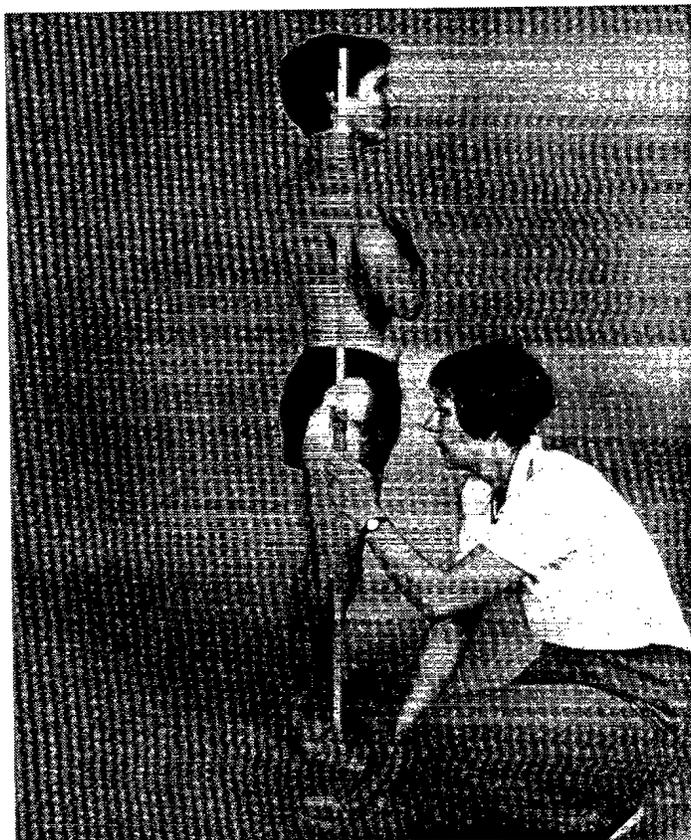


TROCHANTERIC HEIGHT:

Subject stands erect. Measure the vertical distance from the standing surface to the trochanteric landmark on the right hip.

PERCENTILE TABLE

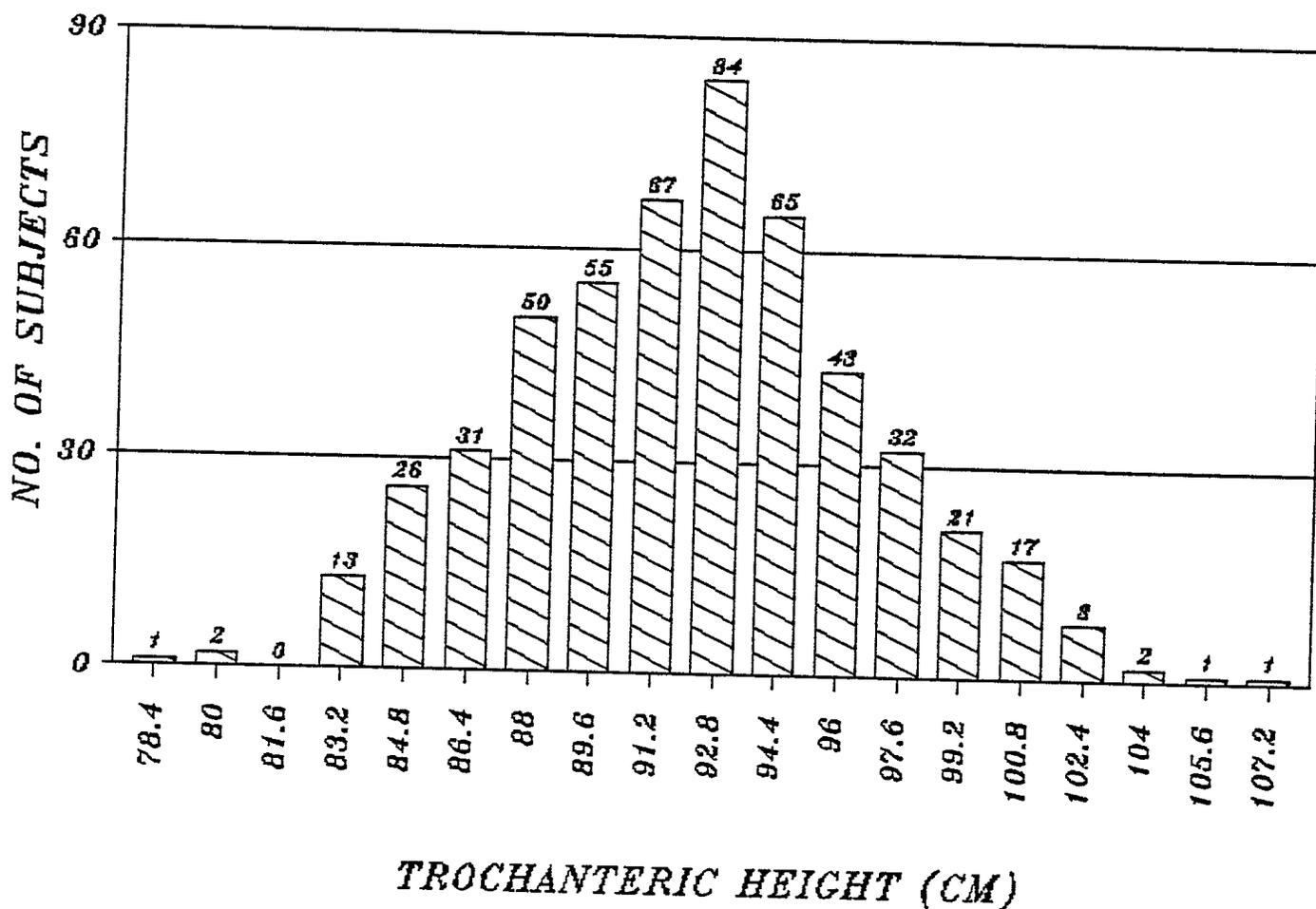
CM.	%ILE	IN.
82.80	1	32.60
83.30	2	32.80
83.95	3	33.05
84.40	4	33.23
84.70	5	33.35
86.30	10	33.98
87.40	15	34.41
88.40	20	34.80
89.10	25	35.08
89.90	30	35.39
90.50	35	35.63
91.30	40	35.94
91.80	45	36.14
92.30	50	36.34
92.60	55	36.46
93.10	60	36.65
93.90	65	36.97
94.50	70	37.20
95.10	75	37.44
96.00	80	37.80
97.10	85	38.23
98.10	90	38.62
100.20	95	39.45
100.70	96	39.65
100.95	97	39.74
101.80	98	40.08
103.00	99	40.55



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
78.000	MINIMUM VALUE	30.709
106.600	MAXIMUM VALUE	41.968
28.600	RANGE	11.260
92.245	MEAN	36.317
4.582	STANDARD DEVIATION	1.804
0.201	STANDARD ERROR (SEM)	0.079
20.995	VARIANCE	3.254
0.090	SKEWNESS	0.090
-0.051	KURTOSIS	-0.051

*Freq. Histogram For Trochanteric Height*  
MIN = 78.0 MAX = 106.6

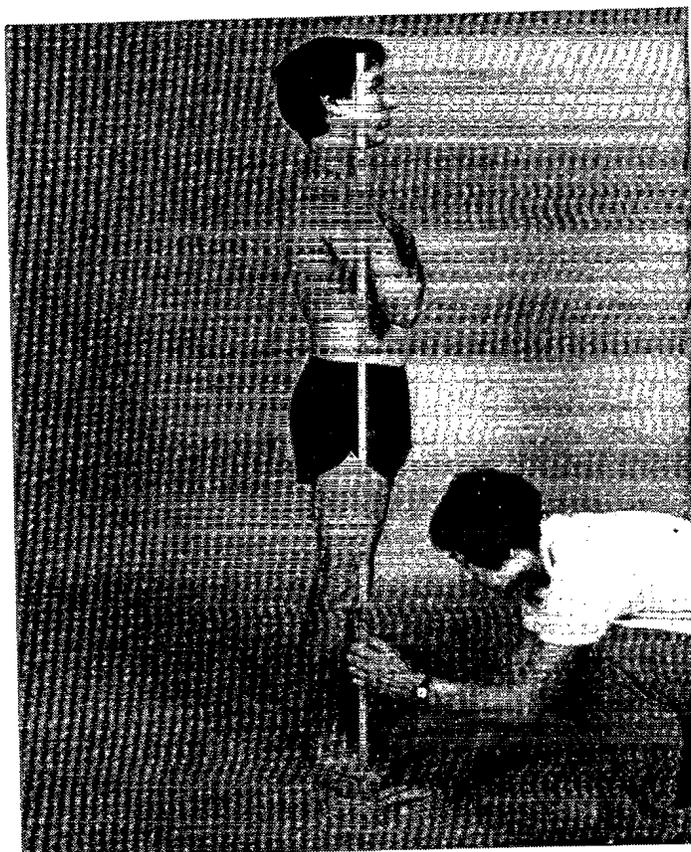


**KNEE HEIGHT:**

Subject stands erect. Measure the vertical distance from the standing surface to the lateral femoral epicondyle.

**PERCENTILE TABLE**

CM.	ZILE	IN.
44.30	1	17.44
44.80	2	17.64
45.40	3	17.87
45.70	4	17.99
45.80	5	18.03
46.50	10	18.31
47.00	15	18.50
47.40	20	18.66
47.90	25	18.86
48.20	30	18.98
48.50	35	19.09
48.90	40	19.25
49.20	45	19.37
49.60	50	19.53
49.80	55	19.61
50.20	60	19.76
50.50	65	19.88
50.90	70	20.04
51.20	75	20.16
51.70	80	20.35
52.30	85	20.59
53.20	90	20.94
54.60	95	21.50
54.60	96	21.50
55.30	97	21.77
55.85	98	21.99
56.20	99	22.13

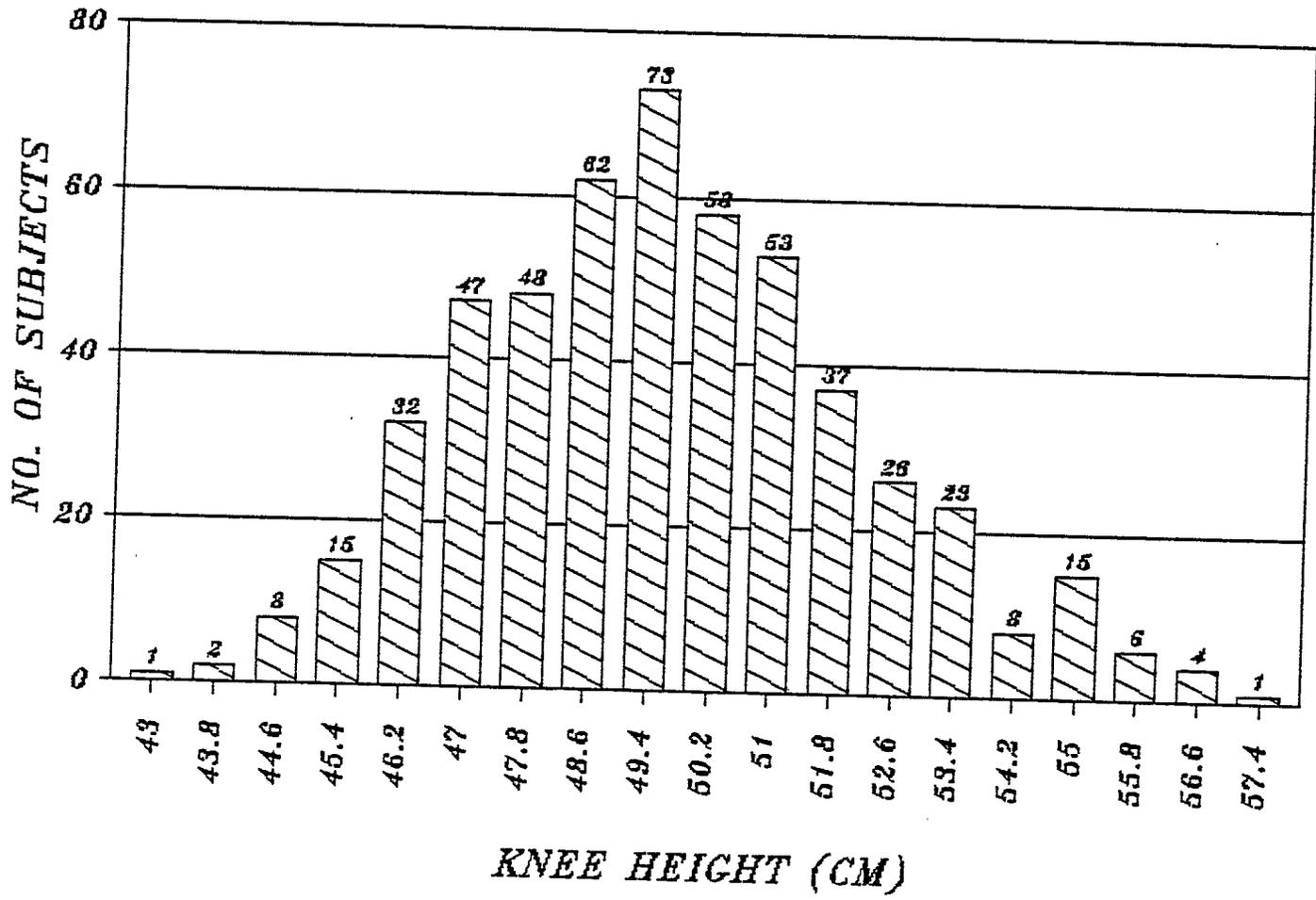


**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
42.900	MINIMUM VALUE	16.890
57.100	MAXIMUM VALUE	22.480
14.200	RANGE	5.591
49.687	MEAN	19.562
2.562	STANDARD DEVIATION	1.009
0.112	STANDARD ERROR (SEM)	0.044
6.563	VARIANCE	1.017
0.347	SKEWNESS	0.347
-0.031	KURTOSIS	-0.031

# Frequency Histogram For Knee Height

MIN = 42.9    MAX = 57.1

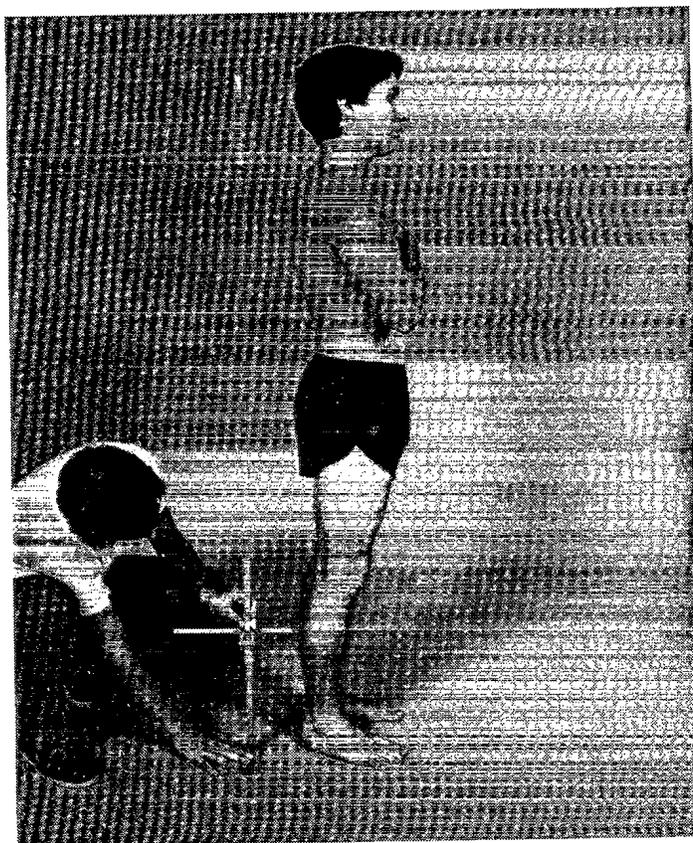


CALF HEIGHT:

Subject stands erect. Measure the vertical distance from the standing surface to the landmark indicating the maximum circumference of the right calf.

PERCENTILE TABLE

CM.	%ILE	IN.
30.00	1	11.81
30.40	2	11.97
30.80	3	12.13
31.00	4	12.20
31.20	5	12.28
31.80	10	12.52
32.30	15	12.72
32.70	20	12.87
33.10	25	13.03
33.40	30	13.15
33.70	35	13.27
33.90	40	13.35
34.30	45	13.50
34.50	50	13.58
34.80	55	13.70
35.00	60	13.78
35.30	65	13.90
35.60	70	14.02
36.00	75	14.17
36.30	80	14.29
36.80	85	14.49
37.60	90	14.80
38.50	95	15.16
38.70	96	15.24
39.00	97	15.35
39.40	98	15.51
39.90	99	15.71

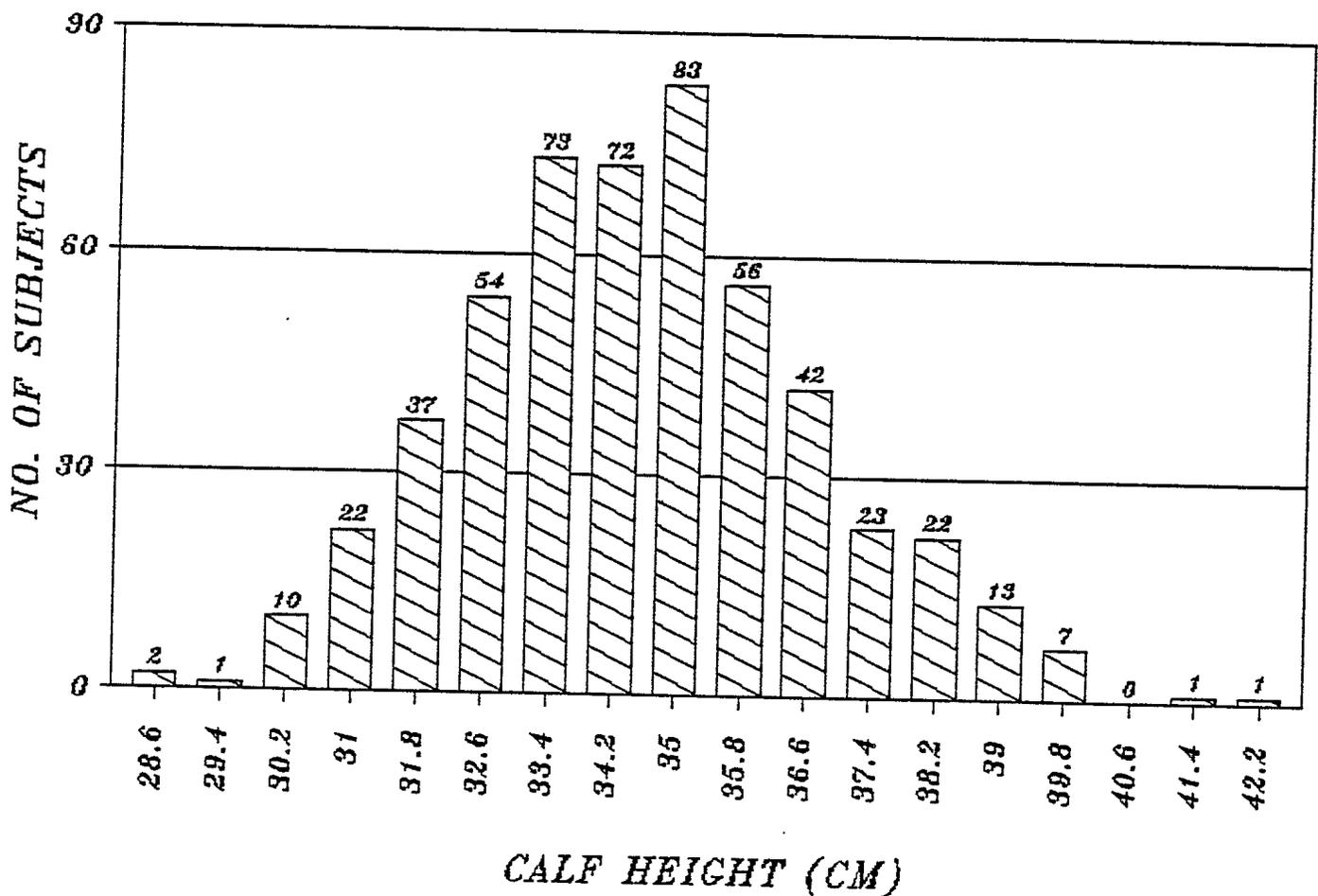


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
28.600	MINIMUM VALUE	11.260
42.300	MAXIMUM VALUE	16.654
13.700	RANGE	5.394
34.597	MEAN	13.621
2.183	STANDARD DEVIATION	0.859
0.096	STANDARD ERROR (SEM)	0.038
4.766	VARIANCE	0.739
0.280	SKEWNESS	0.280
0.032	KURTOSIS	0.032

# Frequency Histogram for Calf Height

MIN = 28.6    MAX = 42.3

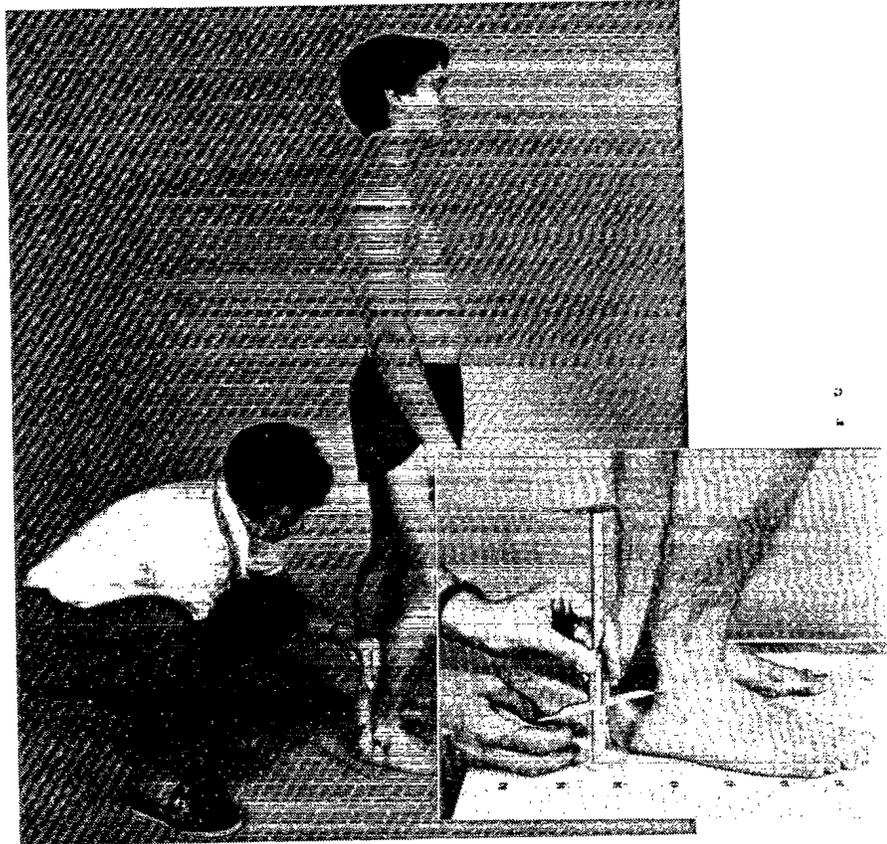


ANKLE HEIGHT:

Subject stands erect. Measure the height of the lateral malleolus from the standing surface.

PERCENTILE TABLE

CM.	%ILE	IN.
5.80	1	2.28
6.00	2	2.36
6.10	3	2.40
6.10	4	2.40
6.20	5	2.44
6.50	10	2.56
6.70	15	2.64
6.80	20	2.68
6.90	25	2.72
7.00	30	2.76
7.10	35	2.80
7.20	40	2.83
7.30	45	2.87
7.30	50	2.87
7.40	55	2.91
7.50	60	2.95
7.60	65	2.99
7.70	70	3.03
7.80	75	3.07
8.00	80	3.15
8.10	85	3.19
8.30	90	3.27
8.50	95	3.35
8.70	96	3.43
8.70	97	3.43
8.85	98	3.48
9.00	99	3.54

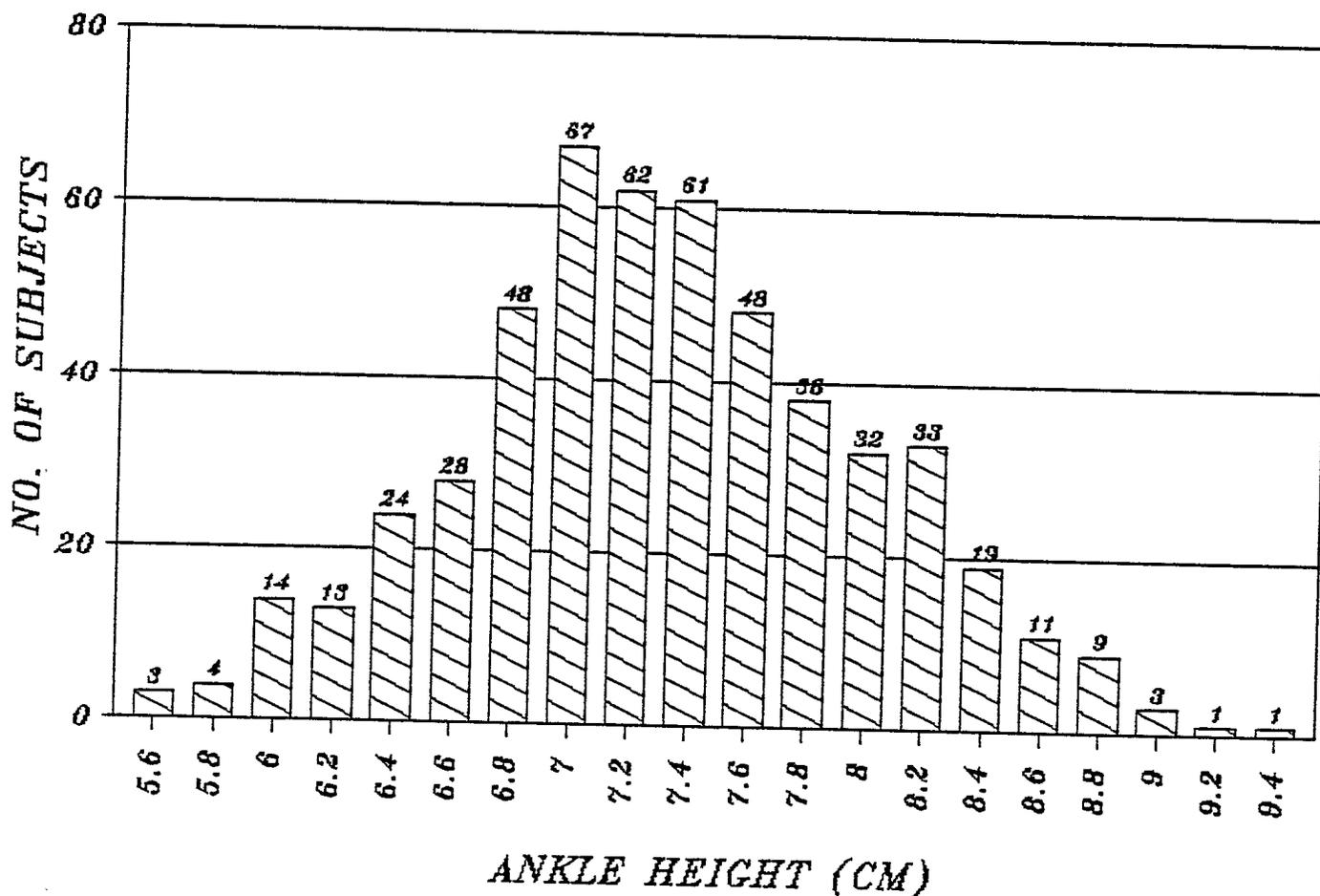


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
5.500	MINIMUM VALUE	2.165
9.400	MAXIMUM VALUE	3.701
3.900	RANGE	1.535
7.374	MEAN	2.903
0.688	STANDARD DEVIATION	0.271
0.030	STANDARD ERROR (SEM)	0.012
0.473	VARIANCE	0.073
0.113	SKEWNESS	0.113
-0.166	KURTOSIS	-0.166

# Frequency Histogram For Ankle Height

MIN = 5.5    MAX = 9.4

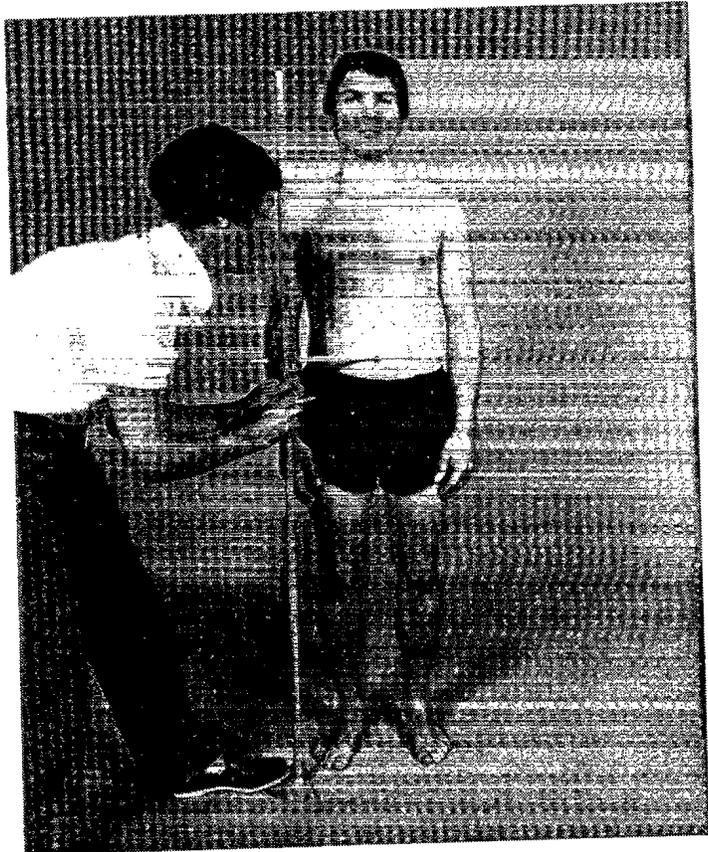


WAIST HEIGHT (OMPHALION):

Subject stands erect. Measure the vertical distance from the standing surface to the center of the umbilicus.

PERCENTILE TABLE

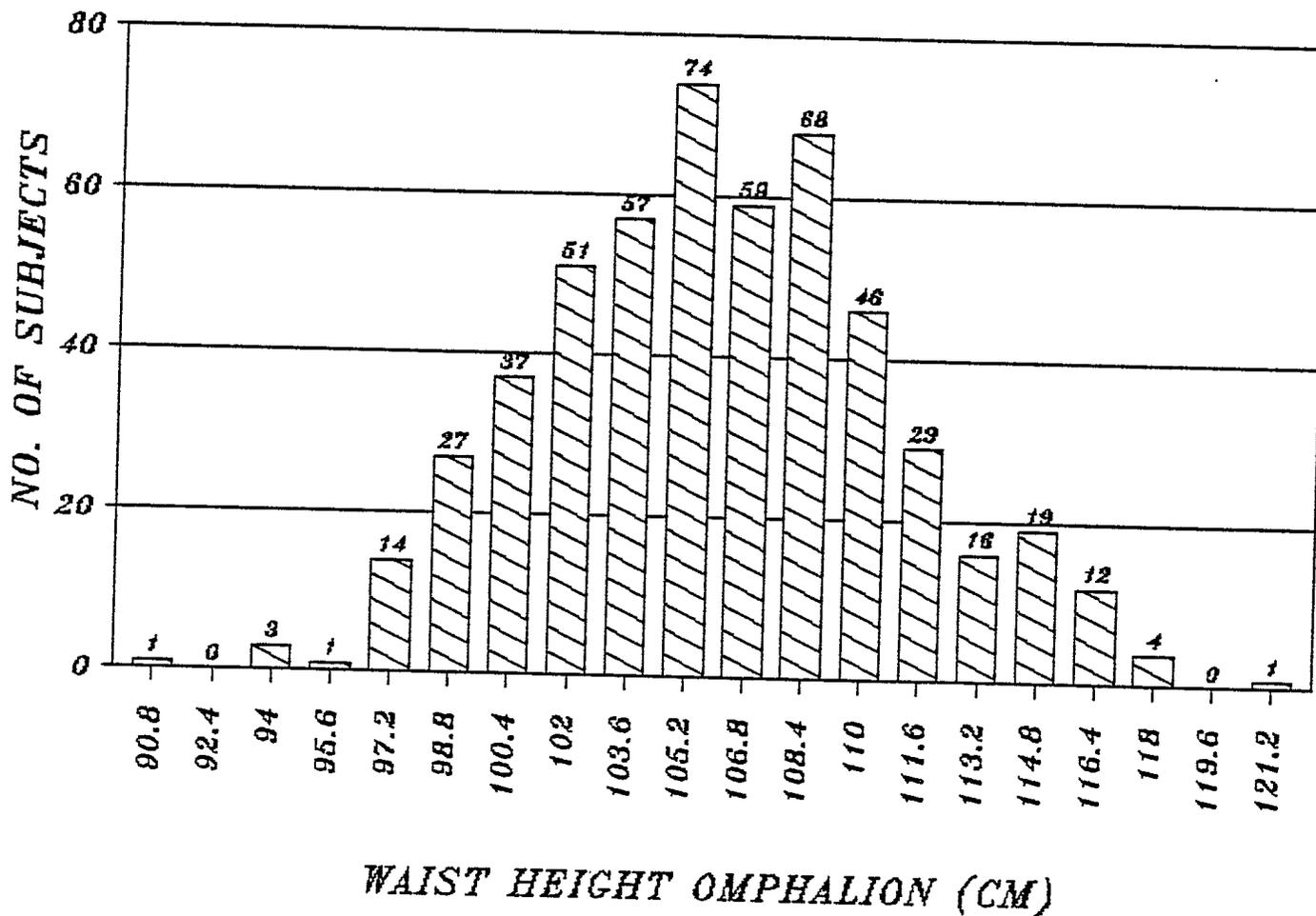
CM.	%ILE	IN.
95.30	1	37.52
97.20	2	38.27
97.60	3	38.43
98.20	4	38.66
98.50	5	38.78
99.90	10	39.33
101.10	15	39.80
102.00	20	40.16
102.70	25	40.43
103.50	30	40.75
104.30	35	41.06
104.90	40	41.30
105.40	45	41.50
106.00	50	41.73
106.50	55	41.93
107.20	60	42.20
107.80	65	42.44
108.40	70	42.68
109.10	75	42.95
110.20	80	43.39
111.00	85	43.70
112.50	90	44.29
114.50	95	45.08
114.70	96	45.16
115.95	97	45.65
116.50	98	45.87
117.60	99	46.30



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
90.100	MINIMUM VALUE	35.472
121.100	MAXIMUM VALUE	47.677
31.000	RANGE	12.205
106.121	MEAN	41.780
4.816	STANDARD DEVIATION	1.896
0.211	STANDARD ERROR (SEM)	0.083
23.190	VARIANCE	3.594
0.125	SKEWNESS	0.125
-0.114	KURTOSIS	-0.114

*Freq. Histogram For Waist Ht. Omphalion*  
 MIN = 90.1 MAX = 121.1

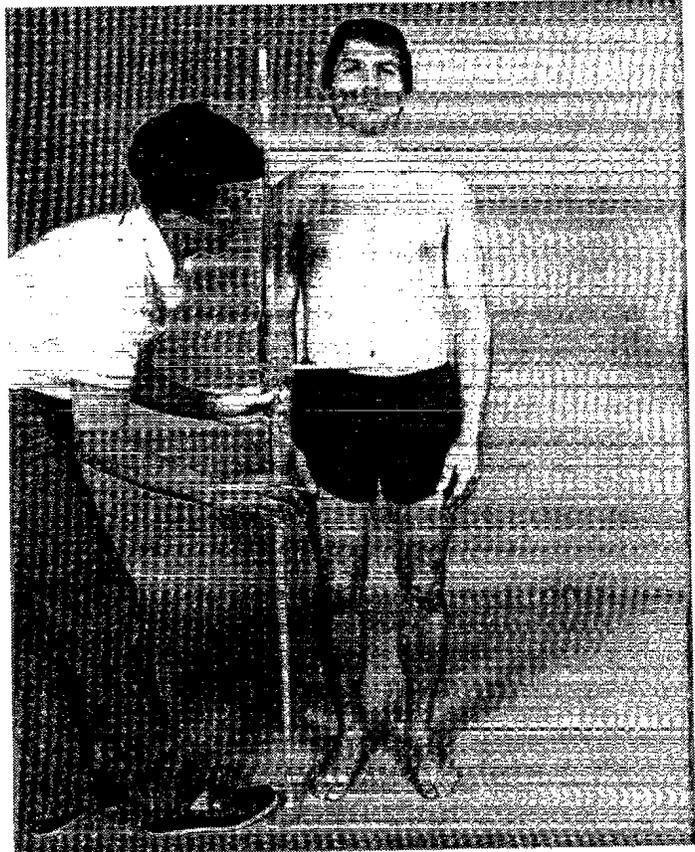


WAIST HEIGHT (NATURAL):

Subject stands erect with his head in the Frankfort Plane, heels together and weight distributed equally over both feet. The vertical distance from the floor to the natural waist landmark is measured.

PERCENTILE TABLE

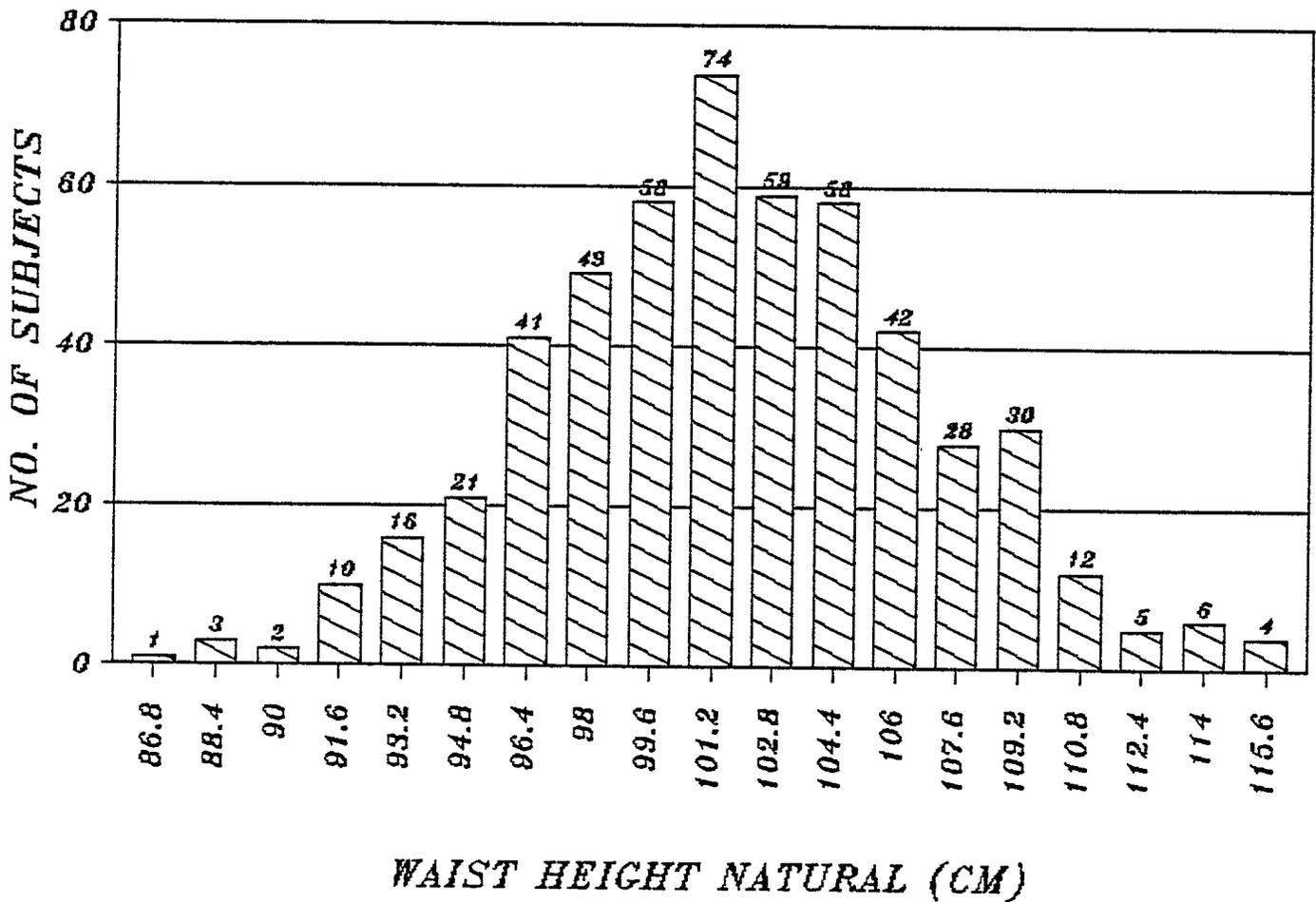
CM.	%ILE	IN.
90.50	1	35.63
91.90	2	36.18
92.40	3	36.38
93.20	4	36.69
93.60	5	36.85
95.60	10	37.64
96.60	15	38.03
97.70	20	38.46
98.40	25	38.74
99.20	30	39.06
100.00	35	39.37
100.60	40	39.61
101.10	45	39.80
101.60	50	40.00
102.20	55	40.24
102.80	60	40.47
103.70	65	40.83
104.40	70	41.10
105.20	75	41.42
106.20	80	41.81
107.20	85	42.20
108.80	90	42.83
110.30	95	43.43
110.80	96	43.62
111.75	97	44.00
113.20	98	44.57
114.40	99	45.04



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
87.100	MINIMUM VALUE	34.291
115.900	MAXIMUM VALUE	45.630
28.800	RANGE	11.339
101.870	MEAN	40.106
5.071	STANDARD DEVIATION	1.996
0.223	STANDARD ERROR (SEM)	0.088
25.715	VARIANCE	3.986
0.104	SKEWNESS	0.104
-0.065	KURTOSIS	-0.065

*Freq. Histogram For Waist Ht. Natural*  
 MIN = 87.1 MAX = 115.9



SUPRASTERNAL HEIGHT:

Subject stands erect. Measure the vertical distance from the standing surface to the suprasternal landmark.

PERCENTILE TABLE

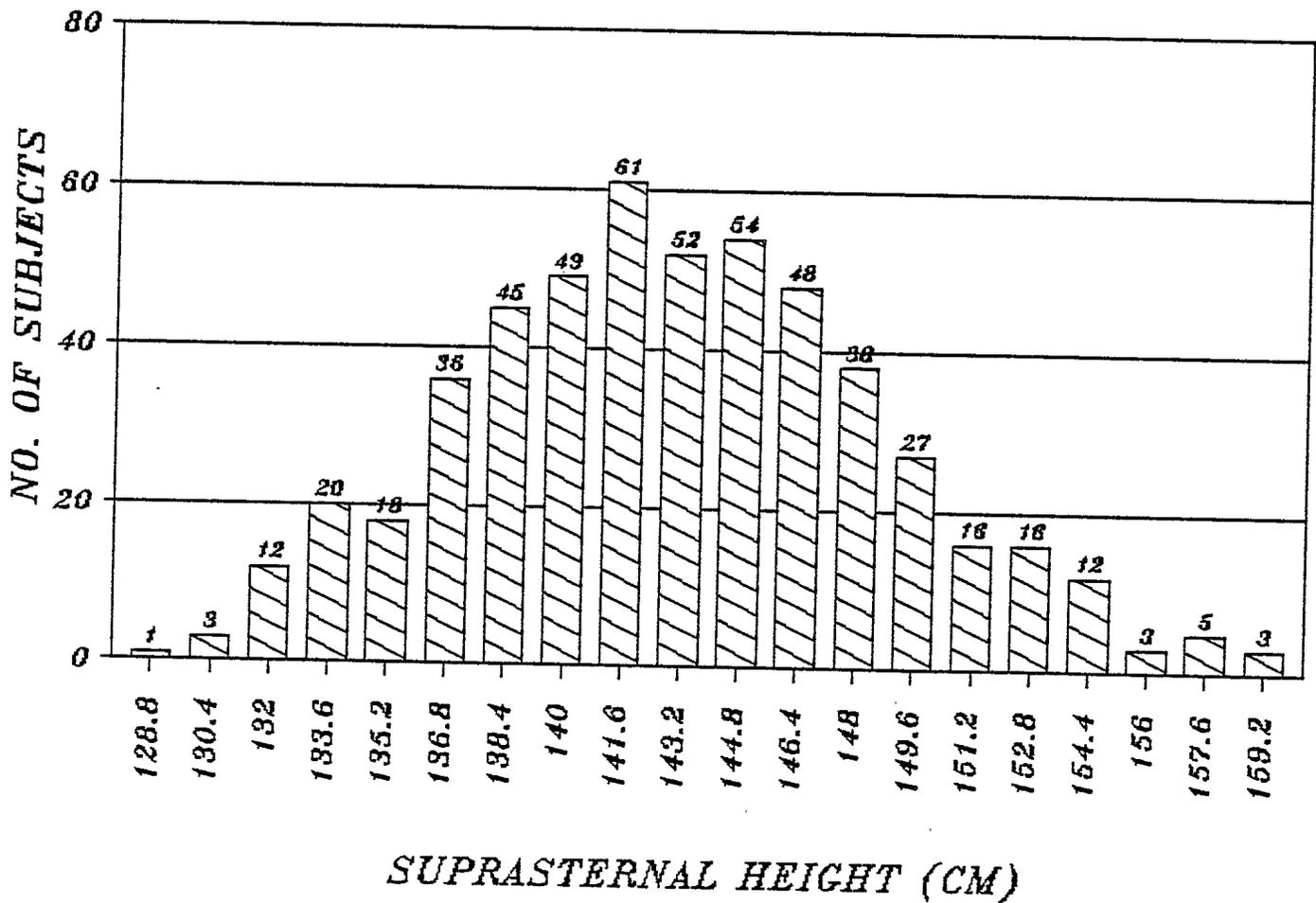
CM.	%ILE	IN.
131.60	1	51.81
132.20	2	52.05
132.80	3	52.28
133.20	4	52.44
133.60	5	52.60
136.00	10	53.54
137.00	15	53.94
138.10	20	54.37
139.00	25	54.72
139.90	30	55.08
140.80	35	55.43
141.60	40	55.75
142.10	45	55.94
142.90	50	56.26
143.60	55	56.54
144.40	60	56.85
145.20	65	57.17
146.10	70	57.52
147.00	75	57.87
148.00	80	58.27
149.00	85	58.66
150.80	90	59.37
153.40	95	60.39
153.90	96	60.59
155.00	97	61.02
155.90	98	61.38
157.70	99	62.09



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
128.700	MINIMUM VALUE	50.669
159.600	MAXIMUM VALUE	62.835
30.900	RANGE	12.165
143.152	MEAN	56.359
5.776	STANDARD DEVIATION	2.274
0.254	STANDARD ERROR (SEM)	0.100
33.362	VARIANCE	5.171
0.232	SKEWNESS	0.232
-0.182	KURTOSIS	-0.182

*Freq. Histogram For Suprasternal Height*  
 MIN = 128.7 MAX = 159.6



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SITTING MEASURES  
USING THE  
SHORTENED "FREE STANDING ANTHROPOMETER"

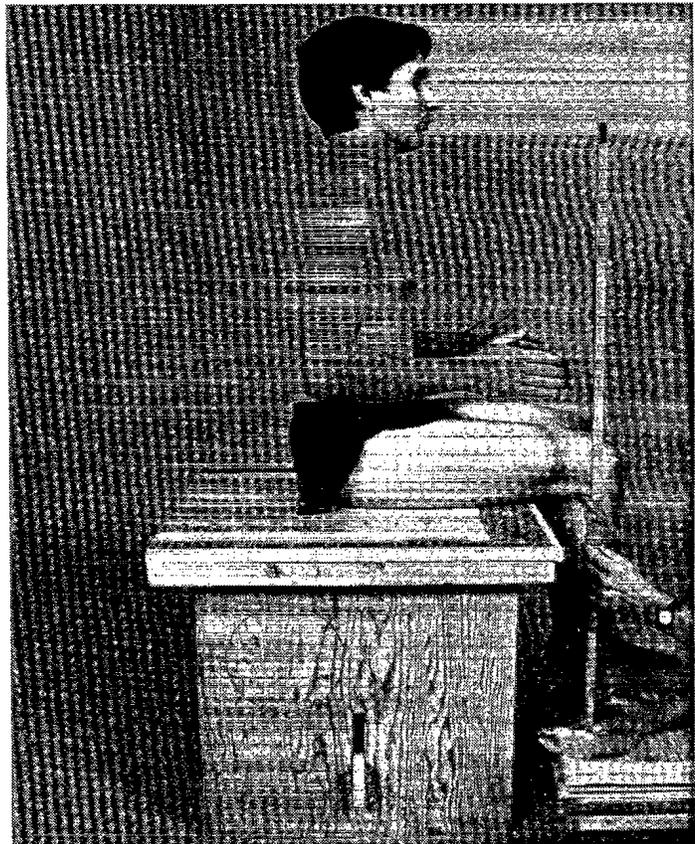
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POPLITEAL HEIGHT:

Subject sits erect, his feet resting on a surface adjusted so that his knees are bent at right angles. Measure the vertical distance from the footrest surface to the underside of the right tendon of the biceps femoris muscle where it joins the calf.

PERCENTILE TABLE

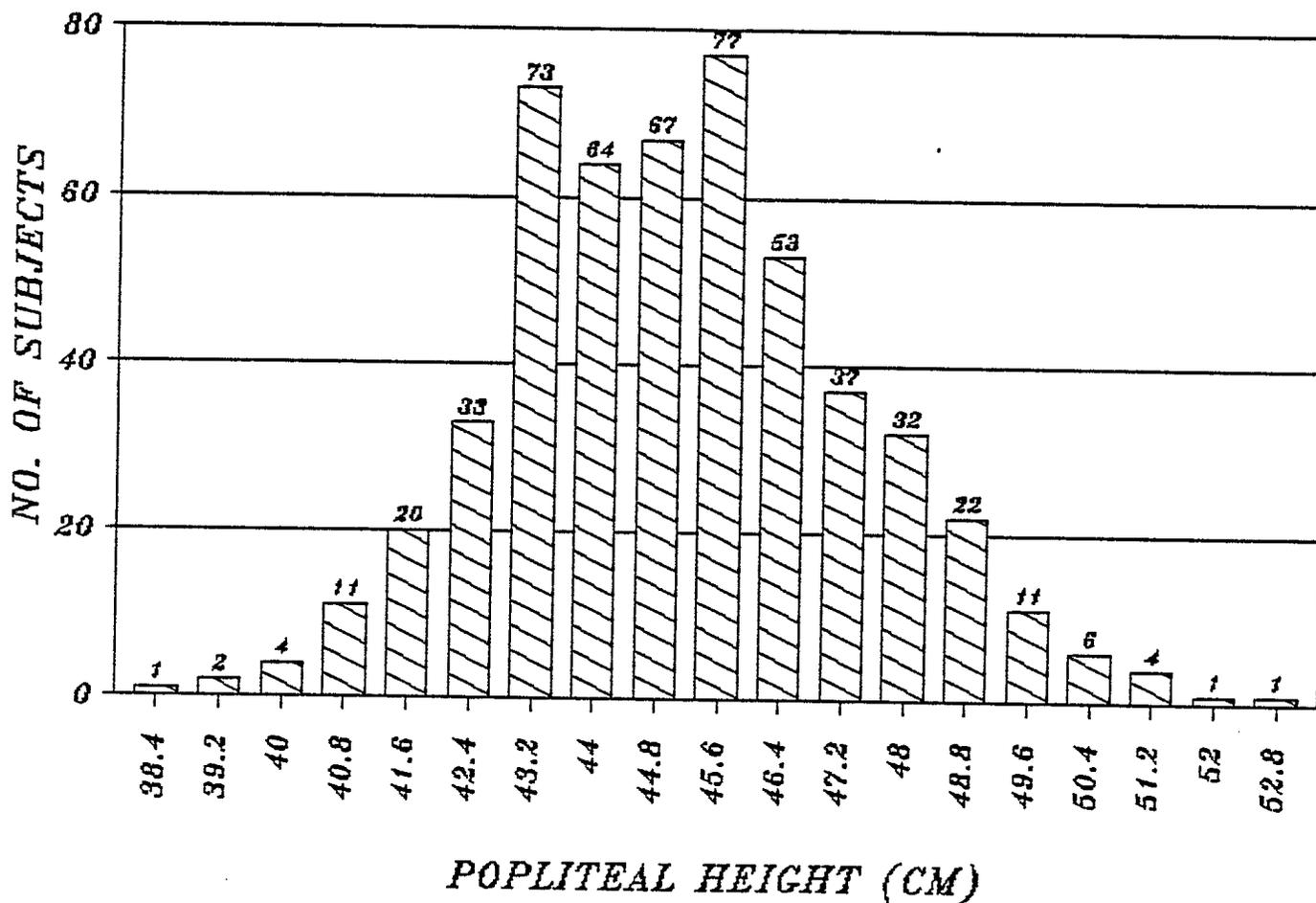
CM.	%ILE	IN.
40.00	1	15.75
41.00	2	16.14
41.00	3	16.14
41.50	4	16.34
41.60	5	16.38
42.40	10	16.69
42.90	15	16.89
43.30	20	17.05
43.50	25	17.13
43.80	30	17.24
44.20	35	17.40
44.40	40	17.48
44.70	45	17.60
45.10	50	17.76
45.30	55	17.83
45.60	60	17.95
45.90	65	18.07
46.20	70	18.19
46.60	75	18.35
47.00	80	18.50
47.60	85	18.74
48.20	90	18.98
49.10	95	19.33
49.40	96	19.45
49.70	97	19.57
50.25	98	19.78
51.10	99	20.12



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
38.100	MINIMUM VALUE	15.000
52.700	MAXIMUM VALUE	20.748
14.600	RANGE	5.748
45.148	MEAN	17.775
2.274	STANDARD DEVIATION	0.895
0.100	STANDARD ERROR (SEM)	0.039
5.172	VARIANCE	0.802
0.247	SKEWNESS	0.247
0.100	KURTOSIS	0.100

*Freq. Histogram For Popliteal Height*  
MIN = 38.1 MAX = 52.7

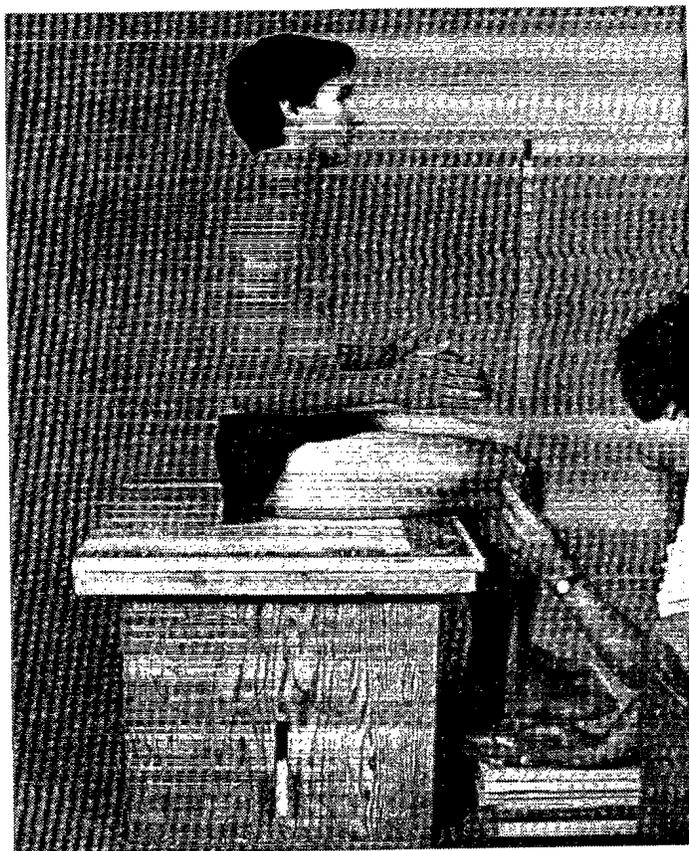


KNEE HEIGHT (SITTING):

Subject sits erect, his feet resting on a surface adjusted so that his knees are bent at right angles. Measure the vertical distance from the footrest surface to the level of the musculature just above the right knee.

PERCENTILE TABLE

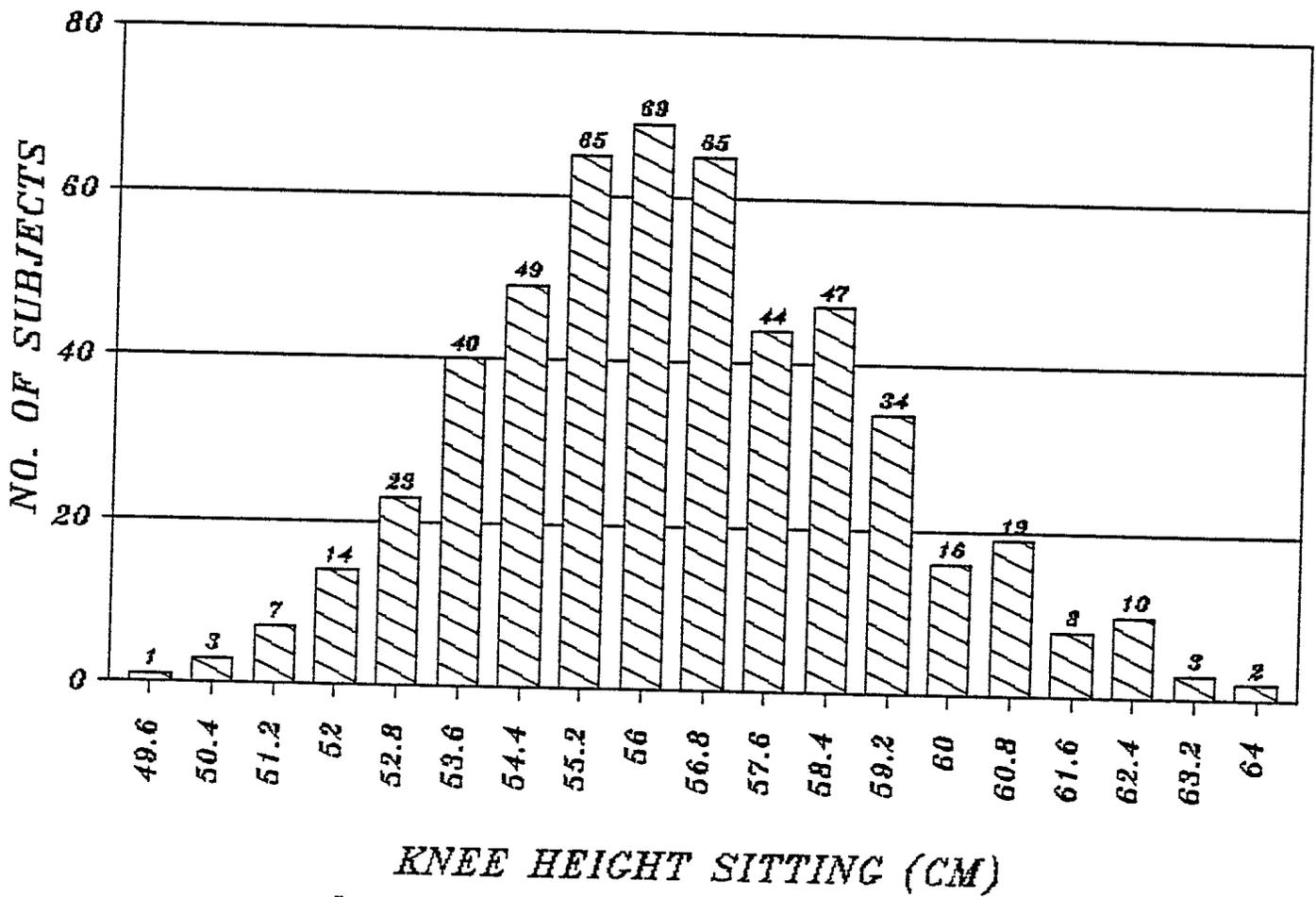
CM.	%ILE	IN.
51.10	1	20.12
51.55	2	20.30
51.75	3	20.37
52.30	4	20.59
52.50	5	20.67
53.30	10	20.98
53.90	15	21.22
54.30	20	21.38
54.70	25	21.54
55.10	30	21.69
55.40	35	21.81
55.70	40	21.93
56.00	45	22.05
56.30	50	22.17
56.60	55	22.28
56.90	60	22.40
57.30	65	22.56
57.80	70	22.76
58.20	75	22.91
58.60	80	23.07
59.10	85	23.27
59.90	90	23.58
61.20	95	24.09
61.40	96	24.17
62.05	97	24.43
62.40	98	24.57
63.30	99	24.92



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
49.500	MINIMUM VALUE	19.488
63.800	MAXIMUM VALUE	25.118
14.300	RANGE	5.630
56.500	MEAN	22.244
2.572	STANDARD DEVIATION	1.013
0.113	STANDARD ERROR (SEM)	0.044
6.617	VARIANCE	1.026
0.300	SKEWNESS	0.300
-0.065	KURTOSIS	-0.065

*Freq. Histogram For Knee Height Sitting*  
*MIN = 49.5    MAX = 63.8*

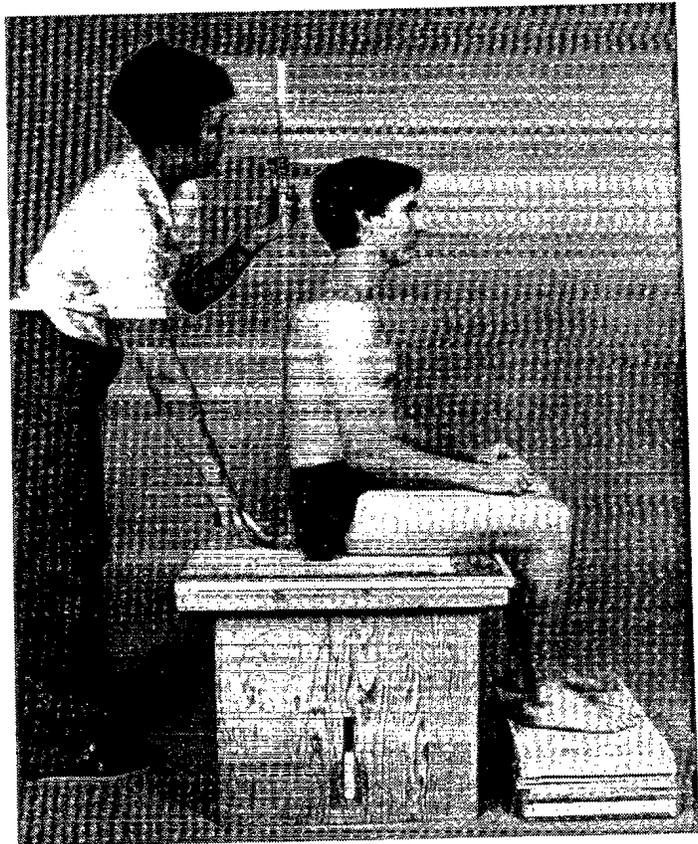


**SITTING HEIGHT, RELAXED:**

Measure the height from the sitting surface to the top of the head with the subject sitting relaxed but not slouched.

**PERCENTILE TABLE**

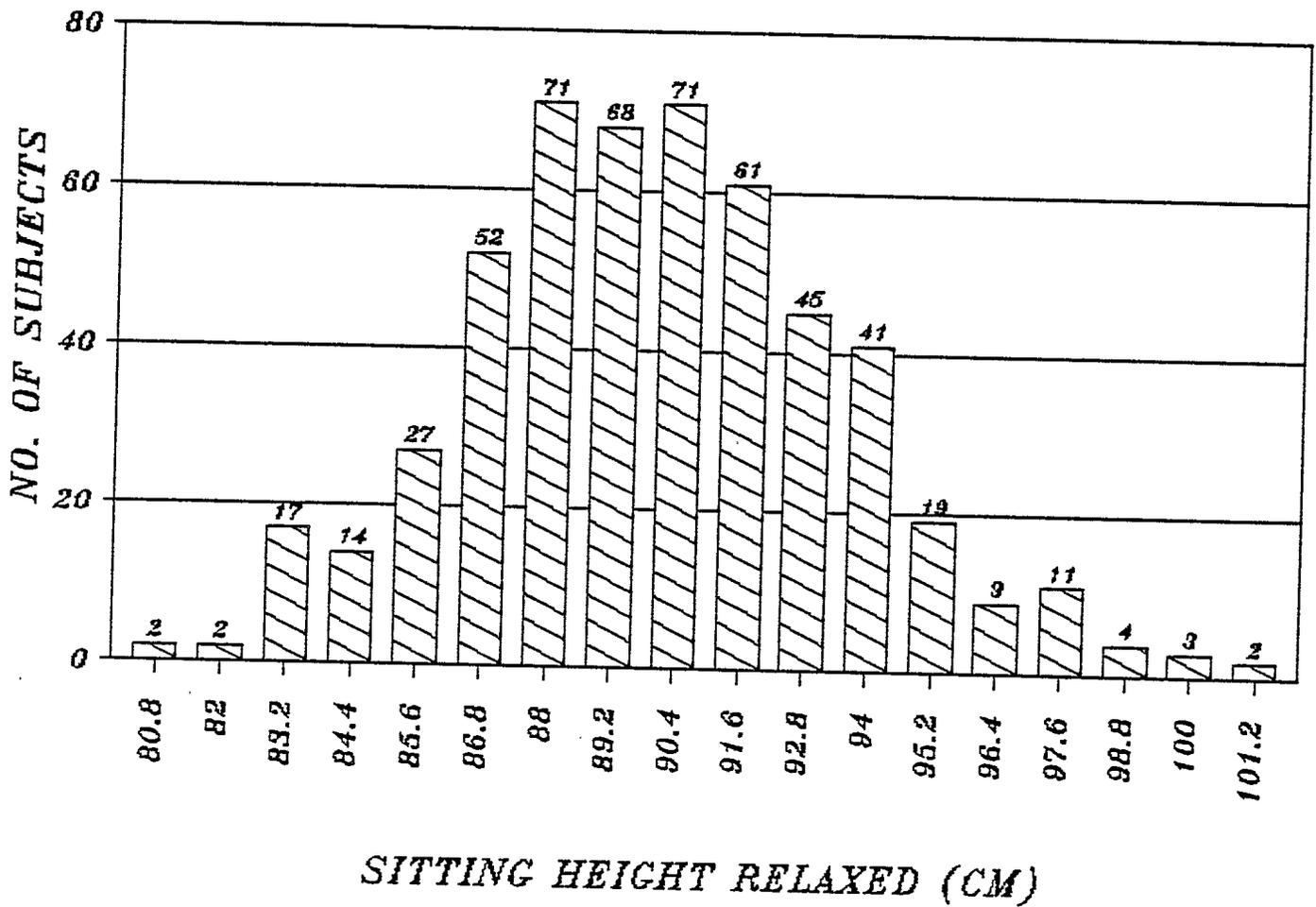
CM.	%ILE	IN.
82.70	1	32.56
83.00	2	32.68
83.55	3	32.89
83.80	4	32.99
84.40	5	33.23
85.80	10	33.78
86.70	15	34.13
87.20	20	34.33
87.90	25	34.61
88.30	30	34.76
88.60	35	34.88
89.00	40	35.04
89.50	45	35.24
90.00	50	35.43
90.40	55	35.59
90.90	60	35.79
91.40	65	35.98
91.80	70	36.14
92.40	75	36.38
93.10	80	36.65
93.70	85	36.89
94.50	90	37.20
96.40	95	37.95
96.90	96	38.15
97.85	97	38.52
98.15	98	38.64
99.60	99	39.21



**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
80.400	MINIMUM VALUE	31.653
101.000	MAXIMUM VALUE	39.764
20.600	RANGE	8.110
90.143	MEAN	35.489
3.515	STANDARD DEVIATION	1.384
0.154	STANDARD ERROR (SEM)	0.061
12.353	VARIANCE	1.915
0.228	SKEWNESS	0.228
0.162	KURTOSIS	0.162

*Freq. Histogram For Sitting Ht. Relaxed*  
 MIN = 80.4 MAX = 101.0

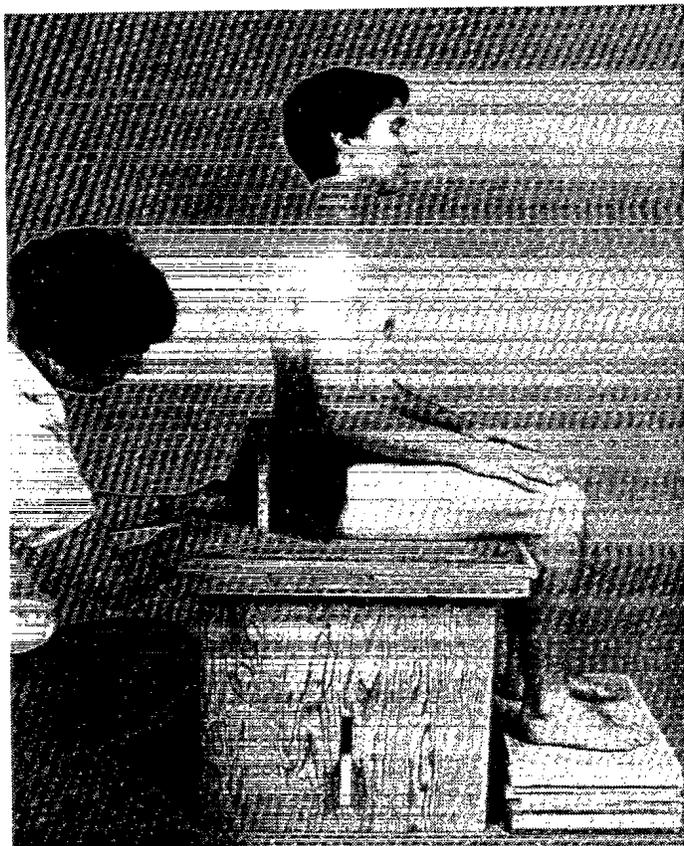


**BUTTOCK-POPLITEAL LENGTH:**

Subject sits erect, his feet resting on a surface so that the knees are bent at right angles, and with the back of the calves in contact with the edge of the table. With a wooden measuring block touching the rearmost surface of the buttocks, use the scale on the table surface to measure the horizontal distance from the most posterior protrusion of the right buttock to the back of the calf.

**PERCENTILE TABLE**

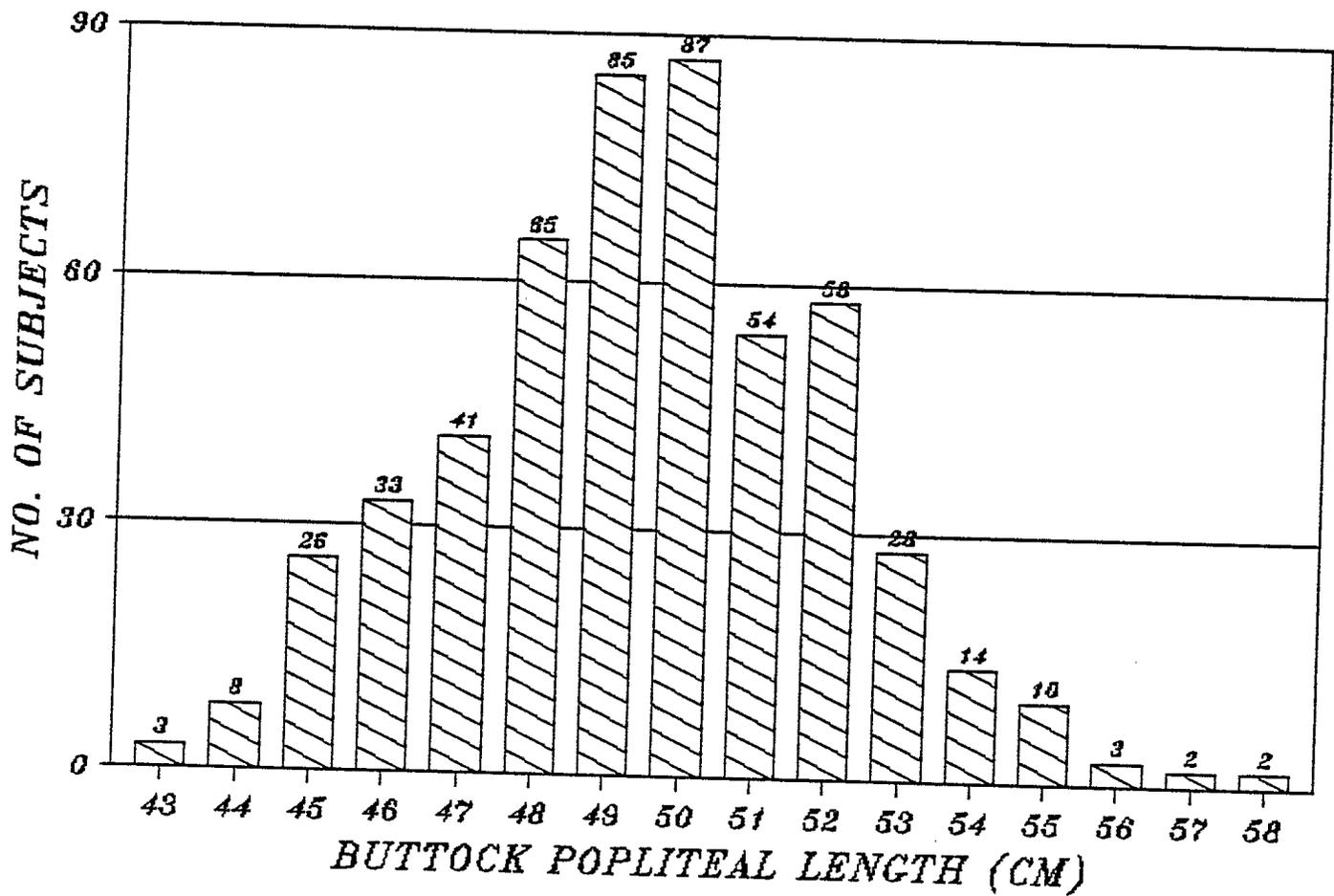
CM.	%ILE	IN.
43.70	1	17.20
44.40	2	17.48
44.95	3	17.70
45.30	4	17.83
45.30	5	17.83
46.00	10	18.11
46.80	15	18.43
47.30	20	18.62
47.80	25	18.82
48.30	30	19.02
48.60	35	19.13
49.00	40	19.29
49.30	45	19.41
49.50	50	19.49
49.90	55	19.65
50.20	60	19.76
50.40	65	19.84
50.90	70	20.04
51.40	75	20.24
51.80	80	20.39
52.30	85	20.59
52.80	90	20.79
53.70	95	21.14
54.30	96	21.38
54.90	97	21.61
55.40	98	21.81
56.00	99	22.05



**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
42.700	MINIMUM VALUE	16.811
58.500	MAXIMUM VALUE	23.031
15.800	RANGE	6.220
49.588	MEAN	19.523
2.622	STANDARD DEVIATION	1.032
0.115	STANDARD ERROR (SEM)	0.045
6.873	VARIANCE	1.065
0.139	SKEWNESS	0.139
0.042	KURTOSIS	0.042

*Freq. Histogram: Butt-Popliteal Length*  
MIN = 42.7 MAX = 58.5

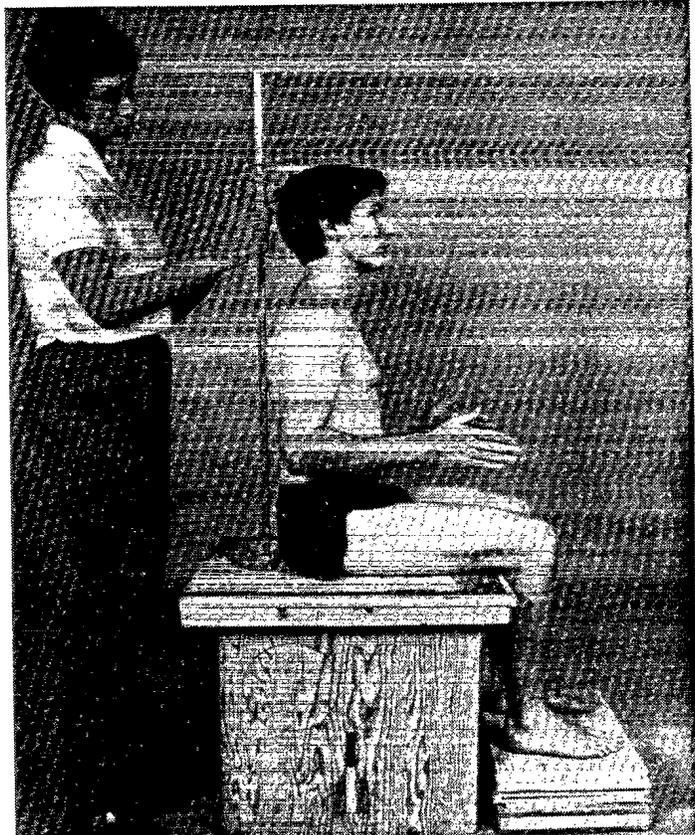


**SITTING HEIGHT:**

Subject sits erect, his head in the Frankfort Plane, and his feet resting on a surface adjusted so that his knees are bent at right angles. Measure the vertical distance from the sitting surface to the top of the head.

**PERCENTILE TABLE**

CM.	%ILE	IN.
84.90	1	33.43
85.55	2	33.68
85.95	3	33.84
86.50	4	34.06
86.80	5	34.17
88.00	10	34.65
88.90	15	35.00
89.40	20	35.20
90.00	25	35.43
90.50	30	35.63
91.00	35	35.83
91.30	40	35.94
91.70	45	36.10
92.20	50	36.30
92.50	55	36.42
92.80	60	36.54
93.40	65	36.77
93.90	70	36.97
94.50	75	37.20
95.30	80	37.52
95.90	85	37.76
96.70	90	38.07
98.60	95	38.82
99.00	96	38.98
99.40	97	39.13
99.90	98	39.33
101.30	99	39.88

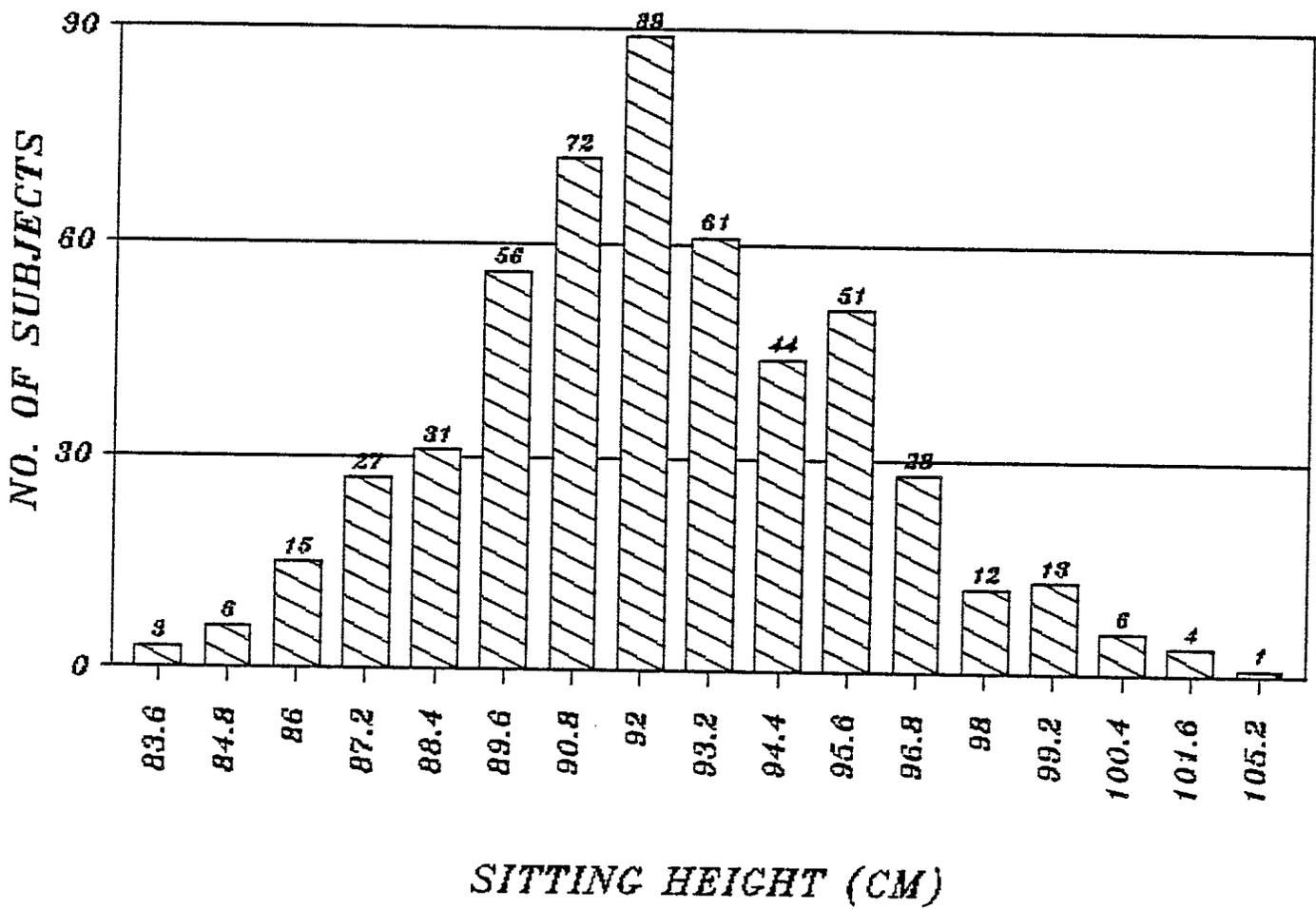


**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
83.300	MINIMUM VALUE	32.795
104.700	MAXIMUM VALUE	41.220
21.400	RANGE	8.425
92.308	MEAN	36.342
3.440	STANDARD DEVIATION	1.354
0.151	STANDARD ERROR (SEM)	0.059
11.830	VARIANCE	1.834
0.242	SKEWNESS	0.242
0.117	KURTOSIS	0.117

# Frequency Histogram For Sitting Height

MIN = 83.3    MAX = 104.7



EYE HEIGHT (SITTING):(External Canthus Height)

Subject sits erect, his head in the Frankfort Plane, his feet resting on a surface adjusted so that his knees are bent at right angles. Measure the vertical distance from the sitting surface to the outer corner of the right eye.

PERCENTILE TABLE

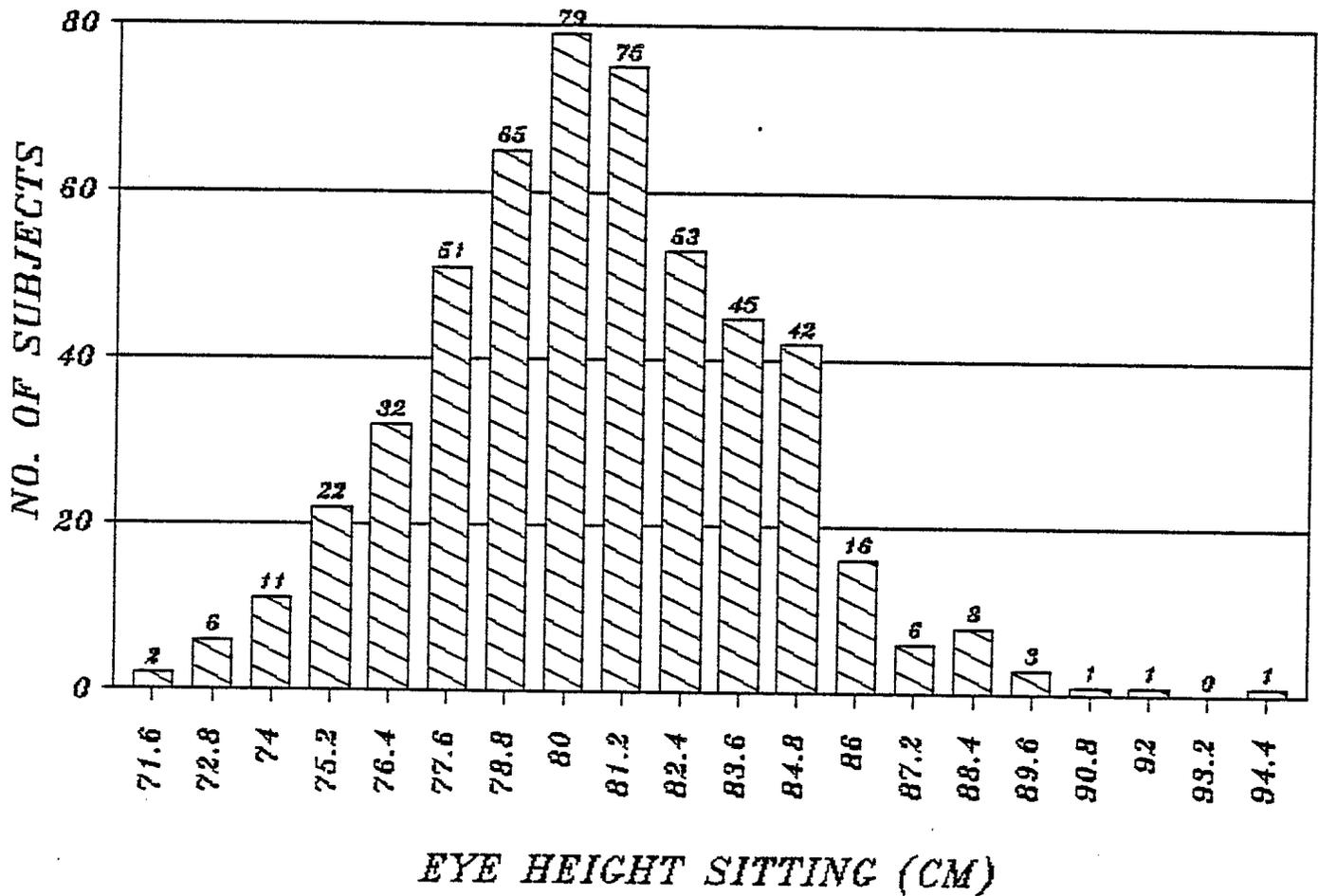
CM.	%ILE	IN.
72.90	1	28.70
73.60	2	28.98
74.10	3	29.17
74.70	4	29.41
75.40	5	29.68
76.20	10	30.00
77.30	15	30.43
77.80	20	30.63
78.40	25	30.87
78.70	30	30.98
79.20	35	31.18
79.70	40	31.38
80.20	45	31.57
80.50	50	31.69
80.90	55	31.85
81.50	60	32.09
81.80	65	32.20
82.30	70	32.40
82.80	75	32.60
83.40	80	32.83
84.30	85	33.19
85.10	90	33.50
86.30	95	33.98
86.60	96	34.09
87.55	97	34.47
88.30	98	34.76
89.60	99	35.28



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
71.100	MINIMUM VALUE	27.992
94.100	MAXIMUM VALUE	37.047
23.000	RANGE	9.055
80.636	MEAN	31.746
3.430	STANDARD DEVIATION	1.351
0.151	STANDARD ERROR (SEM)	0.059
11.768	VARIANCE	1.824
0.233	SKEWNESS	0.233
0.321	KURTOSIS	0.321

*Freq. Histogram For Eye Height Sitting*  
 MIN = 71.1 MAX = 94.1

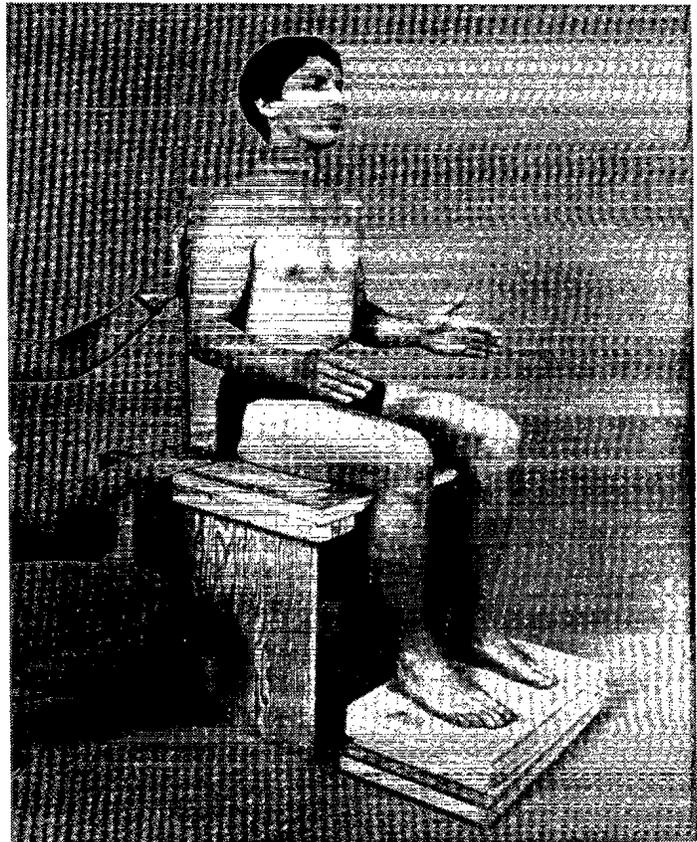


ACROMIAL HEIGHT (SITTING):

The height of the acromion above the sitting surface.

PERCENTILE TABLE

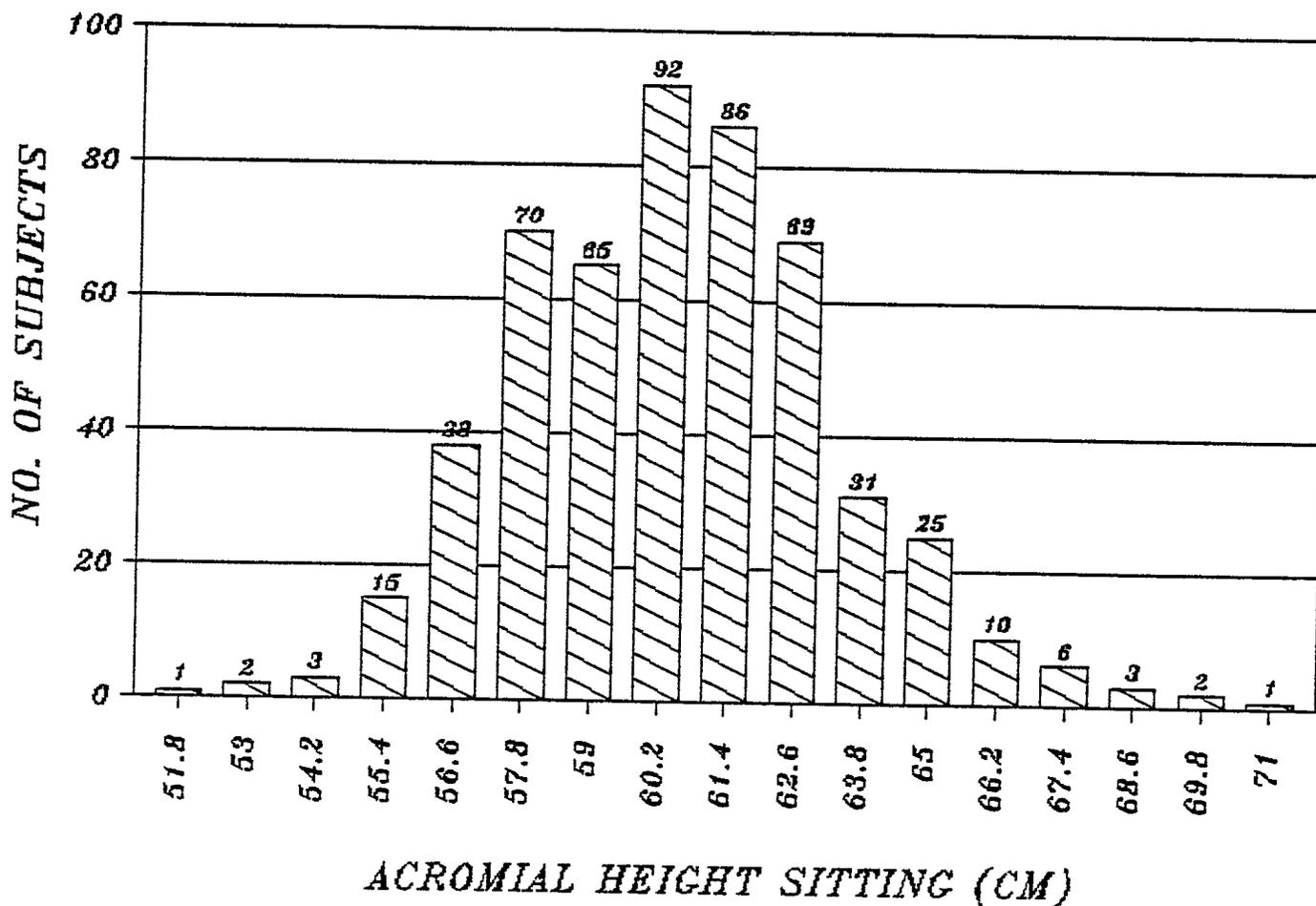
CM.	%ILE	IN.
54.40	1	21.42
55.40	2	21.81
55.80	3	21.97
56.00	4	22.05
56.30	5	22.17
57.00	10	22.44
57.60	15	22.68
58.10	20	22.87
58.50	25	23.03
59.00	30	23.23
59.40	35	23.39
59.90	40	23.58
60.20	45	23.70
60.60	50	23.86
60.80	55	23.94
61.10	60	24.06
61.50	65	24.21
61.90	70	24.37
62.30	75	24.53
62.80	80	24.72
63.30	85	24.92
64.20	90	25.28
65.40	95	25.75
65.80	96	25.91
66.20	97	26.06
67.40	98	26.54
68.20	99	26.85



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
51.600	MINIMUM VALUE	20.315
70.900	MAXIMUM VALUE	27.913
19.300	RANGE	7.598
60.566	MEAN	23.845
2.845	STANDARD DEVIATION	1.120
0.125	STANDARD ERROR (SEM)	0.049
8.092	VARIANCE	1.254
0.318	SKEWNESS	0.318
0.436	KURTOSIS	0.436

*Freq. Histogram For Acromial Ht Sitting*  
 MIN = 51.6 MAX = 70.9

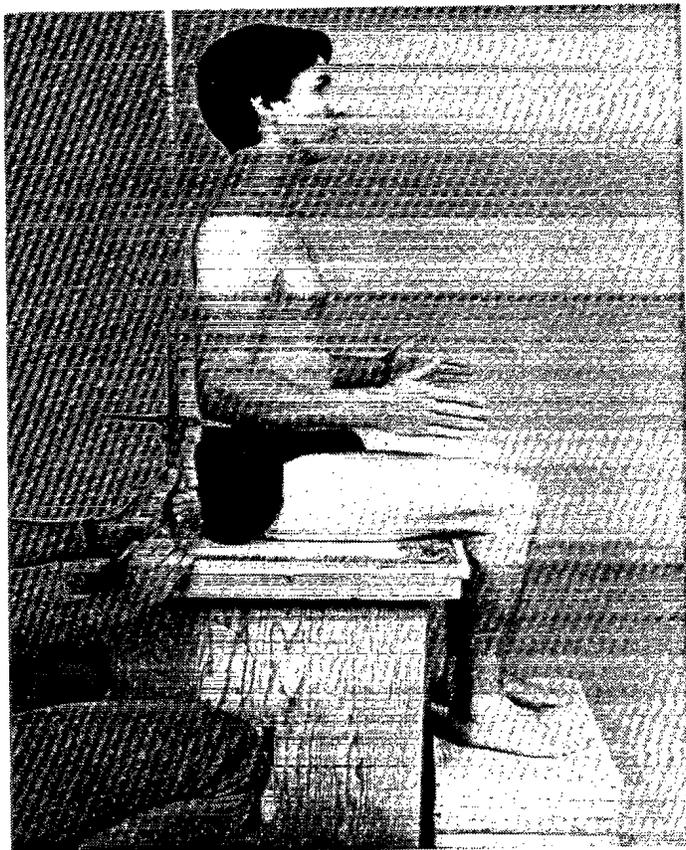


ELBOW REST HEIGHT:

The subject sits erect, his upper arms vertical, elbows resting lightly against his side and forearms extended forward horizontally. The hands and fingers are extended in the vertical plane containing the forearms. Measure the distance from lowest edge of the right olecranon to the sitting surface.

PERCENTILE TABLE

CM.	%ILE	IN.
17.80	1	7.01
18.45	2	7.26
19.05	3	7.50
19.40	4	7.64
19.80	5	7.80
20.60	10	8.11
21.20	15	8.35
21.80	20	8.58
22.10	25	8.70
22.50	30	8.86
22.80	35	8.98
23.10	40	9.09
23.40	45	9.21
23.80	50	9.37
24.00	55	9.45
24.30	60	9.57
24.60	65	9.69
25.00	70	9.84
25.30	75	9.96
25.90	80	10.20
26.40	85	10.39
26.70	90	10.51
27.70	95	10.91
27.90	96	10.98
28.50	97	11.22
29.00	98	11.42
29.90	99	11.77

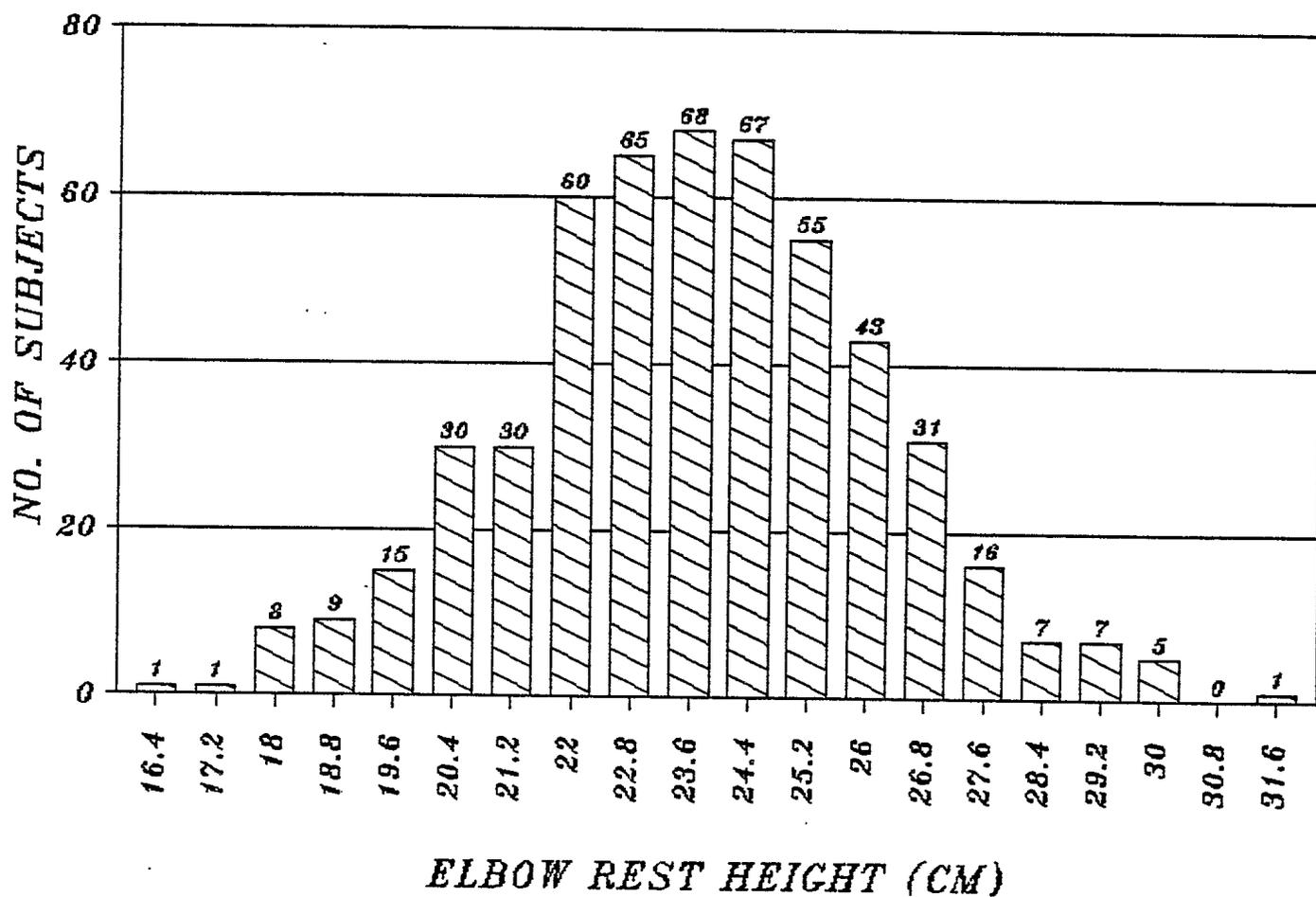


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
16.200	MINIMUM VALUE	6.378
31.300	MAXIMUM VALUE	12.323
15.100	RANGE	5.945
23.737	MEAN	9.345
2.437	STANDARD DEVIATION	0.960
0.107	STANDARD ERROR (SEM)	0.042
5.941	VARIANCE	0.921
0.016	SKEWNESS	0.016
0.071	KURTOSIS	0.071

# Freq. Histogram For Elbow Rest Height

MIN = 16.2 MAX = 31.3

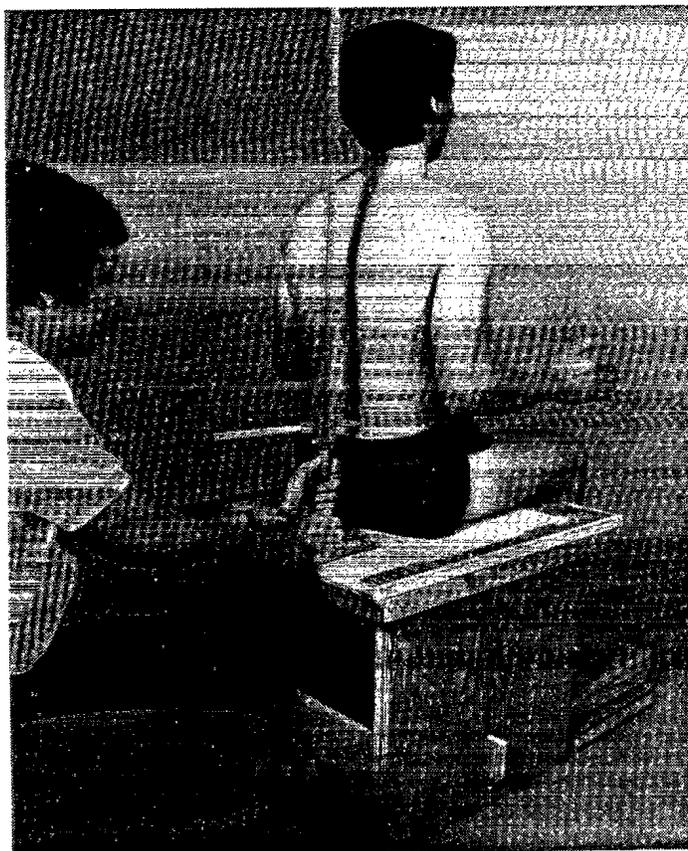


WAIST HEIGHT NATURAL (SITTING):

The subject sits erect. Measure the distance from the sitting surface to the center of the Natural Waist Landmark on the back.

PERCENTILE TABLE

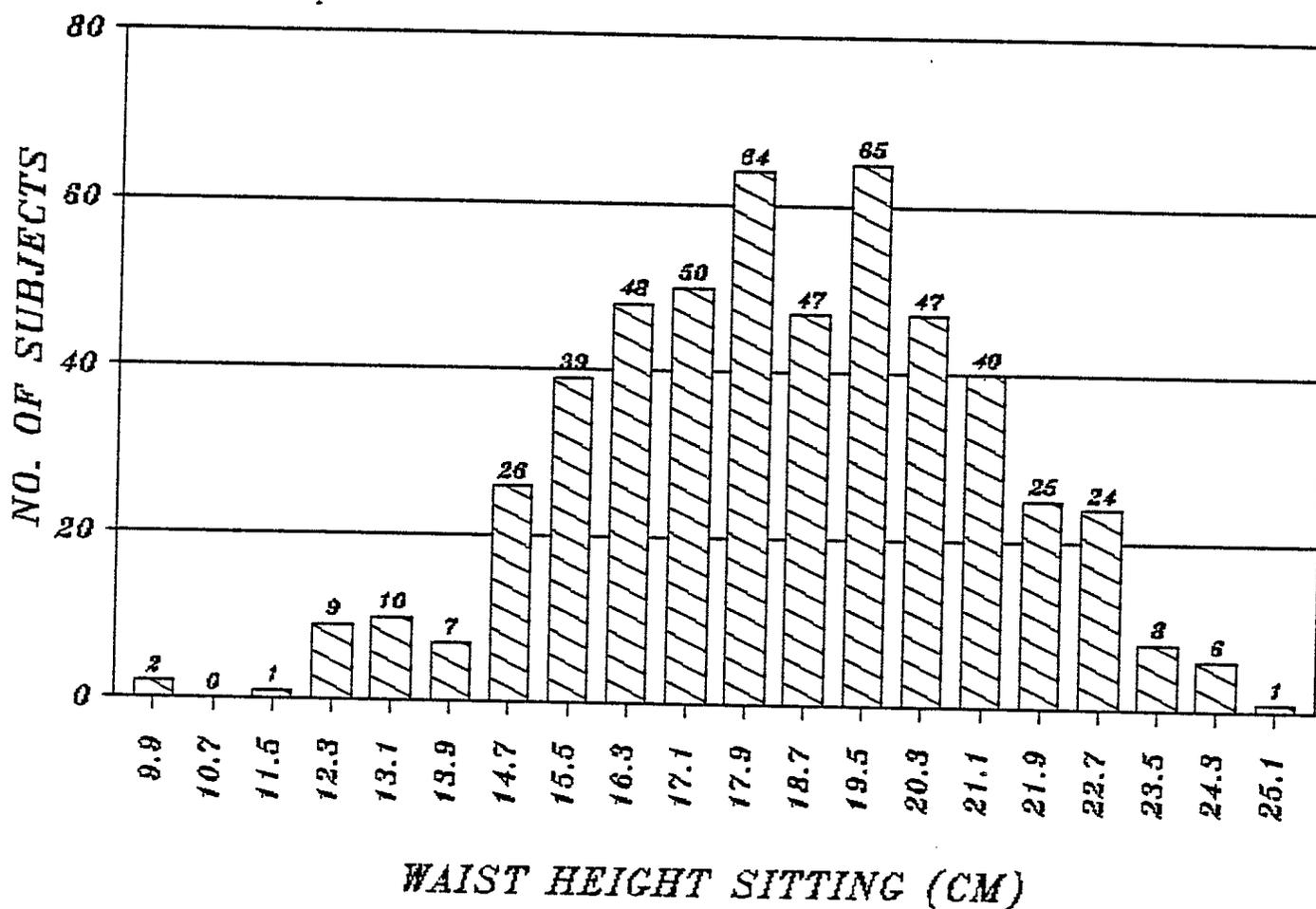
CM.	%ILE	IN.
12.10	1	4.76
12.70	2	5.00
12.95	3	5.10
13.30	4	5.24
13.80	5	5.43
15.10	10	5.94
15.70	15	6.18
16.10	20	6.34
16.50	25	6.50
17.00	30	6.69
17.40	35	6.85
17.70	40	6.97
18.00	45	7.09
18.40	50	7.24
18.90	55	7.44
19.30	60	7.60
19.60	65	7.72
19.90	70	7.83
20.40	75	8.03
20.80	80	8.19
21.20	85	8.35
21.80	90	8.58
22.80	95	8.98
22.90	96	9.02
23.15	97	9.11
23.55	98	9.27
24.30	99	9.57



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
9.500	MINIMUM VALUE	3.740
25.100	MAXIMUM VALUE	9.882
15.600	RANGE	6.142
18.415	MEAN	7.250
2.666	STANDARD DEVIATION	1.050
0.117	STANDARD ERROR (SEM)	0.046
7.108	VARIANCE	1.102
-0.166	SKEWNESS	-0.166
-0.185	KURTOSIS	-0.185

*Freq. Histogram: Waist Height Sitting*  
MIN = 9.5    MAX = 25.1

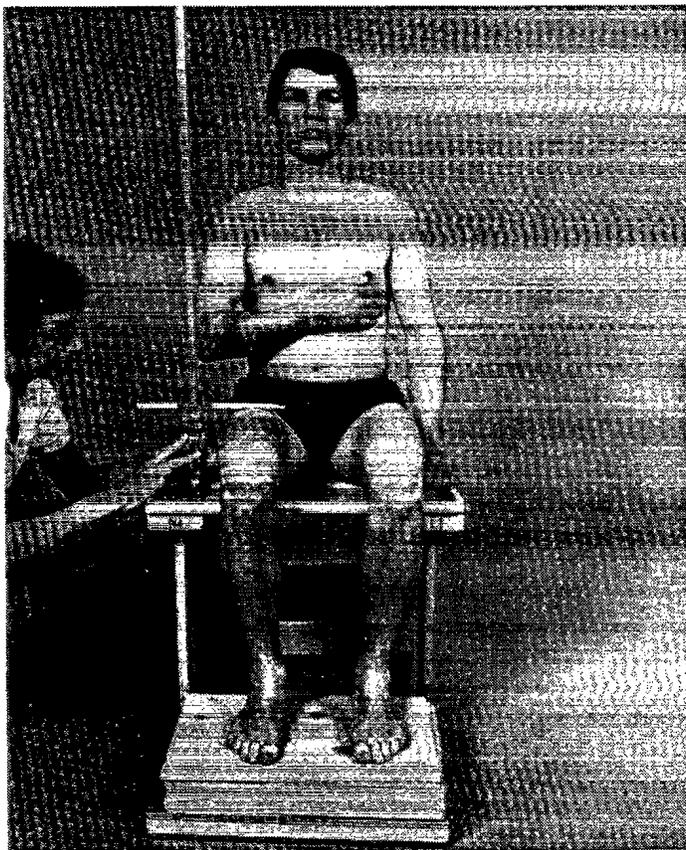


THIGH CLEARANCE :

The subject sits erect. Measure the height of the highest point of the thigh above the sitting surface.

PERCENTILE TABLE

CM.	%ILE	IN.
13.50	1	5.31
14.15	2	5.57
14.30	3	5.63
14.50	4	5.71
14.60	5	5.75
14.90	10	5.87
15.20	15	5.98
15.40	20	6.06
15.60	25	6.14
15.80	30	6.22
16.00	35	6.30
16.10	40	6.34
16.30	45	6.42
16.40	50	6.46
16.60	55	6.54
16.70	60	6.57
16.90	65	6.65
17.10	70	6.73
17.20	75	6.77
17.50	80	6.89
17.70	85	6.97
18.00	90	7.09
18.40	95	7.24
18.50	96	7.28
18.65	97	7.34
18.85	98	7.42
19.40	99	7.64

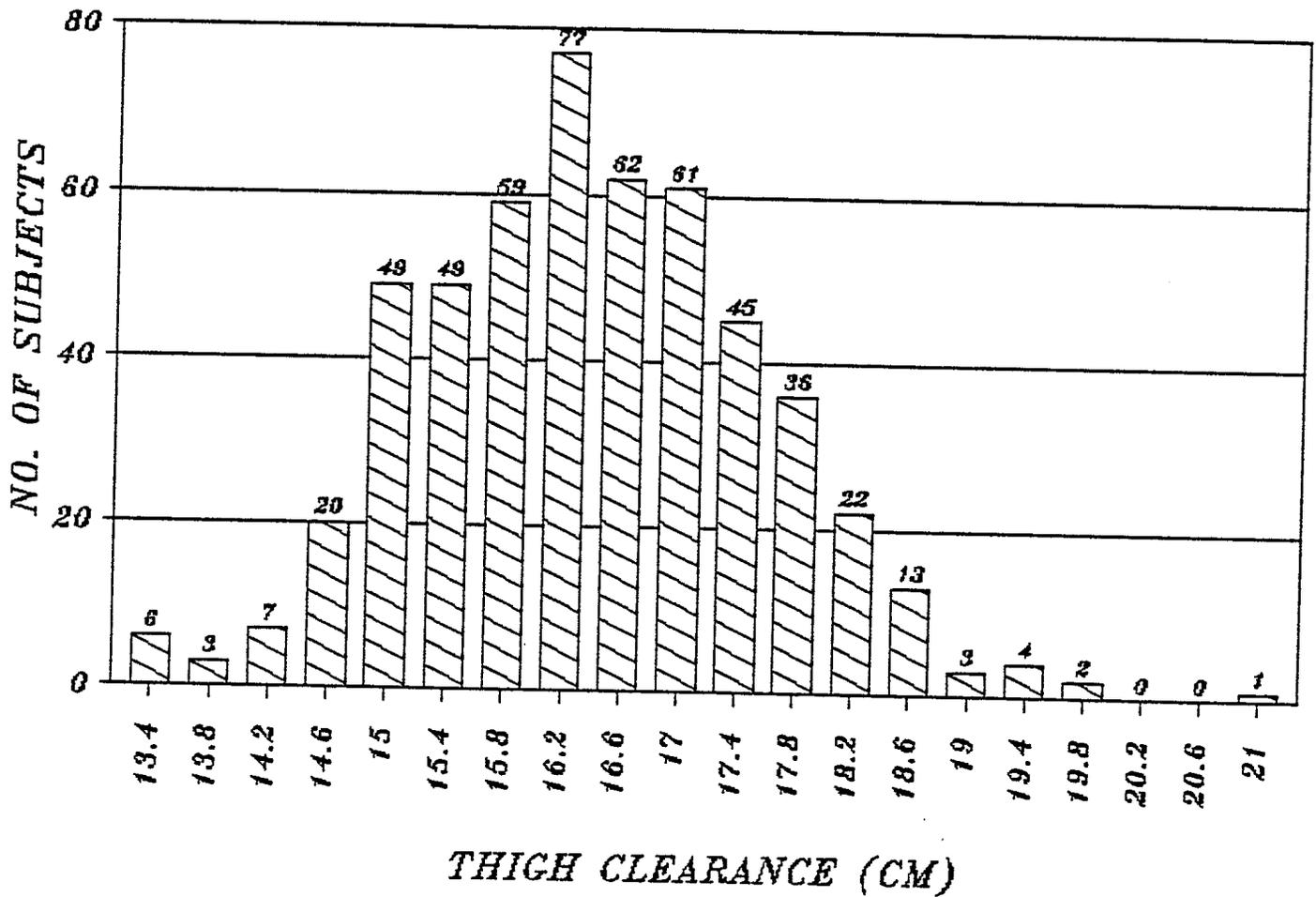


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
13.200	MINIMUM VALUE	5.197
21.100	MAXIMUM VALUE	8.307
7.900	RANGE	3.110
16.440	MEAN	6.472
1.185	STANDARD DEVIATION	0.466
0.052	STANDARD ERROR (SEM)	0.020
1.404	VARIANCE	0.218
0.142	SKEWNESS	0.142
0.137	KURTOSIS	0.137

# Frequency Histogram For Thigh Clearance

MIN = 13.2    MAX = 21.1

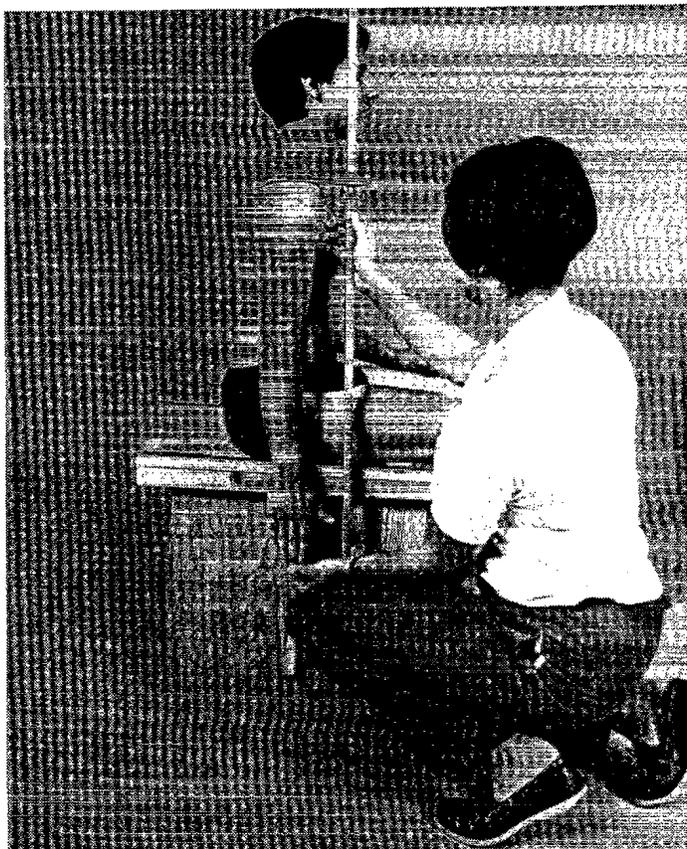


VERTICAL REACH DOWN (SHOULDER FINGER-TIP):

Subject sits erect. Measure the distance from the Acromion to the tip of the middle finger of the fully extended arm and hand.

PERCENTILE TABLE

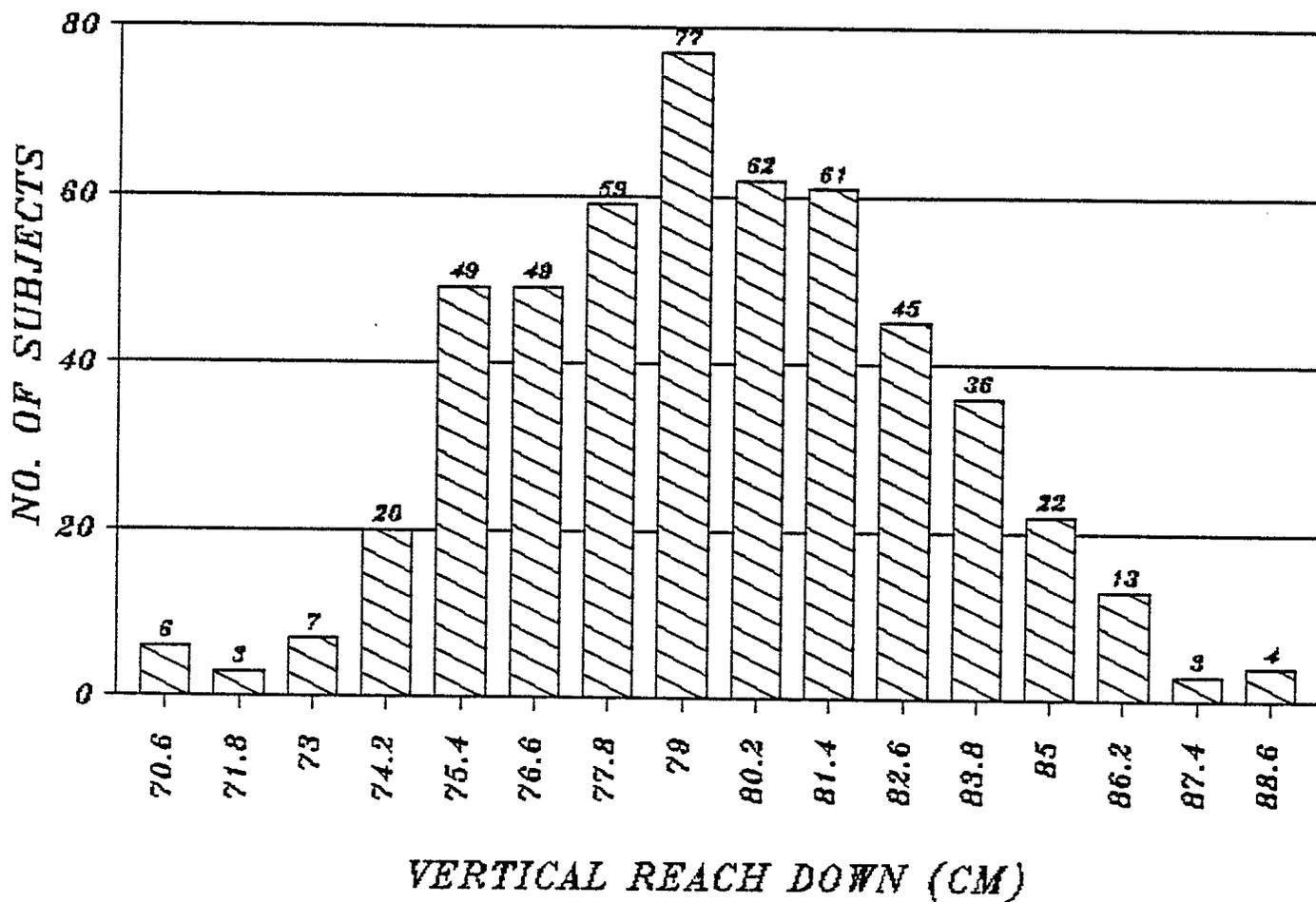
CM.	%ILE	IN.
71.10	1	27.99
71.90	2	28.31
72.55	3	28.56
73.10	4	28.78
73.20	5	28.82
74.20	10	29.21
75.10	15	29.57
75.60	20	29.76
76.20	25	30.00
76.60	30	30.16
77.20	35	30.39
77.70	40	30.59
78.00	45	30.71
78.40	50	30.87
78.80	55	31.02
79.10	60	31.14
79.70	65	31.38
80.10	70	31.54
80.70	75	31.77
81.20	80	31.97
82.10	85	32.32
83.10	90	32.72
85.00	95	33.46
85.40	96	33.62
85.65	97	33.72
86.65	98	34.11
87.10	99	34.29



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
70.500	MINIMUM VALUE	27.756
89.100	MAXIMUM VALUE	35.079
18.600	RANGE	7.323
78.579	MEAN	30.936
3.420	STANDARD DEVIATION	1.347
0.150	STANDARD ERROR (SEM)	0.059
11.700	VARIANCE	1.813
0.316	SKEWNESS	0.316
0.004	KURTOSIS	0.004

*Freq. Histogram For Vertical Reach Down*  
 MIN = 70.5    MAX = 89.1

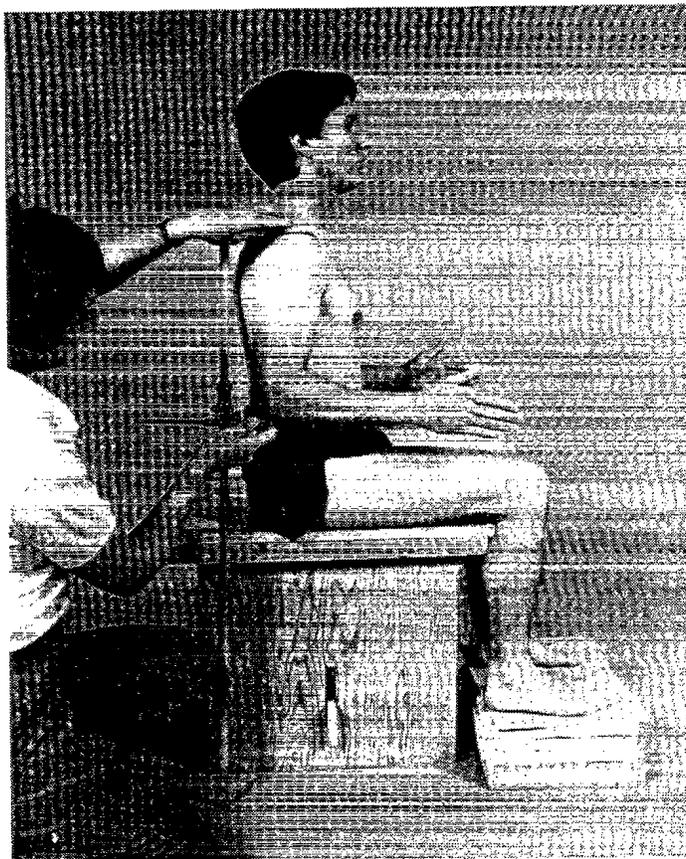


SHOULDER-ELBOW LENGTH:

Subject sits erect, his right upper arm hanging at his side and his lower arm extended forward horizontally. Using the anthropometer measure the vertical distance from the acromion landmark (lateral edge of the acromion) to the bottom of the elbow.

PERCENTILE TABLE

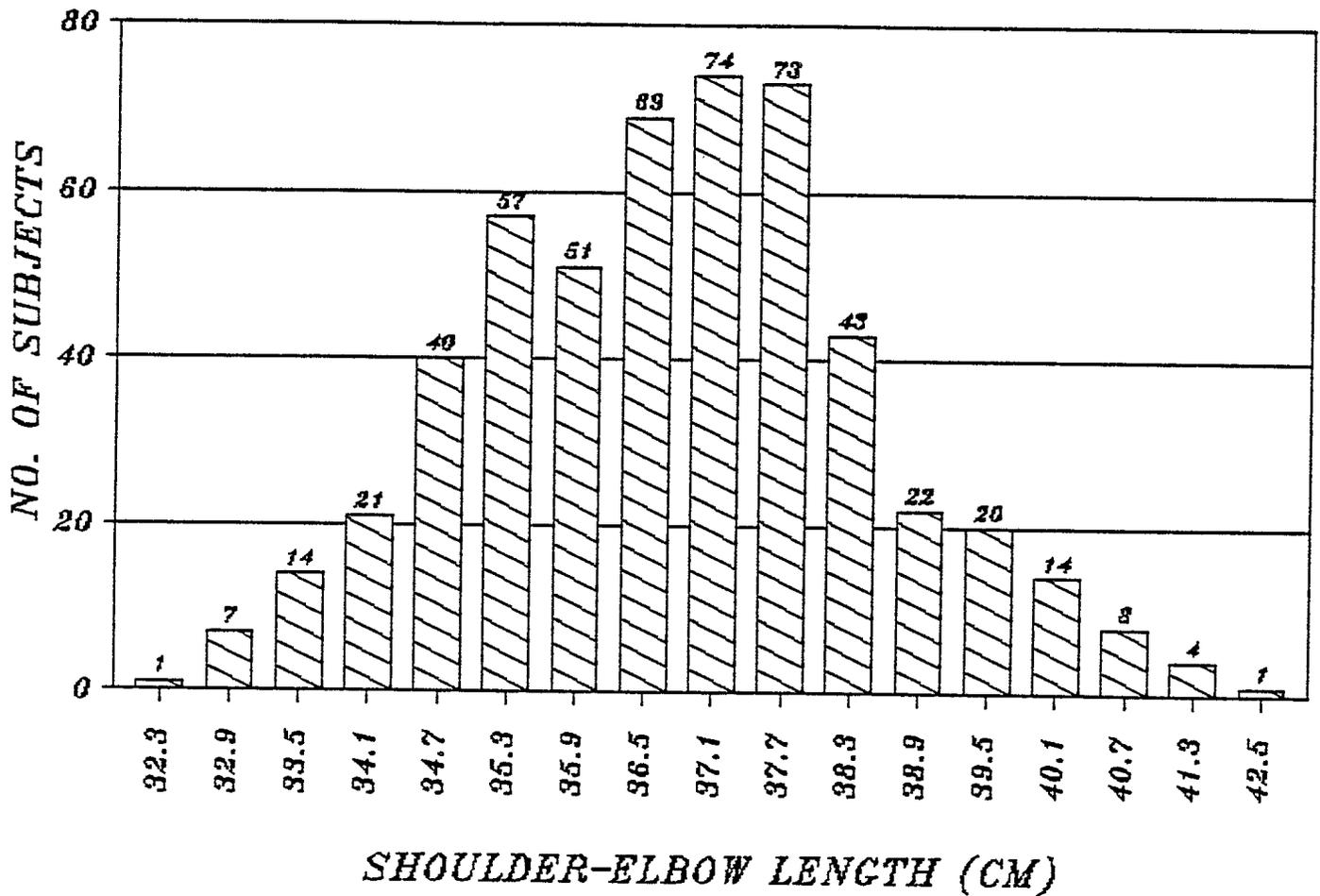
CM.	%ILE	IN.
33.00	1	12.99
33.35	2	13.13
33.50	3	13.19
33.80	4	13.31
34.10	5	13.43
34.60	10	13.62
35.00	15	13.78
35.30	20	13.90
35.60	25	14.02
35.90	30	14.13
36.20	35	14.25
36.40	40	14.33
36.60	45	14.41
36.80	50	14.49
37.00	55	14.57
37.30	60	14.69
37.50	65	14.76
37.60	70	14.80
37.90	75	14.92
38.20	80	15.04
38.50	85	15.16
39.10	90	15.39
39.90	95	15.71
40.10	96	15.79
40.35	97	15.89
40.65	98	16.00
41.10	99	16.18



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
32.400	MINIMUM VALUE	12.756
42.300	MAXIMUM VALUE	16.654
9.900	RANGE	3.898
36.825	MEAN	14.498
1.733	STANDARD DEVIATION	0.682
0.076	STANDARD ERROR (SEM)	0.030
3.002	VARIANCE	0.465
0.151	SKEWNESS	0.151
-0.131	KURTOSIS	-0.131

*Freq. Histogram: Shoulder-Elbow Length*  
 MIN = 32.4    MAX = 42.3

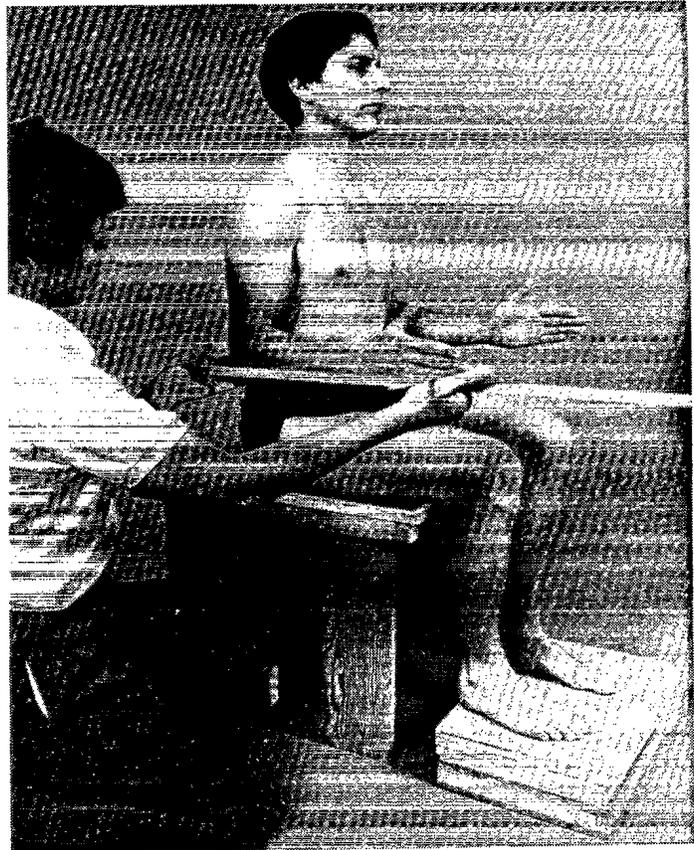


ELBOW-FINGERTIP LENGTH (FOREARM HAND LENGTH):

Subject sits erect, with his arms bent to form right angles at the elbows and with his hands extended. Elbow-fingertip length is measured as the horizontal distance from the back of the right elbow to the tip of the middle finger of the extended hand.

PERCENTILE TABLE

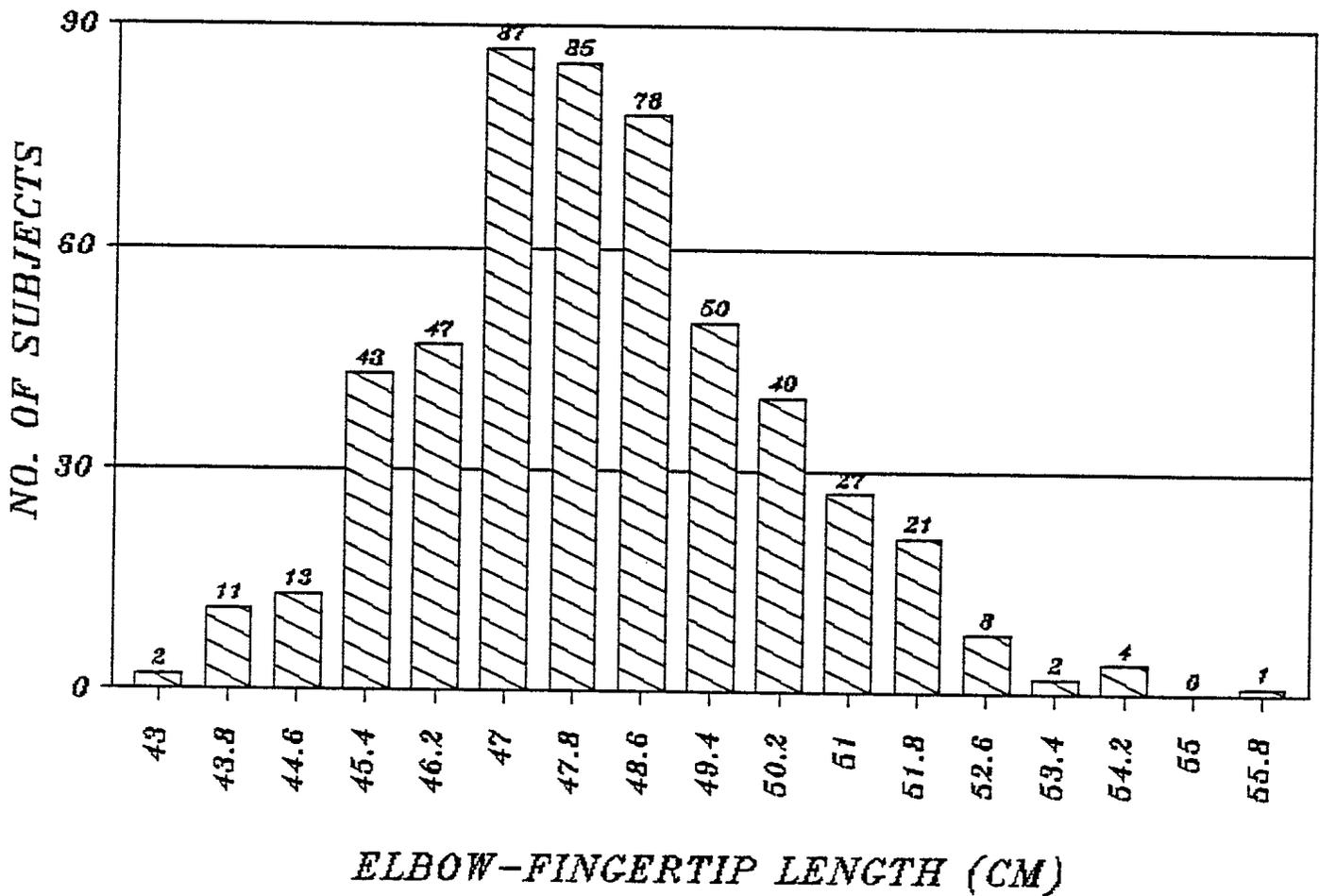
CM.	%ILE	IN.
43.70	1	17.20
44.10	2	17.36
44.40	3	17.48
44.60	4	17.56
45.00	5	17.72
45.60	10	17.95
46.00	15	18.11
46.50	20	18.31
46.80	25	18.43
47.00	30	18.50
47.20	35	18.58
47.50	40	18.70
47.70	45	18.78
47.90	50	18.86
48.20	55	18.98
48.50	60	19.09
48.80	65	19.21
49.00	70	19.29
49.50	75	19.49
49.80	80	19.61
50.30	85	19.80
51.00	90	20.08
51.90	95	20.43
52.10	96	20.51
52.25	97	20.57
52.65	98	20.73
54.10	99	21.30



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
42.800	MINIMUM VALUE	16.850
56.000	MAXIMUM VALUE	22.047
13.200	RANGE	5.197
48.136	MEAN	18.951
2.084	STANDARD DEVIATION	0.821
0.091	STANDARD ERROR (SEM)	0.036
4.344	VARIANCE	0.673
0.393	SKEWNESS	0.393
0.286	KURTOSIS	0.286

*Freq. Histogram: Elbow-Fingertip Length*  
 MIN = 42.8 MAX = 56.0

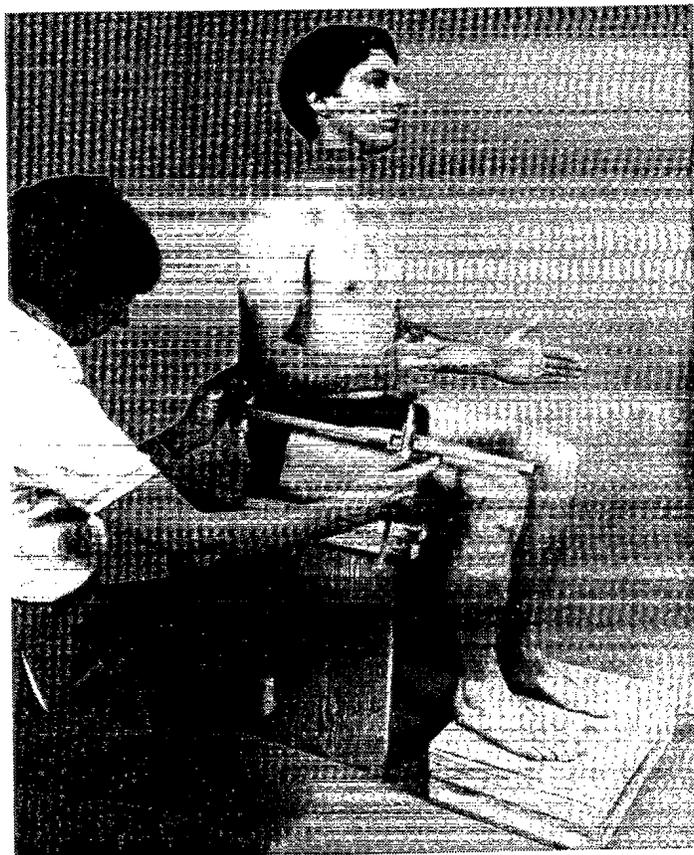


ELBOW TO CENTER OF GRIP LENGTH:

Subject sits erect, the elbows bent at right angles with the forearm horizontal. A piece of dowel is grasped and held vertically with the end of the dowel flush with the lower ulnar side of the hand. Measure the distance from the tip of the elbow to the center of the lower aspect of the dowel.

PERCENTILE TABLE

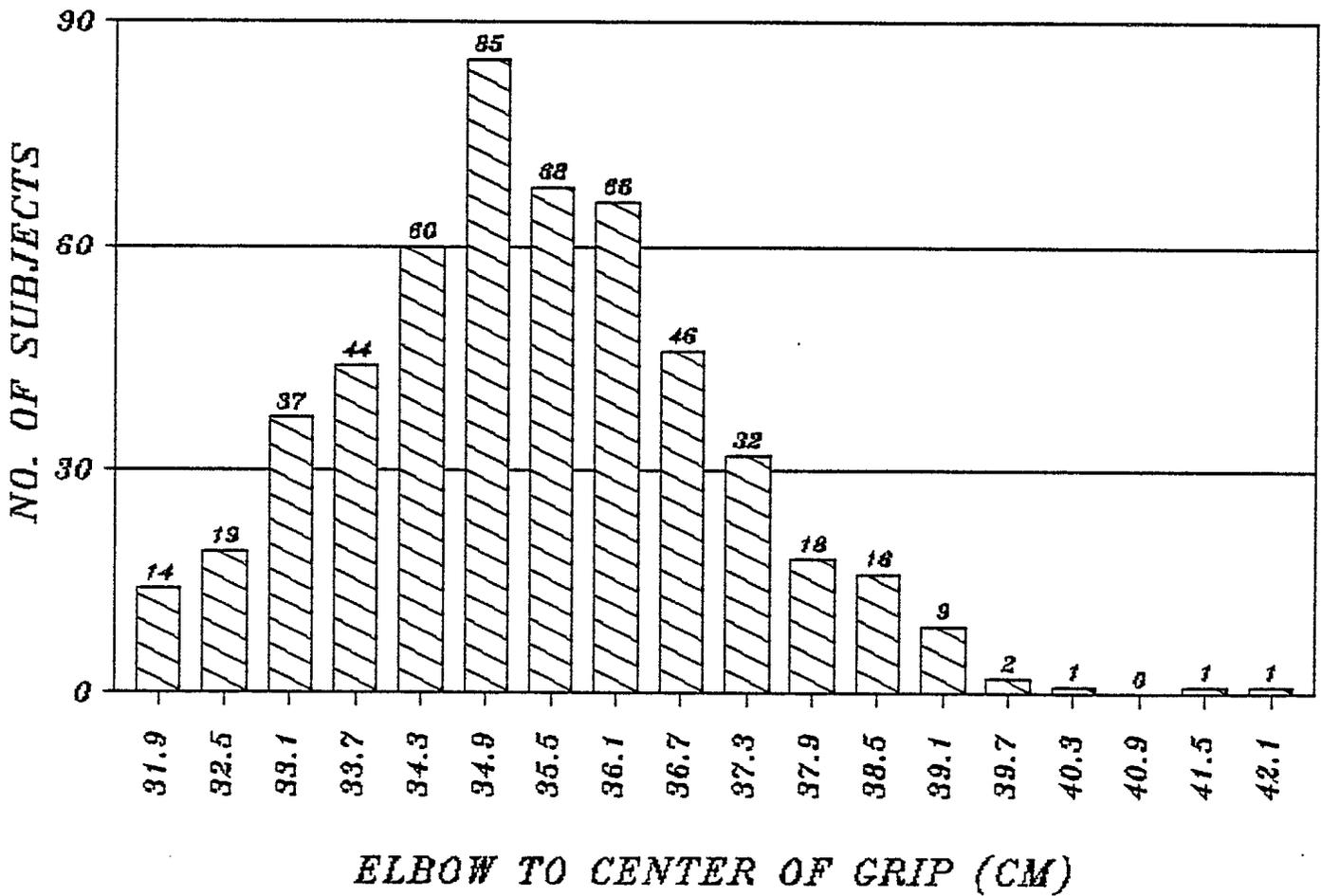
CM.	%ILE	IN.
31.90	1	12.56
32.20	2	12.68
32.30	3	12.72
32.60	4	12.83
32.70	5	12.87
33.20	10	13.07
33.50	15	13.19
33.90	20	13.35
34.20	25	13.46
34.50	30	13.58
34.70	35	13.66
35.00	40	13.78
35.10	45	13.82
35.30	50	13.90
35.50	55	13.98
35.60	60	14.02
35.90	65	14.13
36.10	70	14.21
36.40	75	14.33
36.70	80	14.45
37.10	85	14.61
37.50	90	14.76
38.50	95	15.16
38.60	96	15.20
38.80	97	15.28
39.05	98	15.37
39.60	99	15.59



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
31.700	MINIMUM VALUE	12.480
42.100	MAXIMUM VALUE	16.575
10.400	RANGE	4.094
35.366	MEAN	13.923
1.691	STANDARD DEVIATION	0.666
0.074	STANDARD ERROR (SEM)	0.029
2.860	VARIANCE	0.443
0.352	SKEWNESS	0.352
0.250	KURTOSIS	0.250

*Freq. Histogram: Elbow to Center of Grip*  
 MIN = 31.7 MAX = 42.1



ELBOW-WRIST LENGTH:

Subject sits erect, his right upper arm hanging at his side, his lower arm and hand extended forward horizontally. Using the anthropometer, measure the distance from the tip of the right elbow to the stylium landmark.

PERCENTILE TABLE

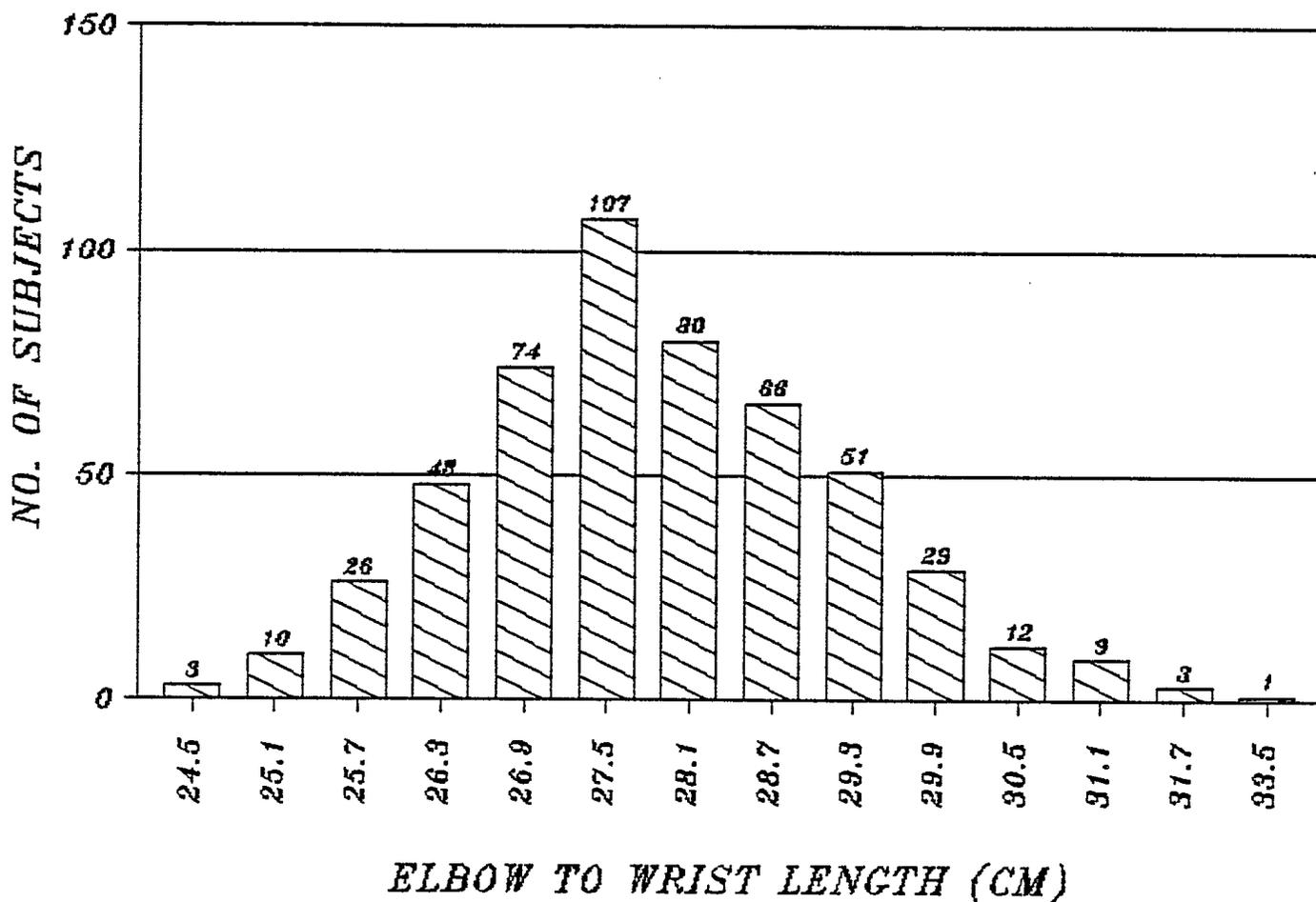
CM.	%ILE	IN.
25.10	1	9.88
25.40	2	10.00
25.60	3	10.08
25.80	4	10.16
25.80	5	10.16
26.20	10	10.31
26.50	15	10.43
26.80	20	10.55
27.00	25	10.63
27.20	30	10.71
27.40	35	10.79
27.50	40	10.83
27.70	45	10.91
27.80	50	10.94
27.90	55	10.98
28.10	60	11.06
28.40	65	11.18
28.60	70	11.26
28.90	75	11.38
29.10	80	11.46
29.40	85	11.57
29.80	90	11.73
30.20	95	11.89
30.30	96	11.93
30.65	97	12.07
30.95	98	12.19
31.20	99	12.28



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
24.500	MINIMUM VALUE	9.646
33.600	MAXIMUM VALUE	13.228
9.100	RANGE	3.583
27.918	MEAN	10.991
1.355	STANDARD DEVIATION	0.533
0.059	STANDARD ERROR (SEM)	0.023
1.836	VARIANCE	0.285
0.337	SKEWNESS	0.337
0.233	KURTOSIS	0.233

*Freq. Histogram: Elbow to Wrist Length*  
 MIN = 24.5    MAX = 33.6



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SITTING MEASURES  
USING THE  
SHORTENED "FREE STANDING ANTHROPOMETER"

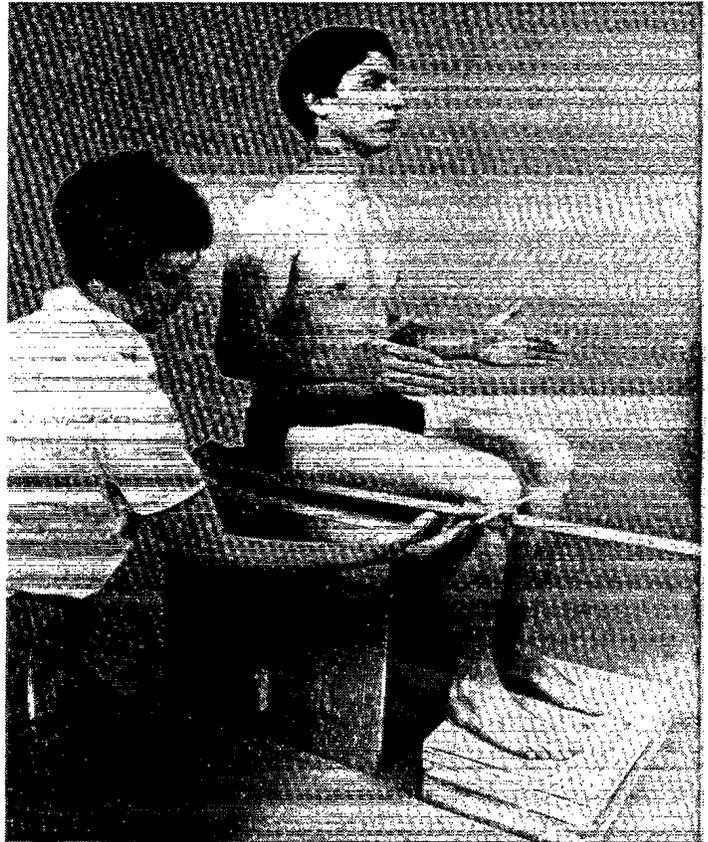
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BUTTOCK-KNEE LENGTH:

Subject sits erect, his feet resting on a surface adjusted so that his knees are bent at right angles. Measure the horizontal distance from the rearmost surface of the right buttock to the front surface of the kneecap.

PERCENTILE TABLE

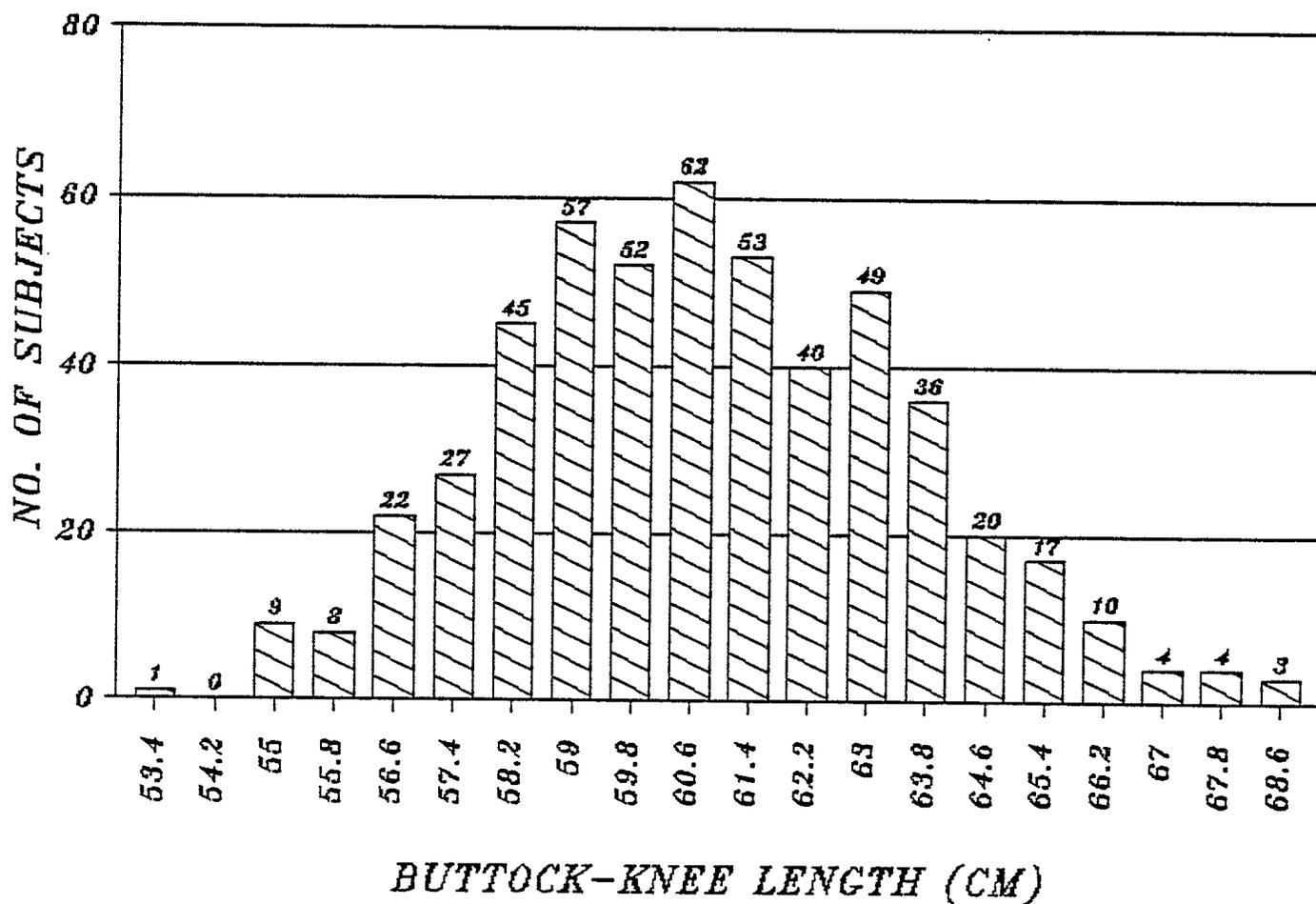
CM.	%ILE	IN.
54.80	1	21.57
55.45	2	21.83
55.95	3	22.03
56.40	4	22.20
56.50	5	22.24
57.40	10	22.60
58.10	15	22.87
58.50	20	23.03
59.00	25	23.23
59.30	30	23.35
59.60	35	23.46
60.10	40	23.66
60.50	45	23.82
60.80	50	23.94
61.10	55	24.06
61.60	60	24.25
61.90	65	24.37
62.30	70	24.53
62.90	75	24.76
63.30	80	24.92
63.80	85	25.12
64.50	90	25.39
65.50	95	25.79
66.00	96	25.98
66.35	97	26.12
67.15	98	26.44
67.80	99	26.69



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
53.200	MINIMUM VALUE	20.945
68.900	MAXIMUM VALUE	27.126
15.700	RANGE	6.181
60.901	MEAN	23.977
2.770	STANDARD DEVIATION	1.091
0.122	STANDARD ERROR (SEM)	0.048
7.673	VARIANCE	1.189
0.176	SKEWNESS	0.176
-0.219	KURTOSIS	-0.219

*Freq. Histogram For Buttock-Knee Length*  
 MIN = 53.2 MAX = 68.9

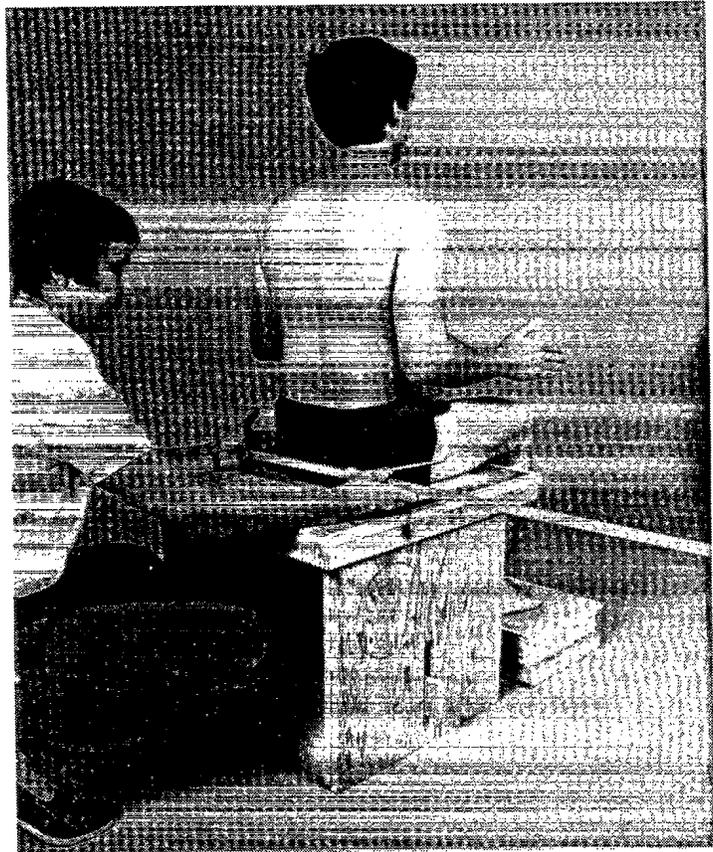


HIP BREADTH (SITTING):

Subject sits erect with heels together. Using the anthropometer, measure the horizontal distance across the widest protrusions of the hips.

PERCENTILE TABLE

CM.	%ILE	IN.
32.70	1	12.87
32.95	2	12.97
33.30	3	13.11
33.50	4	13.19
33.70	5	13.27
34.30	10	13.50
34.80	15	13.70
35.30	20	13.90
35.50	25	13.98
35.70	30	14.06
36.00	35	14.17
36.30	40	14.29
36.60	45	14.41
36.90	50	14.53
37.10	55	14.61
37.40	60	14.72
37.60	65	14.80
38.00	70	14.96
38.50	75	15.16
39.00	80	15.35
39.40	85	15.51
40.10	90	15.79
41.40	95	16.30
41.80	96	16.46
42.45	97	16.71
43.20	98	17.01
43.70	99	17.20

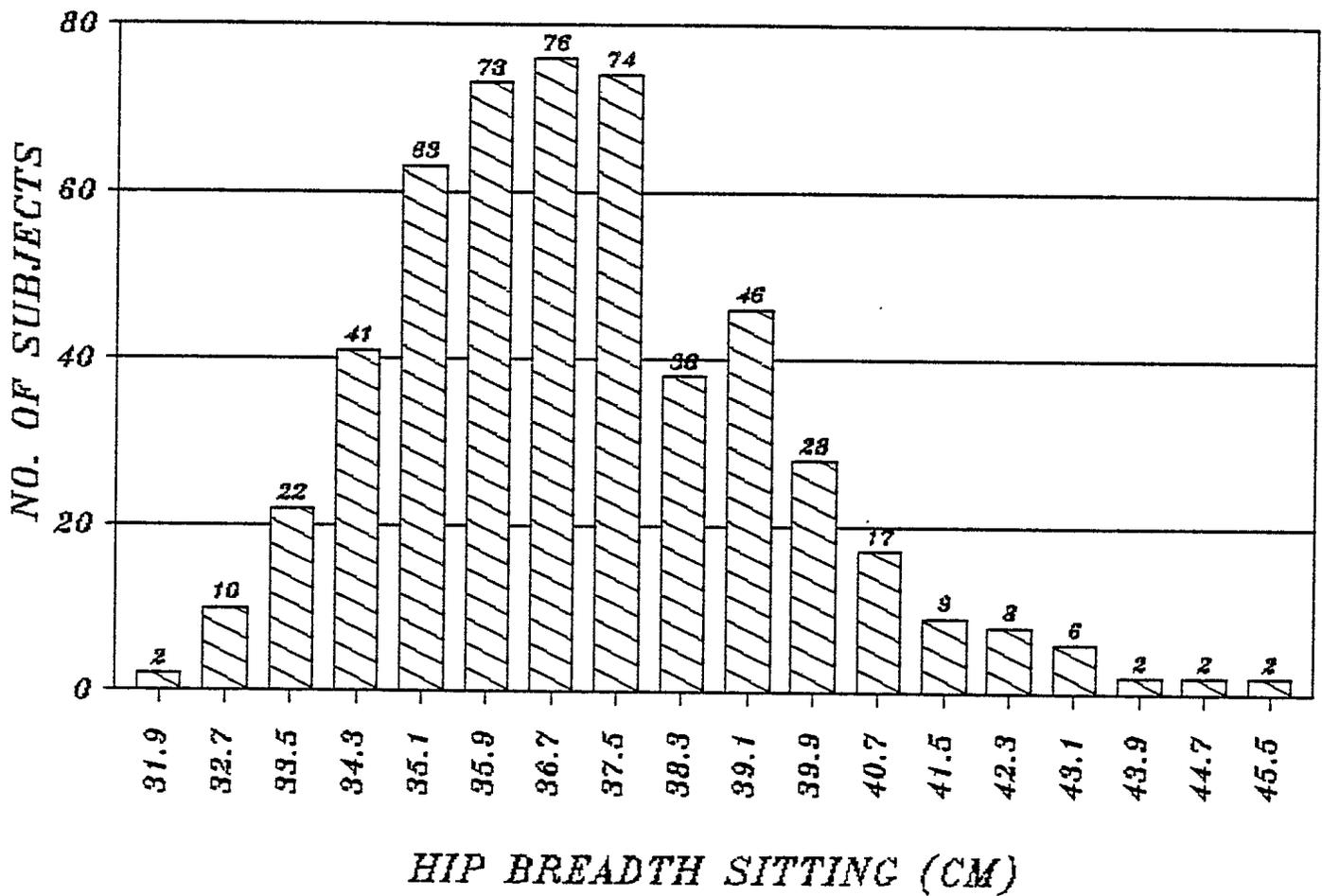


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
31.800	MINIMUM VALUE	12.520
45.500	MAXIMUM VALUE	17.913
13.700	RANGE	5.394
37.104	MEAN	14.608
2.341	STANDARD DEVIATION	0.921
0.103	STANDARD ERROR (SEM)	0.040
5.478	VARIANCE	0.849
0.647	SKEWNESS	0.647
0.555	KURTOSIS	0.555

# Freq. Histogram For Hip Breadth Sitting

MIN = 31.8    MAX = 45.5



ELBOW-ELBOW BREADTH:

Subject sits erect, his upper arms hanging at his sides, his lower arms extended forward horizontally, and his elbows resting lightly against his body. Measure the maximum horizontal distance across the lateral surfaces of the elbows.

PERCENTILE TABLE

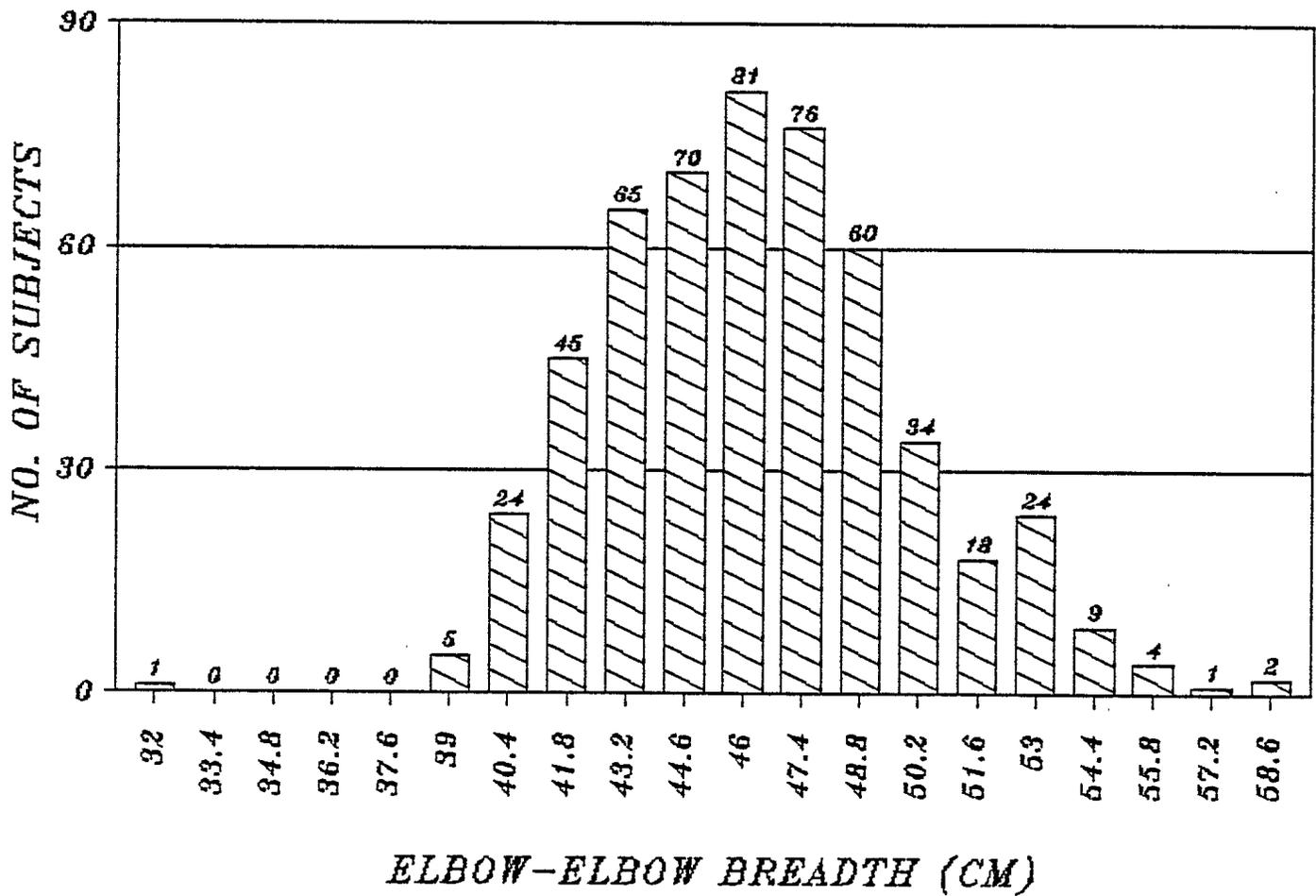
CM.	%ILE	IN.
39.40	1	15.51
40.20	2	15.83
40.45	3	15.93
40.70	4	16.02
41.00	5	16.14
42.00	10	16.54
42.60	15	16.77
43.20	20	17.01
43.80	25	17.24
44.20	30	17.40
44.80	35	17.64
45.30	40	17.83
45.70	45	17.99
46.20	50	18.19
46.70	55	18.39
47.10	60	18.54
47.50	65	18.70
47.90	70	18.86
48.50	75	19.09
49.30	80	19.41
50.20	85	19.76
51.40	90	20.24
53.00	95	20.87
53.40	96	21.02
53.80	97	21.18
54.55	98	21.48
55.40	99	21.81



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
31.500	MINIMUM VALUE	12.402
59.200	MAXIMUM VALUE	23.307
27.700	RANGE	10.905
46.390	MEAN	18.264
3.644	STANDARD DEVIATION	1.435
0.160	STANDARD ERROR (SEM)	0.063
13.280	VARIANCE	2.058
0.341	SKEWNESS	0.341
0.413	KURTOSIS	0.413

*Freq. Histogram For Elbow-Elbow Breadth*  
 MIN = 31.5    MAX = 59.2

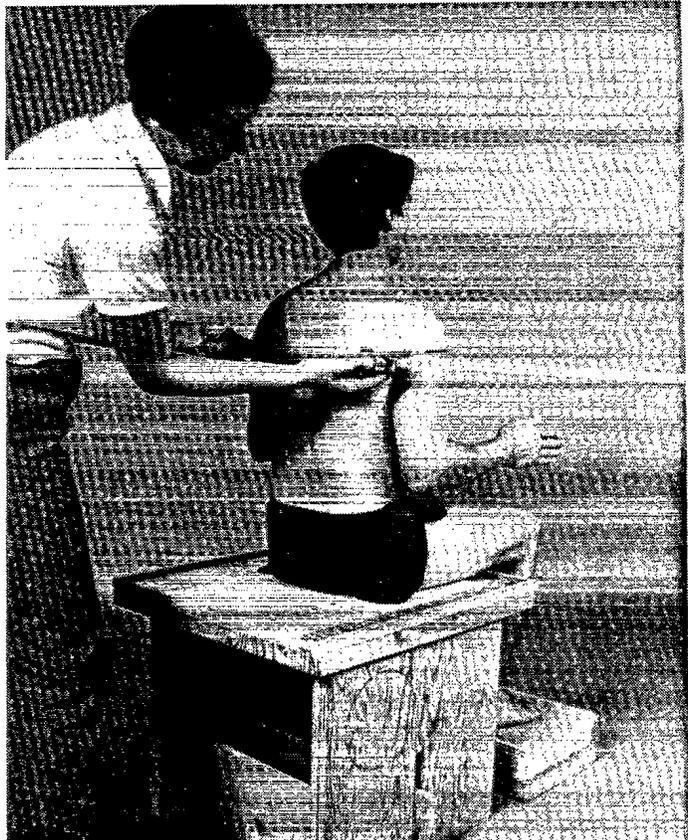


**BIDELTROID BREADTH:**

Subject sits erect, his upper arms hanging at his sides, and his lower arms extended forward horizontally. Using the anthropometer, measure the horizontal distance across the maximum lateral protrusions of the right and left deltoid muscles.

**PERCENTILE TABLE**

CM.	%ILE	IN.
43.60	1	17.17
44.10	2	17.36
44.65	3	17.58
44.90	4	17.68
45.00	5	17.72
45.40	10	17.87
46.00	15	18.11
46.40	20	18.27
46.80	25	18.43
47.10	30	18.54
47.50	35	18.70
47.70	40	18.78
48.10	45	18.94
48.50	50	19.09
48.70	55	19.17
49.10	60	19.33
49.30	65	19.41
49.60	70	19.53
49.90	75	19.65
50.30	80	19.80
50.80	85	20.00
51.30	90	20.20
52.30	95	20.59
52.70	96	20.75
53.20	97	20.94
53.70	98	21.14
54.20	99	21.34

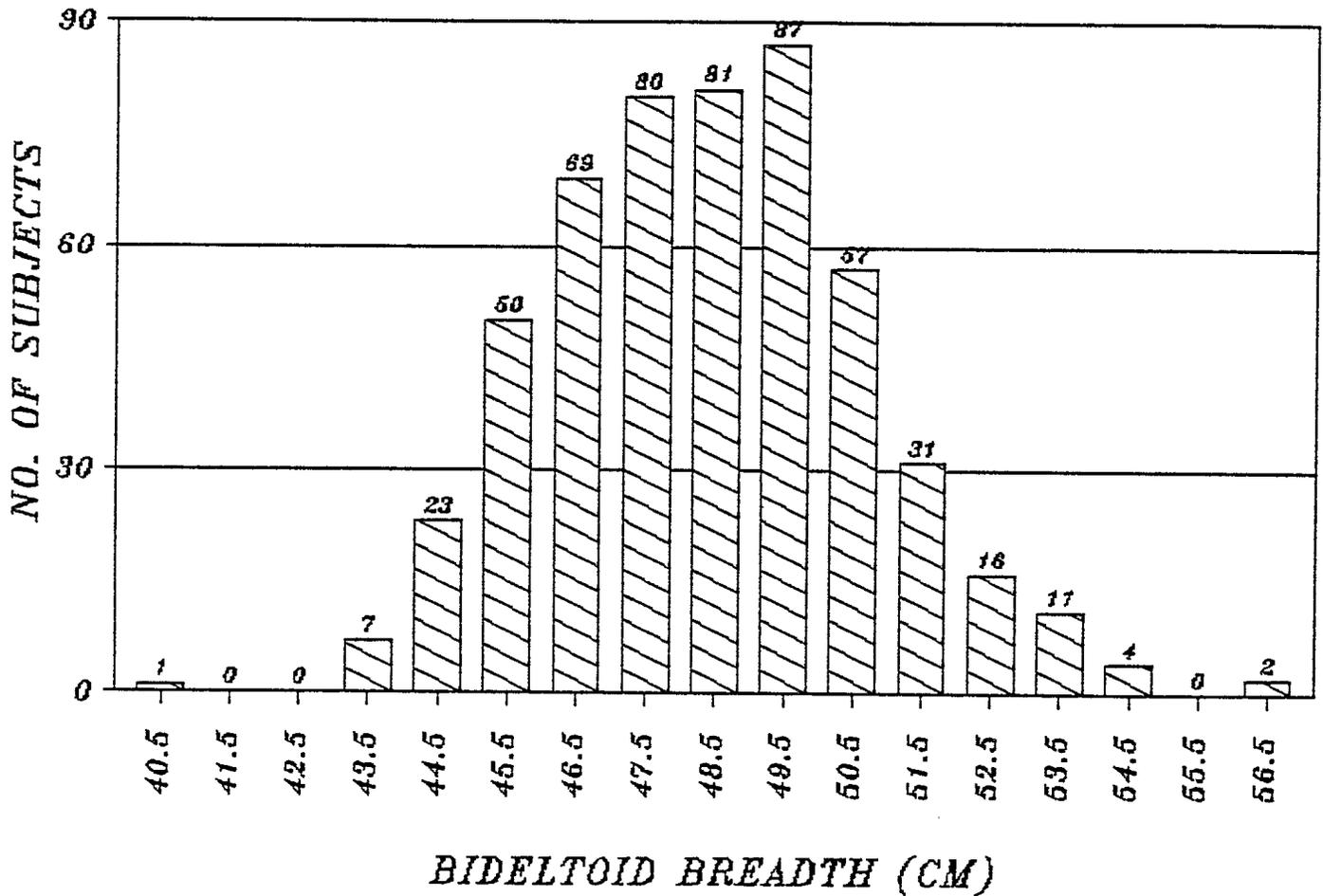


**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
40.400	MINIMUM VALUE	15.905
56.600	MAXIMUM VALUE	22.283
16.200	RANGE	6.378
48.436	MEAN	19.069
2.302	STANDARD DEVIATION	0.906
0.101	STANDARD ERROR (SEM)	0.040
5.298	VARIANCE	0.821
0.248	SKEWNESS	0.248
0.180	KURTOSIS	0.180

# Freq. Histogram For Bideltoid Breadth

MIN = 40.4    MAX = 56.6

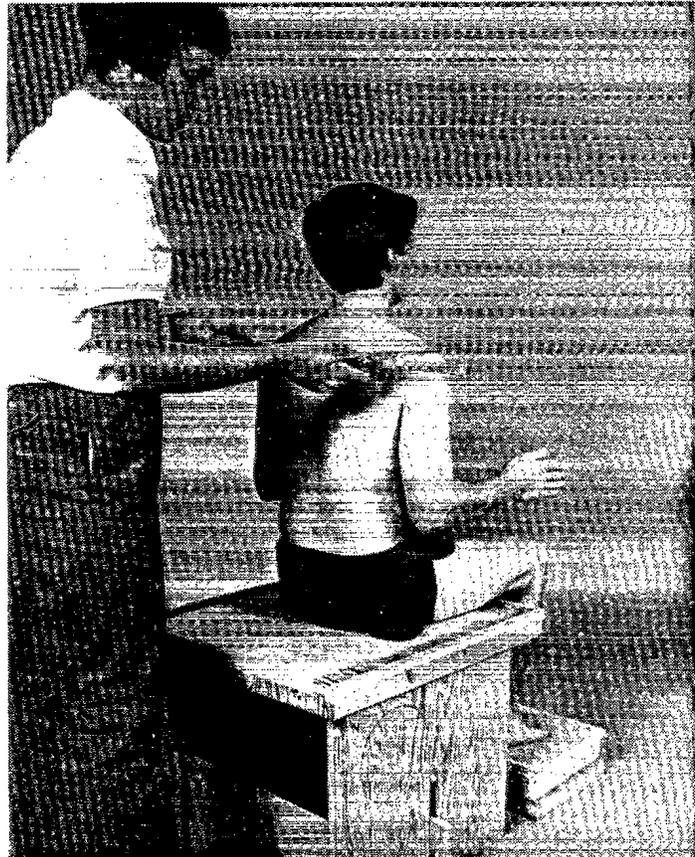


BIACROMIAL BREADTH:

Subject sits erect, his upper arms hanging at his sides and his lower arms extended horizontally. Using the anthropometer, measure the distance between the right and left acromion landmarks.

PERCENTILE TABLE

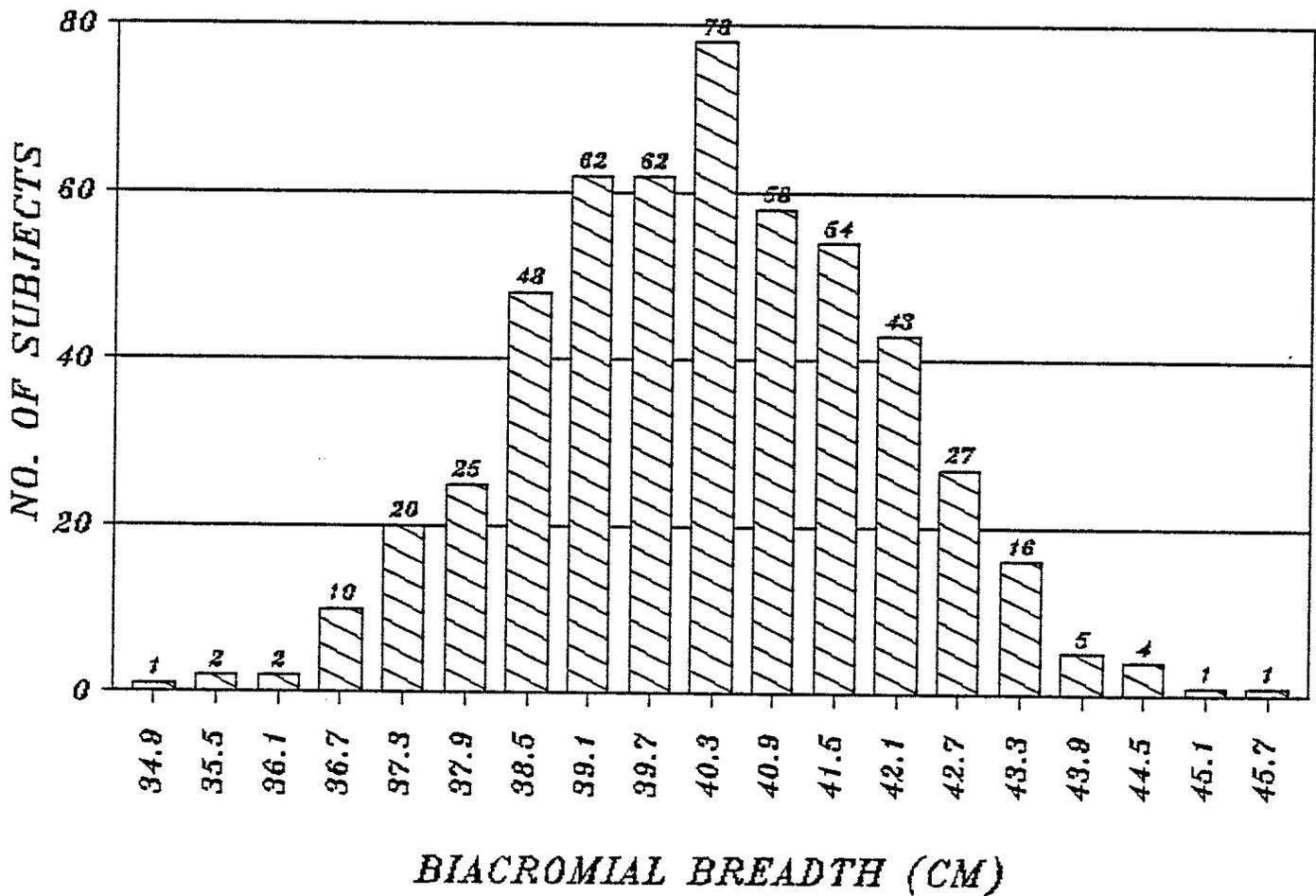
CM.	ZILE	IN.
36.40	1	14.33
36.80	2	14.49
37.05	3	14.59
37.30	4	14.69
37.40	5	14.72
38.00	10	14.96
38.50	15	15.16
38.80	20	15.28
39.10	25	15.39
39.30	30	15.47
39.60	35	15.59
39.80	40	15.67
40.10	45	15.79
40.30	50	15.87
40.50	55	15.94
40.70	60	16.02
40.90	65	16.10
41.20	70	16.22
41.50	75	16.34
41.80	80	16.46
42.10	85	16.57
42.60	90	16.77
43.10	95	16.97
43.20	96	17.01
43.40	97	17.09
43.75	98	17.22
44.30	99	17.44



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
34.800	MINIMUM VALUE	13.701
45.800	MAXIMUM VALUE	18.031
11.000	RANGE	4.331
40.267	MEAN	15.853
1.722	STANDARD DEVIATION	0.678
0.076	STANDARD ERROR (SEM)	0.030
2.966	VARIANCE	0.460
0.003	SKEWNESS	0.003
-0.067	KURTOSIS	-0.067

*Freq. Histogram For Biacromial Breadth*  
 MIN = 34.8    MAX = 45.8



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SITTING MEASURES  
USING THE  
"SPREADING CALIPERS"

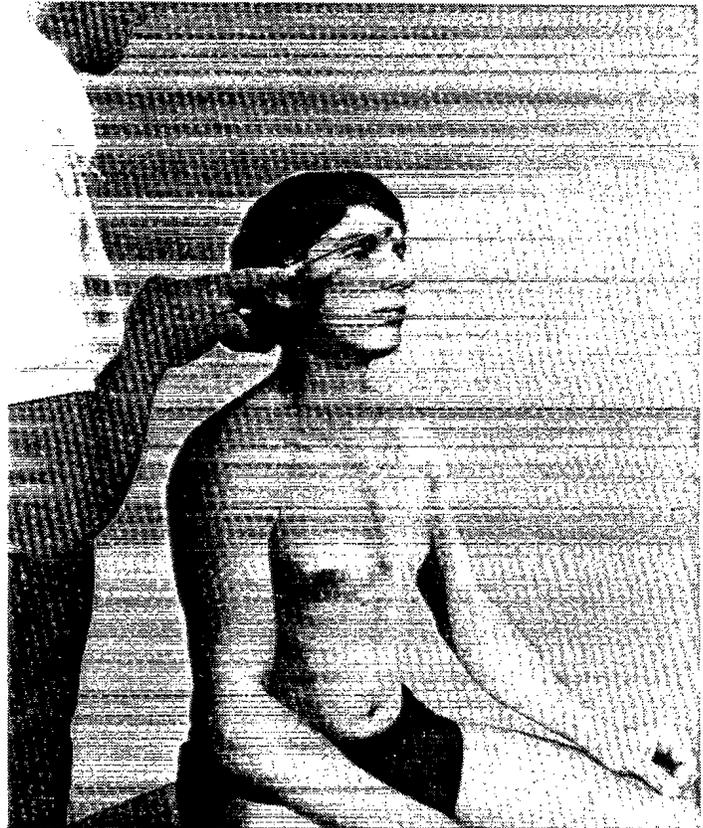
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HEAD LENGTH:

Subject sits. Holding the spreading caliper near the tips, measure the maximum length of the head between the glabella landmark on the forehead and the occiput.

PERCENTILE TABLE

CM.	%ILE	IN.
18.10	1	7.13
18.30	2	7.20
18.40	3	7.24
18.50	4	7.28
18.50	5	7.28
18.70	10	7.36
18.90	15	7.44
19.00	20	7.48
19.10	25	7.52
19.20	30	7.56
19.30	35	7.60
19.40	40	7.64
19.50	45	7.68
19.60	50	7.72
19.70	55	7.76
19.80	60	7.80
19.80	65	7.80
20.00	70	7.87
20.10	75	7.91
20.20	80	7.95
20.30	85	7.99
20.50	90	8.07
20.70	95	8.15
20.80	96	8.19
20.90	97	8.23
21.10	98	8.31
21.30	99	8.39

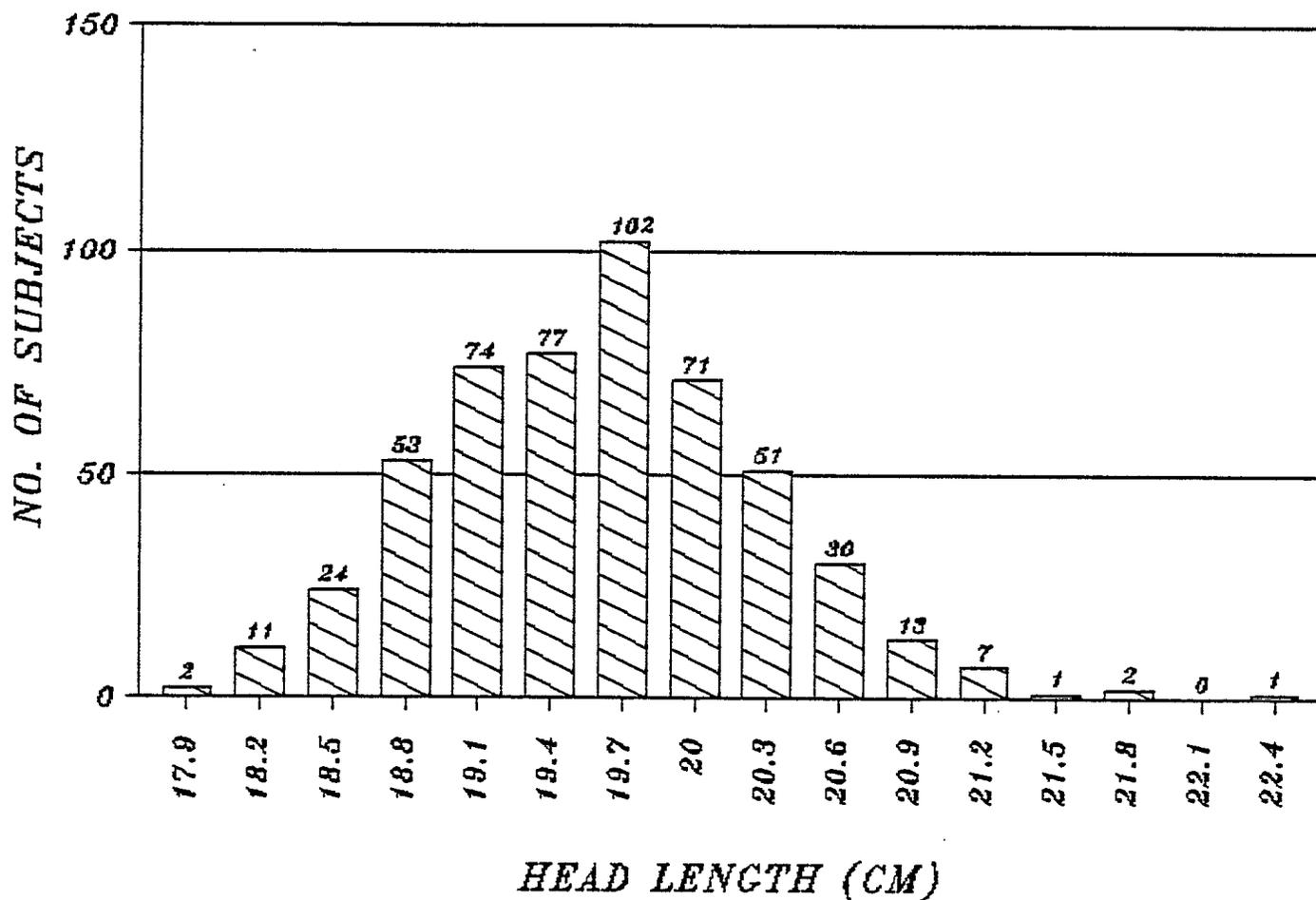


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
17.900	MINIMUM VALUE	7.047
22.400	MAXIMUM VALUE	8.819
4.500	RANGE	1.772
19.606	MEAN	7.719
0.684	STANDARD DEVIATION	0.269
0.030	STANDARD ERROR (SEM)	0.012
0.468	VARIANCE	0.072
0.283	SKEWNESS	0.283
0.266	KURTOSIS	0.266

# Frequency Histogram For Head Length

MIN = 17.9    MAX = 22.4



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SITTING MEASURES  
USING THE  
SHORTENED "FREE STANDING ANTHROPOMETER"

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MENTON-VERTEX HEIGHT:

Subject sits. Measure the vertical distance from the menton to the vertex of the head.

PERCENTILE TABLE

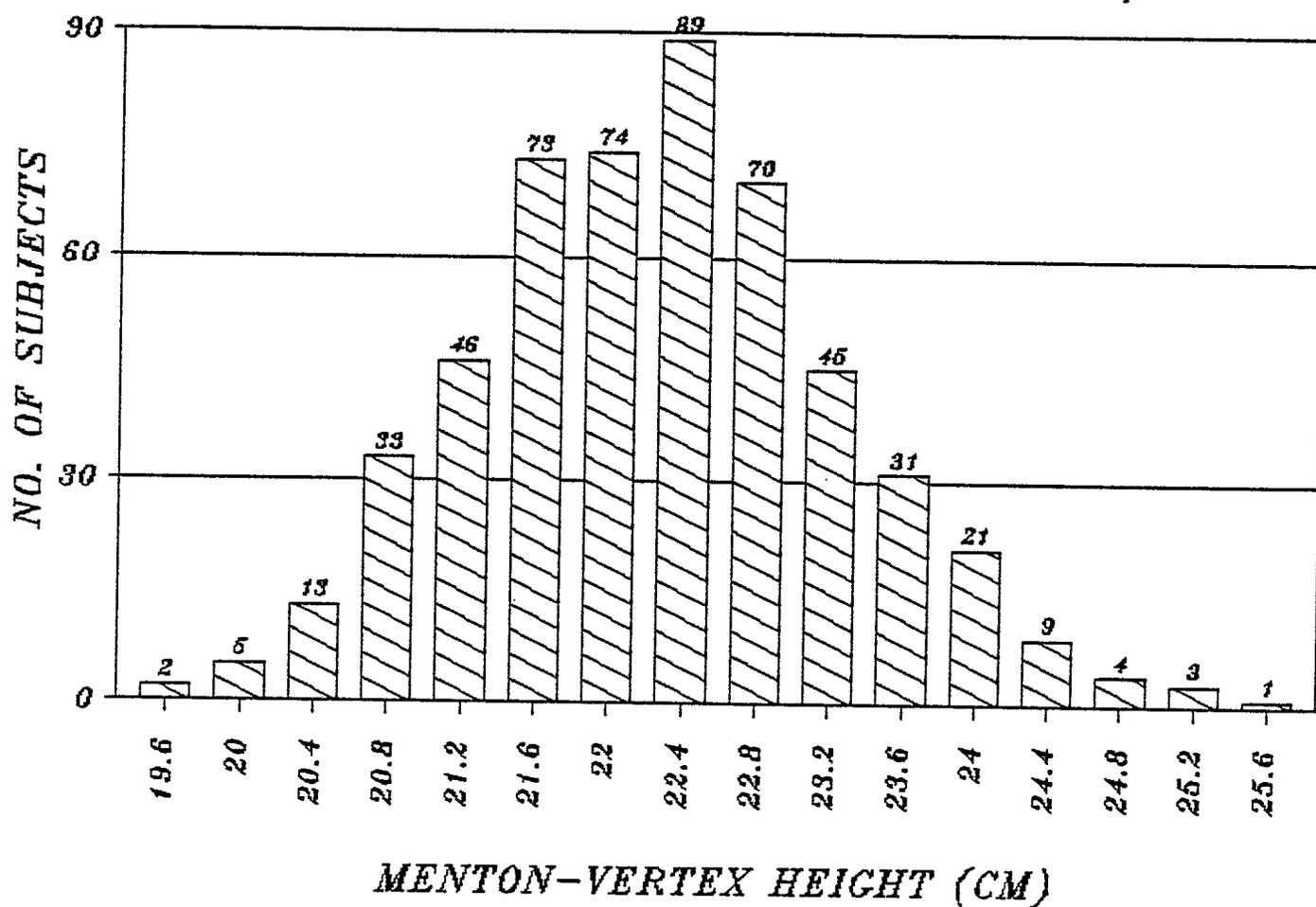
CM.	%ILE	IN.
20.10	1	7.91
20.30	2	7.99
20.50	3	8.07
20.70	4	8.15
20.70	5	8.15
21.00	10	8.27
21.30	15	8.39
21.50	20	8.46
21.60	25	8.50
21.80	30	8.58
21.90	35	8.62
22.10	40	8.70
22.20	45	8.74
22.30	50	8.78
22.40	55	8.82
22.50	60	8.86
22.70	65	8.94
22.80	70	8.98
22.90	75	9.02
23.20	80	9.13
23.40	85	9.21
23.70	90	9.33
24.10	95	9.49
24.10	96	9.49
24.35	97	9.59
24.50	98	9.65
24.90	99	9.80



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
19.500	MINIMUM VALUE	7.677
25.600	MAXIMUM VALUE	10.079
6.100	RANGE	2.402
22.326	MEAN	8.790
1.007	STANDARD DEVIATION	0.396
0.044	STANDARD ERROR (SEM)	0.017
1.013	VARIANCE	0.157
0.191	SKEWNESS	0.191
0.030	KURTOSIS	0.030

*Freq. Histogram For Menton-Vertex Height*  
*MIN = 19.5    MAX = 25.6*

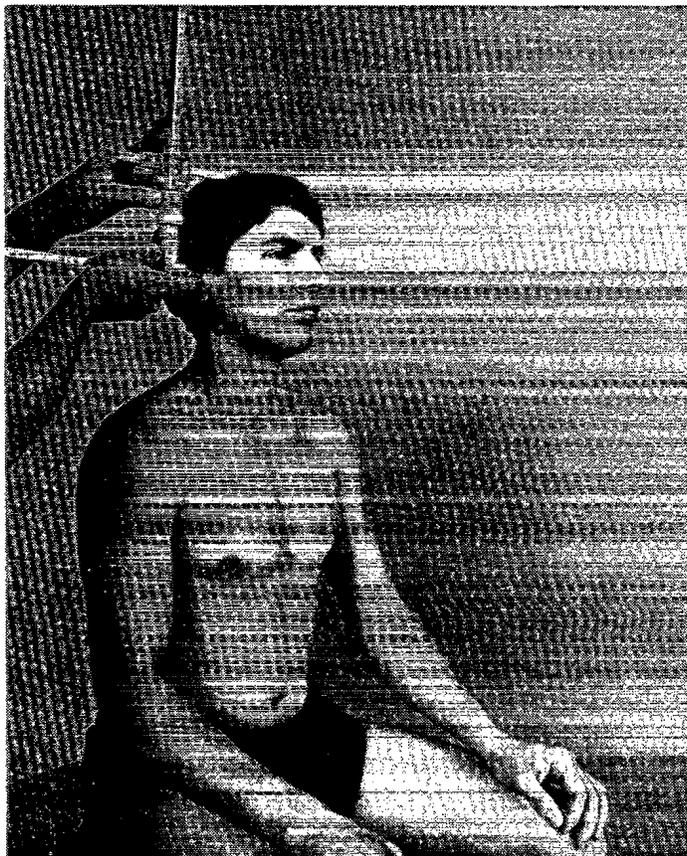


HEAD HEIGHT:

Subject sits. Measure the vertical distance from the tragon to the vertex of the head.

PERCENTILE TABLE

CM.	%ILE	IN.
11.70	1	4.61
11.90	2	4.69
12.00	3	4.72
12.10	4	4.76
12.20	5	4.80
12.40	10	4.88
12.50	15	4.92
12.60	20	4.96
12.70	25	5.00
12.80	30	5.04
12.90	35	5.08
13.00	40	5.12
13.10	45	5.16
13.20	50	5.20
13.30	55	5.24
13.40	60	5.28
13.40	65	5.28
13.50	70	5.31
13.60	75	5.35
13.70	80	5.39
13.80	85	5.43
13.90	90	5.47
14.20	95	5.59
14.30	96	5.63
14.50	97	5.71
14.50	98	5.71
14.70	99	5.79

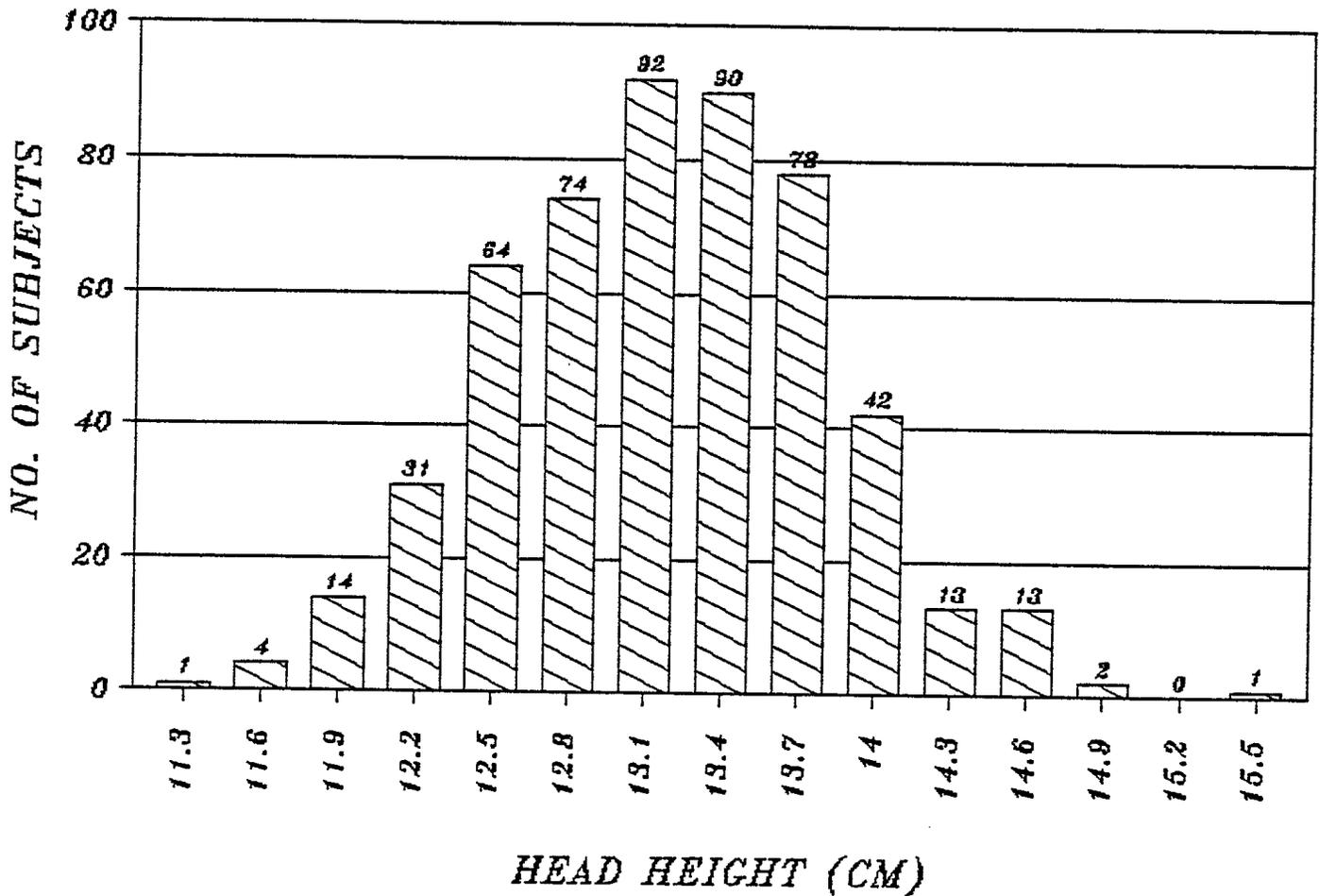


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
11.300	MINIMUM VALUE	4.449
15.400	MAXIMUM VALUE	6.063
4.100	RANGE	1.614
13.177	MEAN	5.188
0.636	STANDARD DEVIATION	0.250
0.028	STANDARD ERROR (SEM)	0.011
0.405	VARIANCE	0.063
0.071	SKEWNESS	0.071
-0.075	KURTOSIS	-0.075

# Frequency Histogram For Head Height

MIN = 11.3    MAX = 15.4

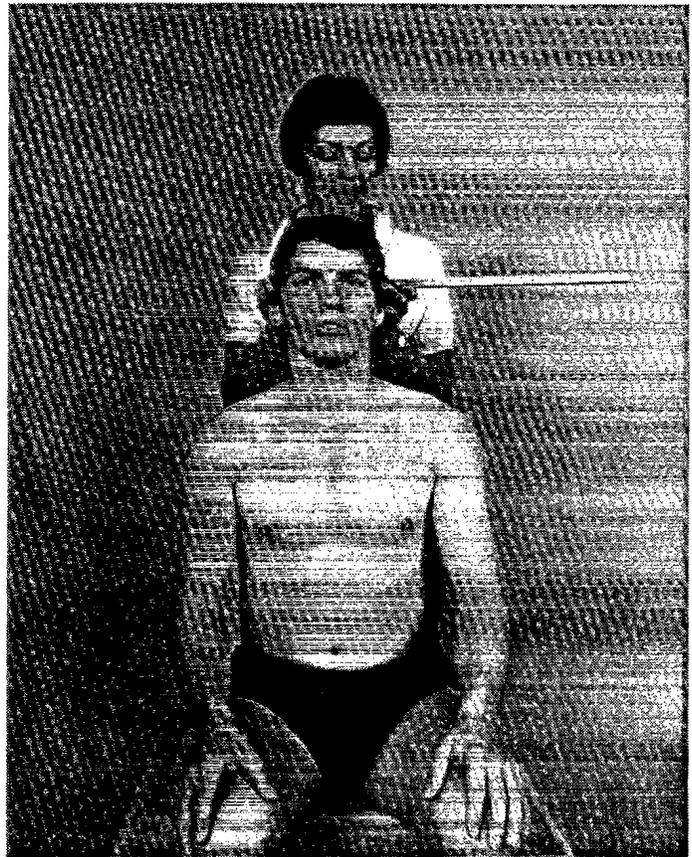


HEAD BREADTH:

Subject sits. Measure the maximum breadth of the head in a line perpendicular to the midsagittal plane.

PERCENTILE TABLE

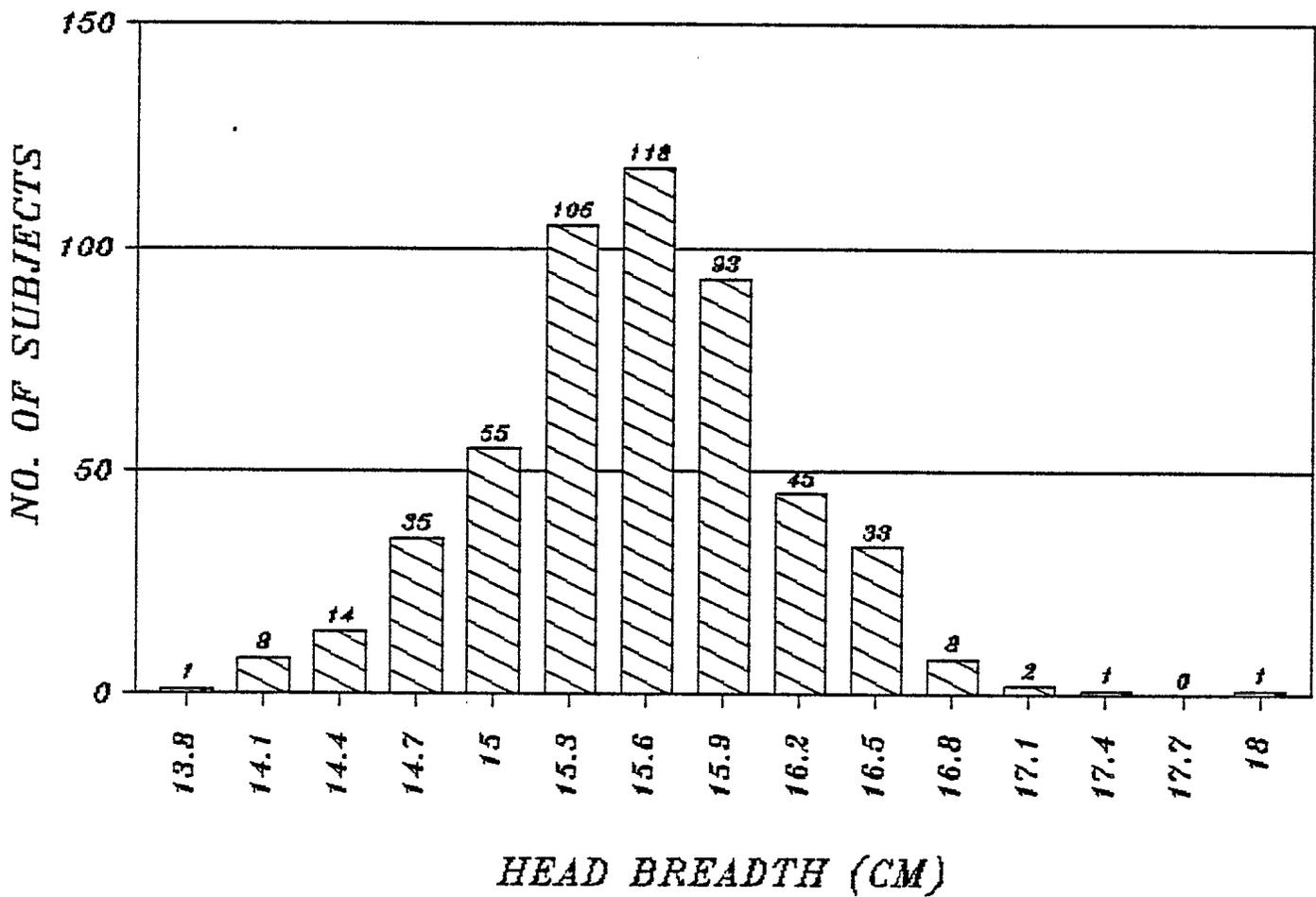
CM.	%ILE	IN.
14.20	1	5.59
14.30	2	5.63
14.35	3	5.65
14.50	4	5.71
14.60	5	5.75
14.80	10	5.83
15.00	15	5.91
15.10	20	5.94
15.20	25	5.98
15.30	30	6.02
15.30	35	6.02
15.40	40	6.06
15.50	45	6.10
15.60	50	6.14
15.60	55	6.14
15.70	60	6.18
15.80	65	6.22
15.80	70	6.22
15.90	75	6.26
16.00	80	6.30
16.10	85	6.34
16.30	90	6.42
16.50	95	6.50
16.60	96	6.54
16.60	97	6.54
16.70	98	6.57
16.90	99	6.65



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
13.800	MINIMUM VALUE	5.433
18.000	MAXIMUM VALUE	7.087
4.200	RANGE	1.654
15.551	MEAN	6.122
0.575	STANDARD DEVIATION	0.226
0.025	STANDARD ERROR (SEM)	0.010
0.330	VARIANCE	0.051
0.084	SKEWNESS	0.084
0.551	KURTOSIS	0.551

*Frequency Histogram For Head Breadth*  
MIN = 13.8 MAX = 18.0



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SITTING MEASURES  
USING THE  
SMALL "SLIDING CALIPERS"

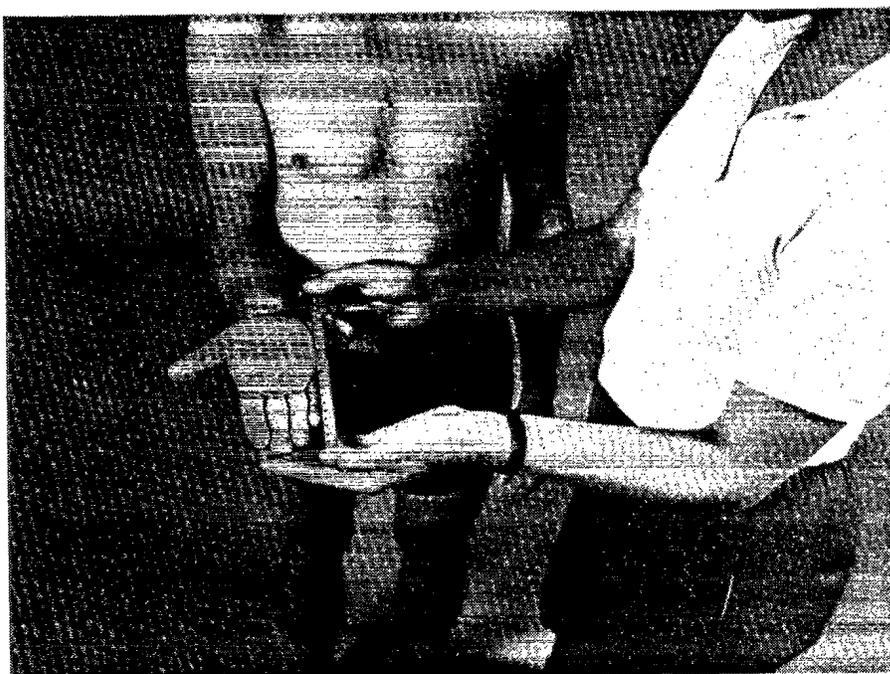
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HAND LENGTH:

Subject's right hand is extended stiffly in the axis of the lower arm, palm upward and fingers together. With the bar of the sliding caliper parallel to the long axis of the hand, measure the distance from the landmark at the base of the hand to the tip of the middle finger.

PERCENTILE TABLE

CM.	%ILE	IN.
17.30	1	6.81
17.70	2	6.97
17.70	3	6.97
17.80	4	7.01
18.00	5	7.09
18.20	10	7.17
18.30	15	7.20
18.50	20	7.28
18.60	25	7.32
18.70	30	7.36
18.90	35	7.44
19.00	40	7.48
19.10	45	7.52
19.20	50	7.56
19.30	55	7.60
19.40	60	7.64
19.50	65	7.68
19.70	70	7.76
19.80	75	7.80
20.00	80	7.87
20.10	85	7.91
20.40	90	8.03
20.90	95	8.23
20.90	96	8.23
21.00	97	8.27
21.20	98	8.35
21.50	99	8.46

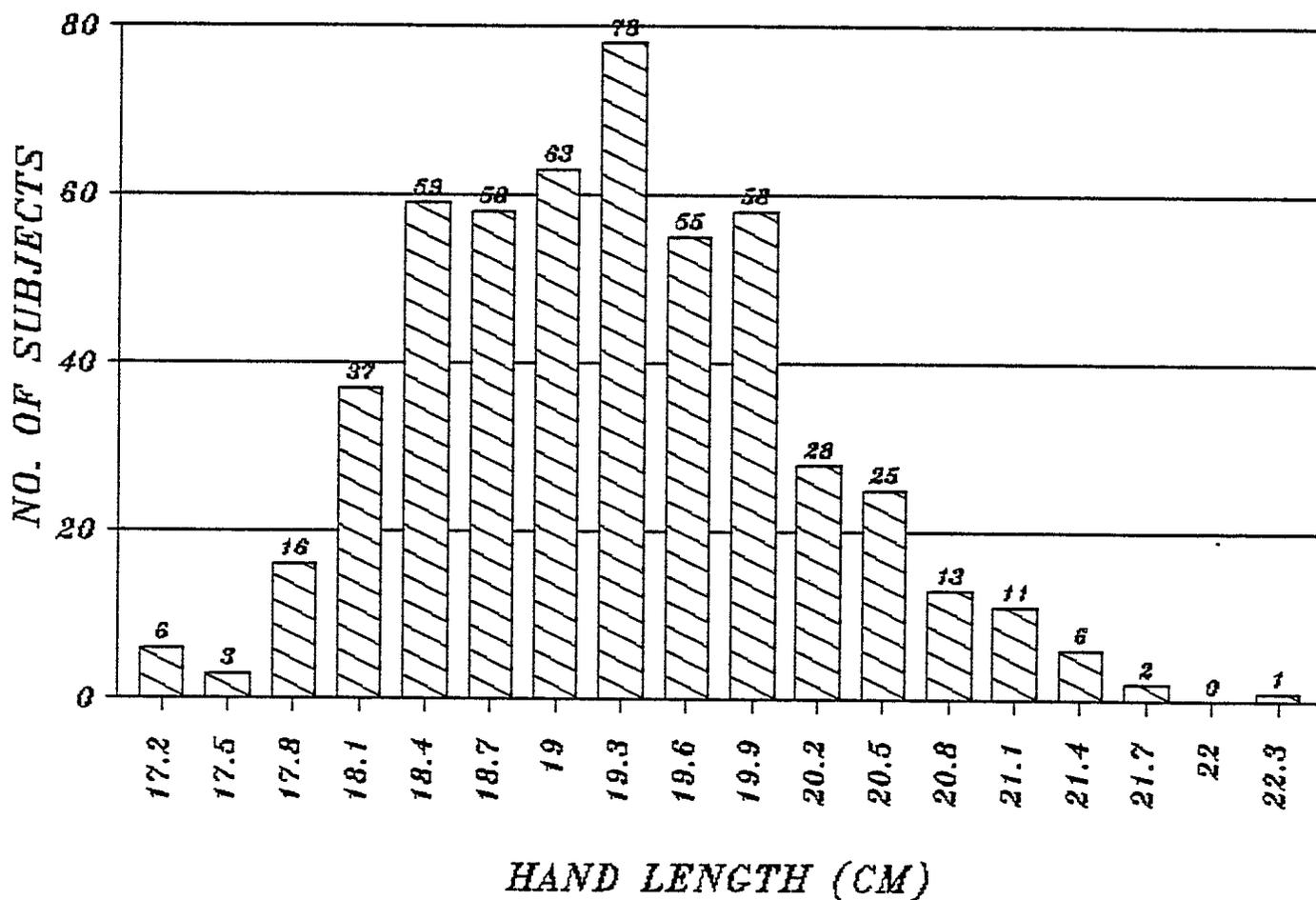


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
17.200	MINIMUM VALUE	6.772
22.300	MAXIMUM VALUE	8.780
5.100	RANGE	2.008
19.248	MEAN	7.578
0.869	STANDARD DEVIATION	0.342
0.038	STANDARD ERROR (SEM)	0.015
0.755	VARIANCE	0.117
0.304	SKEWNESS	0.304
-0.055	KURTOSIS	-0.055

# Frequency Histogram For Hand Length

MIN = 17.2    MAX = 22.3

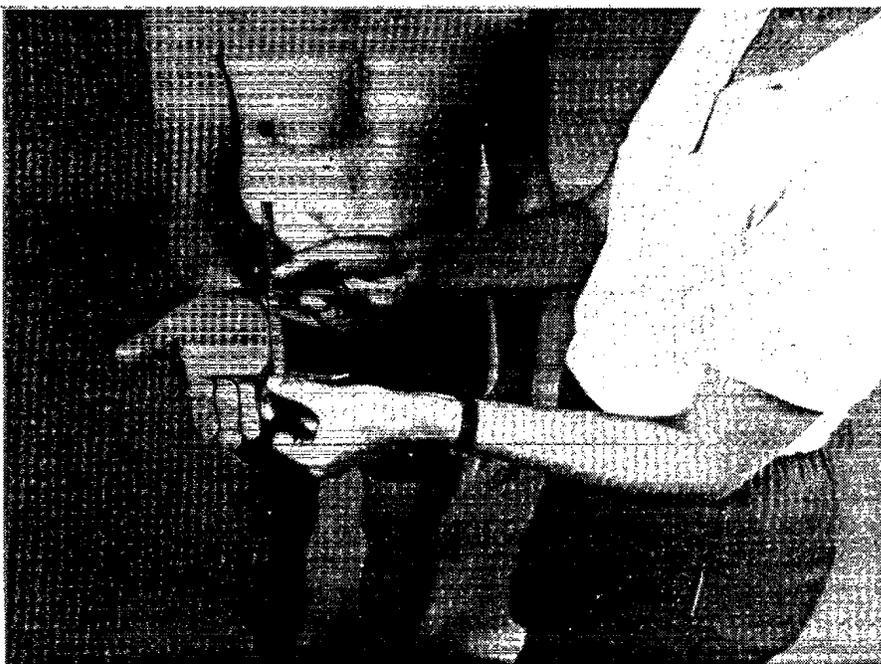


PALM LENGTH:

Subject's right hand is extended stiffly in the axis of the lower arm, palm upward and fingers together. With the bar of the sliding caliper parallel to the long axis of the hand, measure the distance from the landmark at the base of the hand to the skin furrow formed where the middle finger folds upon the hand.

PERCENTILE TABLE

CM.	%ILE	IN.
9.90	1	3.90
10.00	2	3.94
10.05	3	3.96
10.10	4	3.98
10.20	5	4.02
10.30	10	4.06
10.40	15	4.09
10.50	20	4.13
10.70	25	4.21
10.70	30	4.21
10.80	35	4.25
10.90	40	4.29
10.90	45	4.29
11.00	50	4.33
11.10	55	4.37
11.10	60	4.37
11.20	65	4.41
11.30	70	4.45
11.30	75	4.45
11.40	80	4.49
11.60	85	4.57
11.70	90	4.61
11.90	95	4.69
12.00	96	4.72
12.05	97	4.74
12.20	98	4.80
12.50	99	4.92

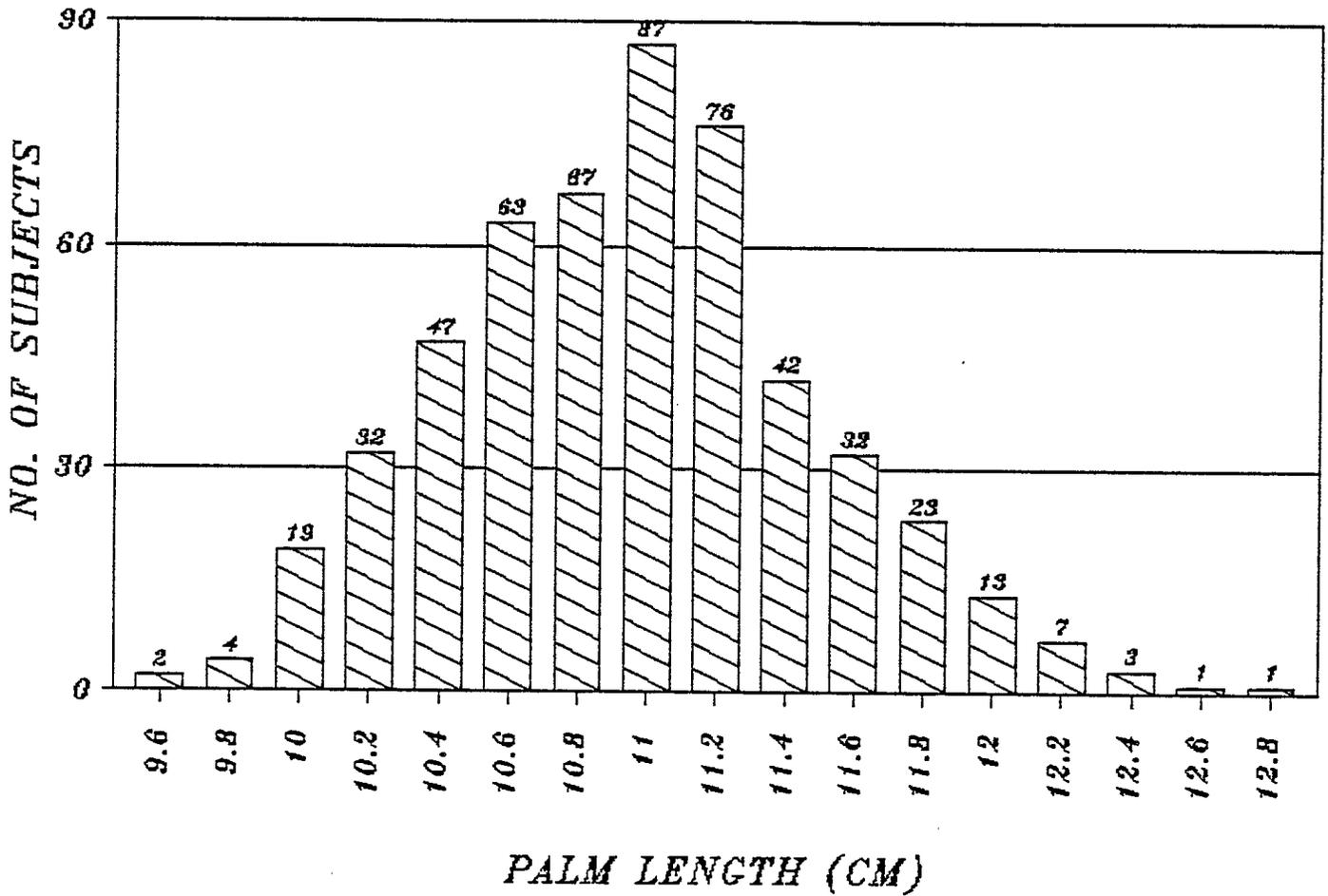


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
9.600	MINIMUM VALUE	3.780
12.900	MAXIMUM VALUE	5.079
3.300	RANGE	1.299
11.009	MEAN	4.334
0.533	STANDARD DEVIATION	0.210
0.023	STANDARD ERROR (SEM)	0.009
0.284	VARIANCE	0.044
0.266	SKEWNESS	0.266
0.084	KURTOSIS	0.084

# Frequency Histogram For Palm Length

MIN = 9.6 MAX = 12.9

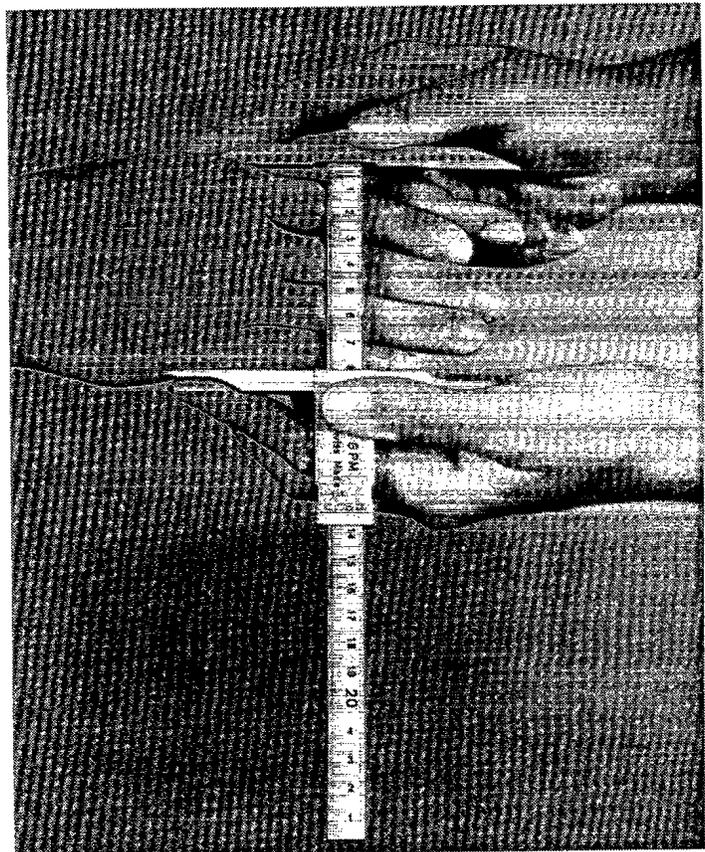


HAND BREADTH AT METACARPALE:

Subject's right hand is extended stiffly, palm upward, the fingers extended and together. The thumb is held away from the hand. Using the sliding caliper, measure the distance across the distal ends of the metacarpal bones.

PERCENTILE TABLE

CM.	%ILE	IN.
7.80	1	3.07
8.00	2	3.15
8.00	3	3.15
8.10	4	3.19
8.10	5	3.19
8.20	10	3.23
8.30	15	3.27
8.30	20	3.27
8.40	25	3.31
8.50	30	3.35
8.50	35	3.35
8.60	40	3.39
8.60	45	3.39
8.70	50	3.43
8.70	55	3.43
8.80	60	3.46
8.80	65	3.46
8.90	70	3.50
9.00	75	3.54
9.00	80	3.54
9.10	85	3.58
9.20	90	3.62
9.40	95	3.70
9.40	96	3.70
9.50	97	3.74
9.50	98	3.74
9.60	99	3.78

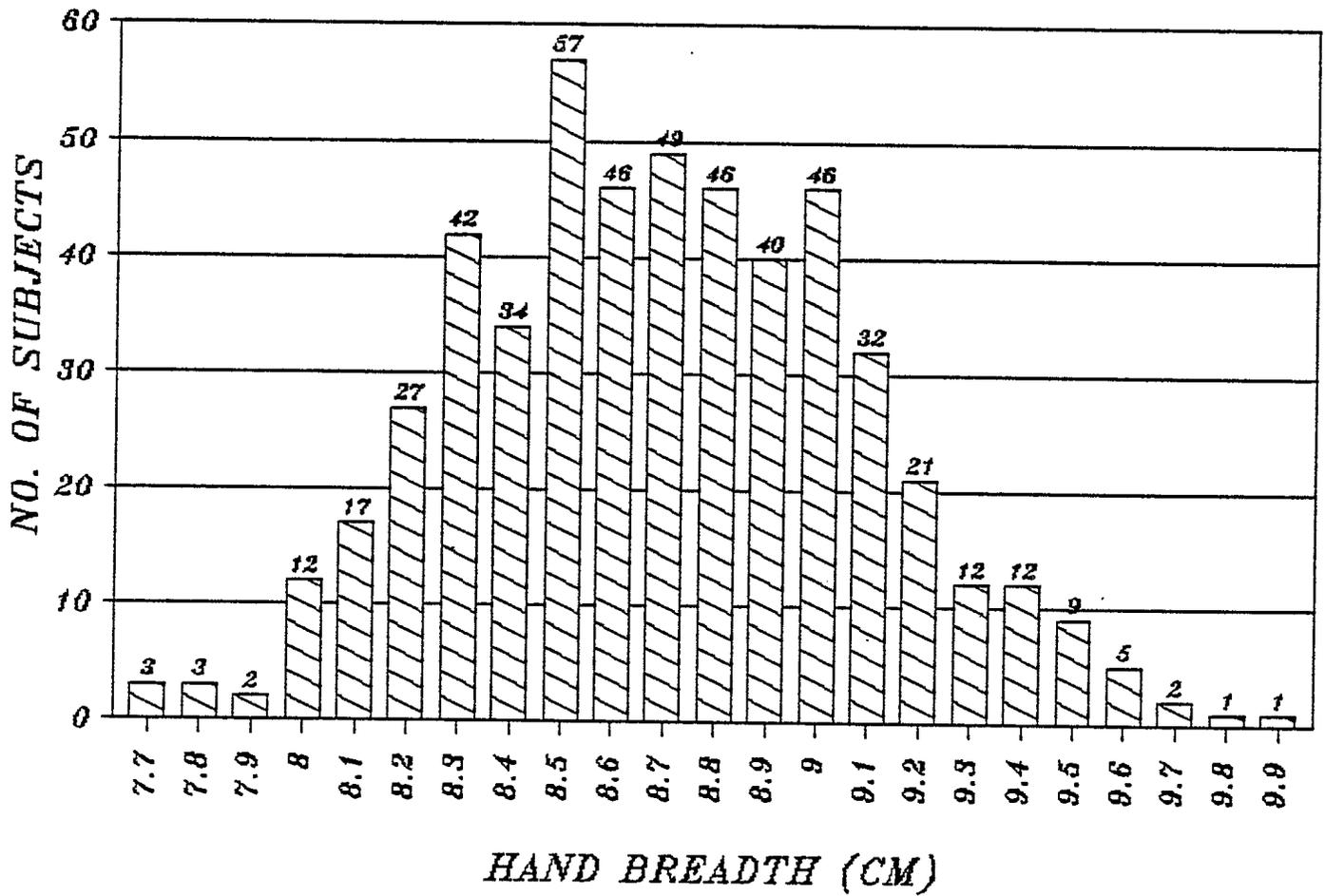


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
7.700	MINIMUM VALUE	3.031
9.900	MAXIMUM VALUE	3.898
2.200	RANGE	0.866
8.698	MEAN	3.424
0.391	STANDARD DEVIATION	0.154
0.017	STANDARD ERROR (SEM)	0.007
0.153	VARIANCE	0.024
0.172	SKEWNESS	0.172
-0.224	KURTOSIS	-0.224

# Frequency Histogram For Hand Breadth

MIN = 7.7 MAX = 9.9

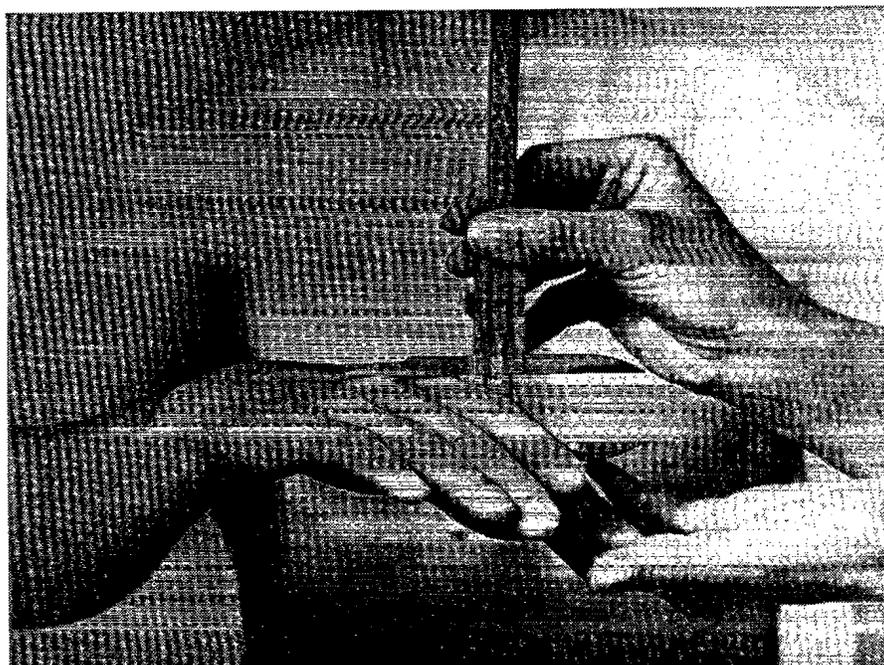


HAND THICKNESS AT METACARPALE III:

Subject's right hand is held with the palm facing downward. The fingers are extended and together, but bent downward slightly on the metacarpal axis from the plane of the palm. Using only the tips of the sliding caliper arms, with light pressure, measure the thickness of the metacarpal-phalangeal joint of the middle finger.

PERCENTILE TABLE

CM.	%ILE	IN.
2.50	1	0.98
2.60	2	1.02
2.60	3	1.02
2.60	4	1.02
2.60	5	1.02
2.70	10	1.06
2.80	15	1.10
2.80	20	1.10
2.80	25	1.10
2.90	30	1.14
2.90	35	1.14
2.90	40	1.14
3.00	45	1.18
3.00	50	1.18
3.00	55	1.18
3.00	60	1.18
3.10	65	1.22
3.10	70	1.22
3.10	75	1.22
3.10	80	1.22
3.20	85	1.26
3.20	90	1.26
3.30	95	1.30
3.30	96	1.30
3.30	97	1.30
3.40	98	1.34
3.40	99	1.34

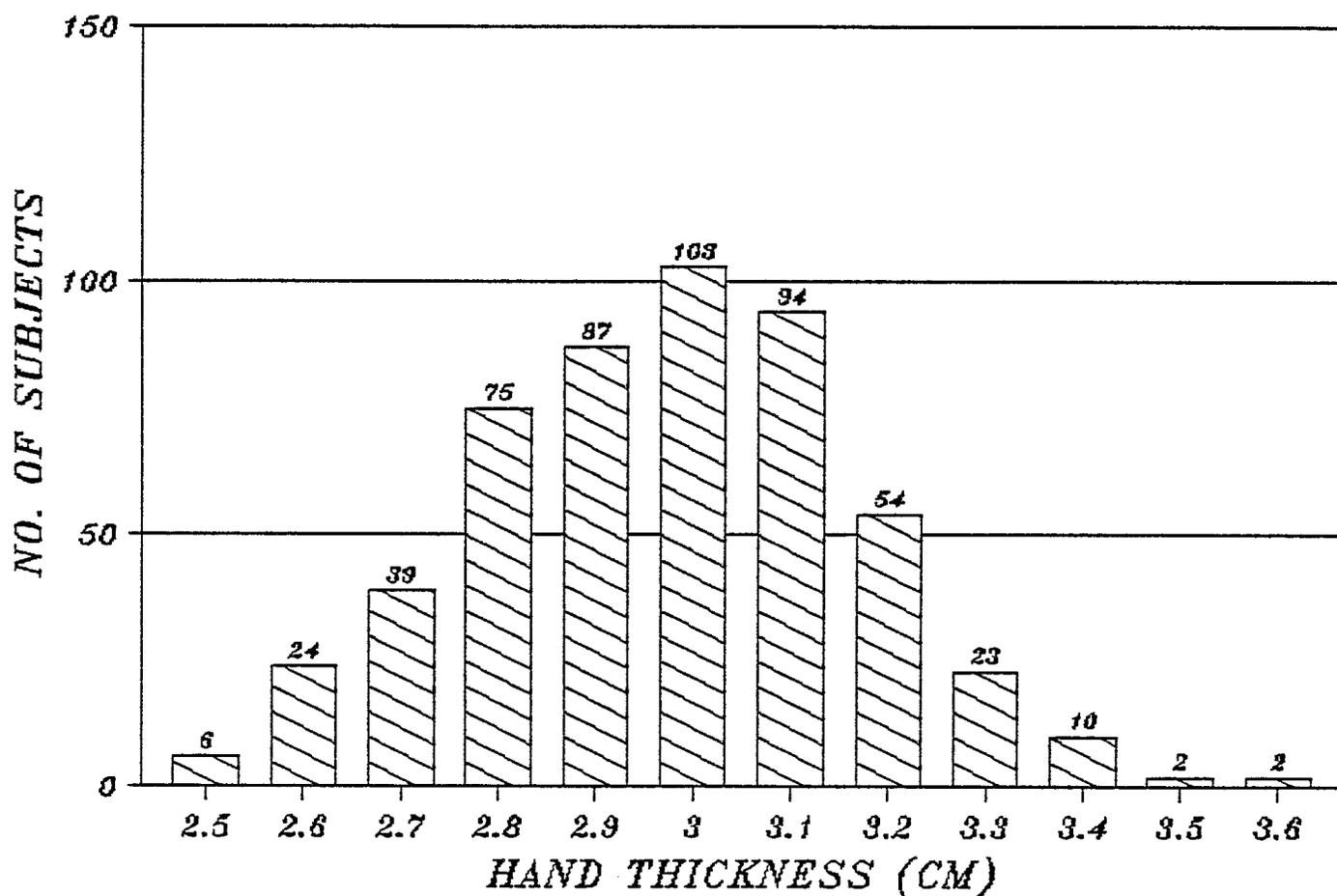


DESCRIPTIVE STATISTICS

CM		IN
519	NUMBER OF CASES	519
2.500	MINIMUM VALUE	0.984
3.600	MAXIMUM VALUE	1.417
1.100	RANGE	0.433
2.972	MEAN	1.170
0.198	STANDARD DEVIATION	0.078
0.009	STANDARD ERROR (SEM)	0.003
0.039	VARIANCE	0.006
0.045	SKEWNESS	0.045
-0.128	KURTOSIS	-0.128

# Frequency Histogram For Hand Thickness

MIN = 2.5    MAX = 3.6



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SITTING CIRCUMFERENCES

USING THE

"MEASURING TAPE"

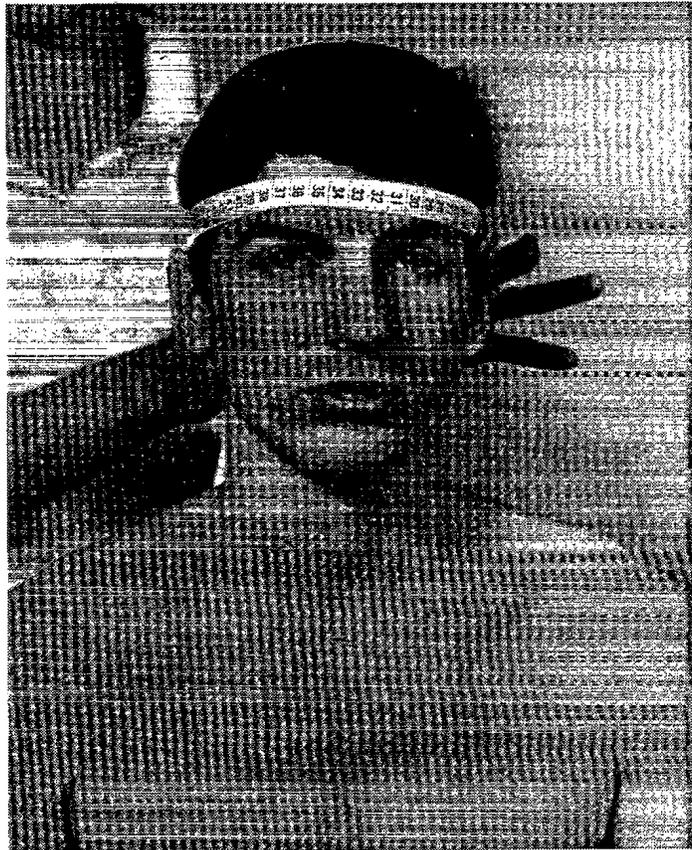
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**HEAD CIRCUMFERENCE:**

Subject sits. With the tape passing above (but not including) the brow ridges, measure the maximum circumference of the head.

**PERCENTILE TABLE**

CM.	%ILE	IN.
54.80	1	21.57
55.35	2	21.79
55.50	3	21.85
55.70	4	21.93
55.80	5	21.97
56.40	10	22.20
56.70	15	22.32
56.90	20	22.40
57.10	25	22.48
57.30	30	22.56
57.50	35	22.64
57.70	40	22.72
57.90	45	22.80
58.10	50	22.87
58.30	55	22.95
58.40	60	22.99
58.60	65	23.07
58.90	70	23.19
59.10	75	23.27
59.40	80	23.39
59.60	85	23.46
60.00	90	23.62
60.60	95	23.86
60.90	96	23.98
61.00	97	24.02
61.35	98	24.15
61.80	99	24.33

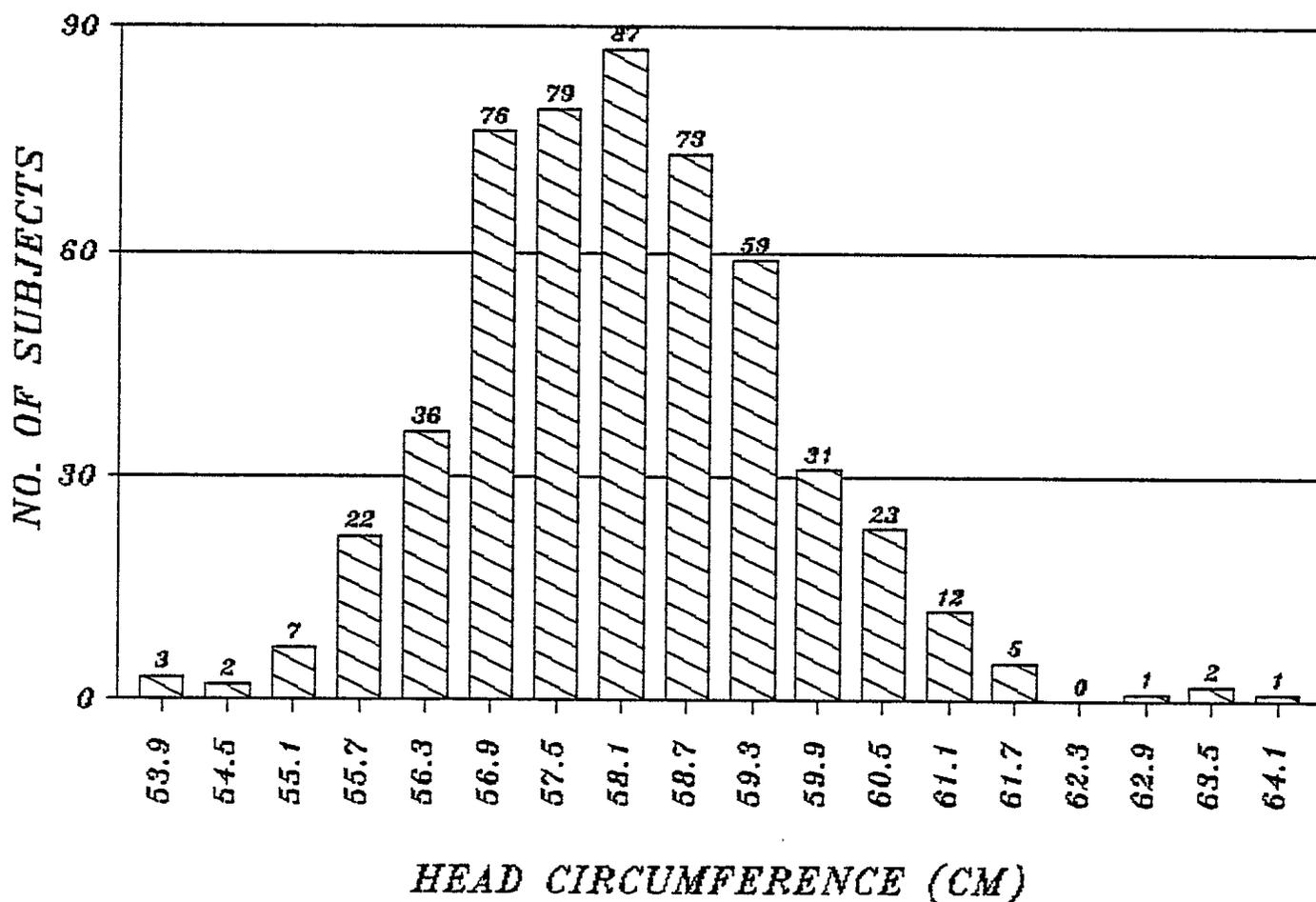


**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
53.700	MINIMUM VALUE	21.142
64.200	MAXIMUM VALUE	25.276
10.500	RANGE	4.134
58.155	MEAN	22.896
1.478	STANDARD DEVIATION	0.582
0.065	STANDARD ERROR (SEM)	0.026
2.184	VARIANCE	0.339
0.326	SKEWNESS	0.326
0.686	KURTOSIS	0.686

# Freq. Histogram For Head Circumference

MIN = 53.7    MAX = 64.2



**BICEPS CIRCUMFERENCE FLEXED:**

Subject bends his right arm and makes a fist while holding the upper arm horizontally. Using the tape, measure the circumference of the arm at the biceps circumference landmark.

**PERCENTILE TABLE**

CM.	%ILE	IN.
28.40	1	11.18
29.05	2	11.44
29.25	3	11.52
29.40	4	11.57
29.60	5	11.65
30.40	10	11.97
31.00	15	12.20
31.30	20	12.32
31.70	25	12.48
32.00	30	12.60
32.40	35	12.76
32.70	40	12.87
33.00	45	12.99
33.30	50	13.11
33.50	55	13.19
33.80	60	13.31
34.10	65	13.43
34.50	70	13.58
34.80	75	13.70
35.30	80	13.90
35.90	85	14.13
36.40	90	14.33
37.40	95	14.72
37.70	96	14.84
38.20	97	15.04
38.45	98	15.14
39.90	99	15.71

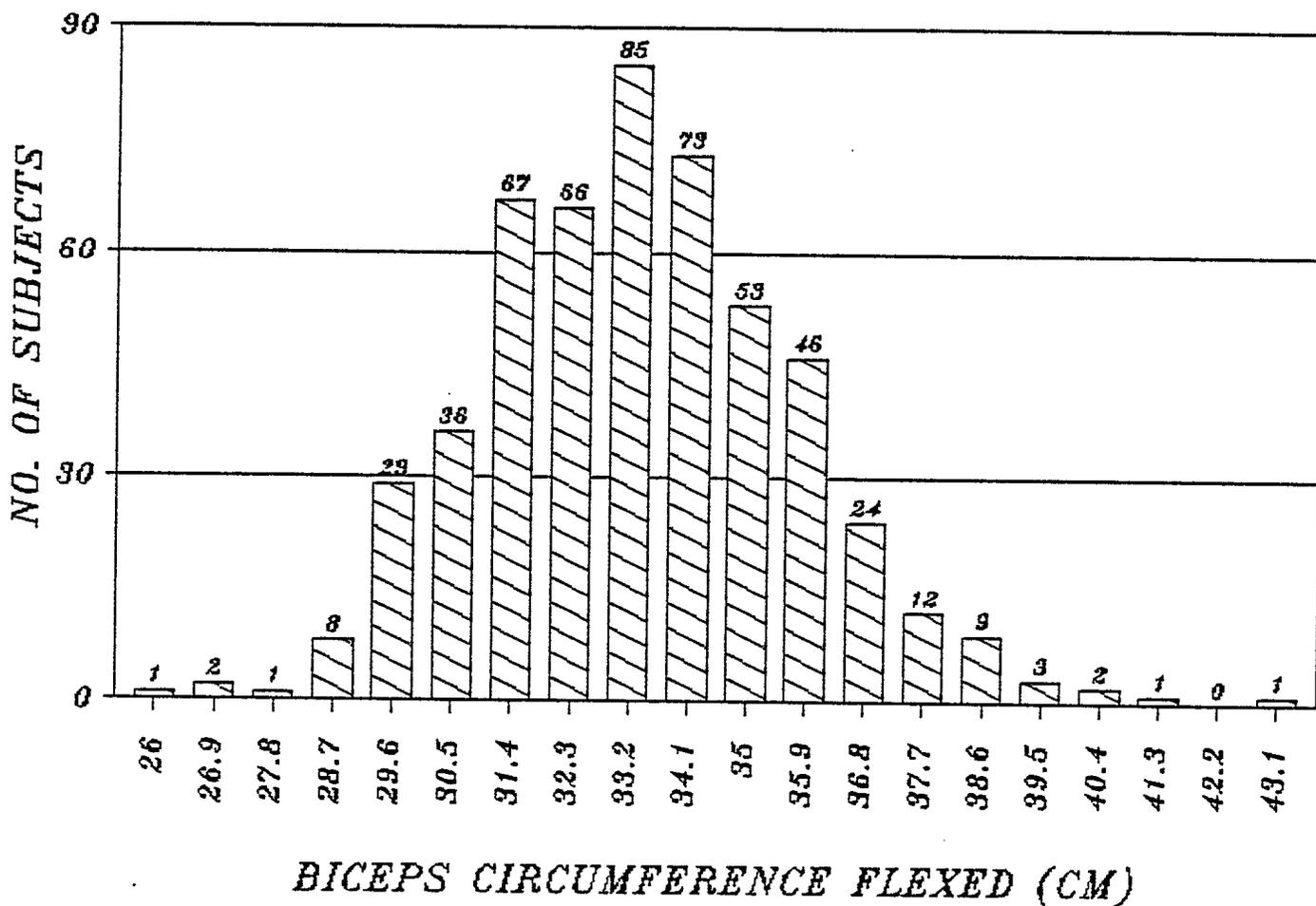


**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
26.000	MINIMUM VALUE	10.236
43.500	MAXIMUM VALUE	17.126
17.500	RANGE	6.890
33.363	MEAN	13.135
2.398	STANDARD DEVIATION	0.944
0.105	STANDARD ERROR (SEM)	0.041
5.748	VARIANCE	0.891
0.345	SKEWNESS	0.345
0.548	KURTOSIS	0.548

# Freq. Histogram For Biceps Circ. Flexed

MIN = 26.0    MAX = 43.5

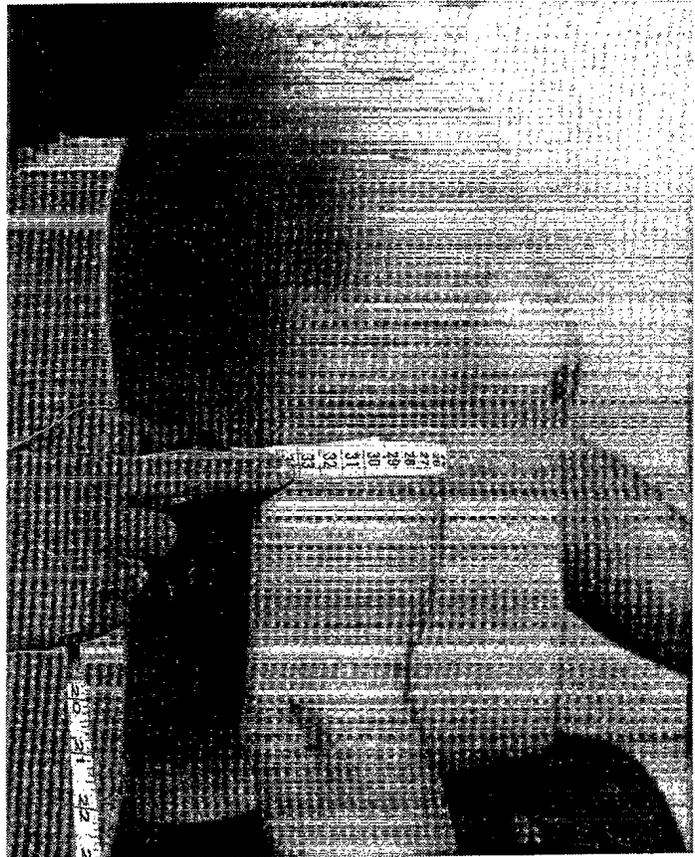


BICEPS CIRCUMFERENCE RELAXED:

Subject stands, his right arm extended with the hand about a foot from the body. Holding the tape perpendicular to the long axis of the upper arm at the biceps circumference landmark.

PERCENTILE TABLE

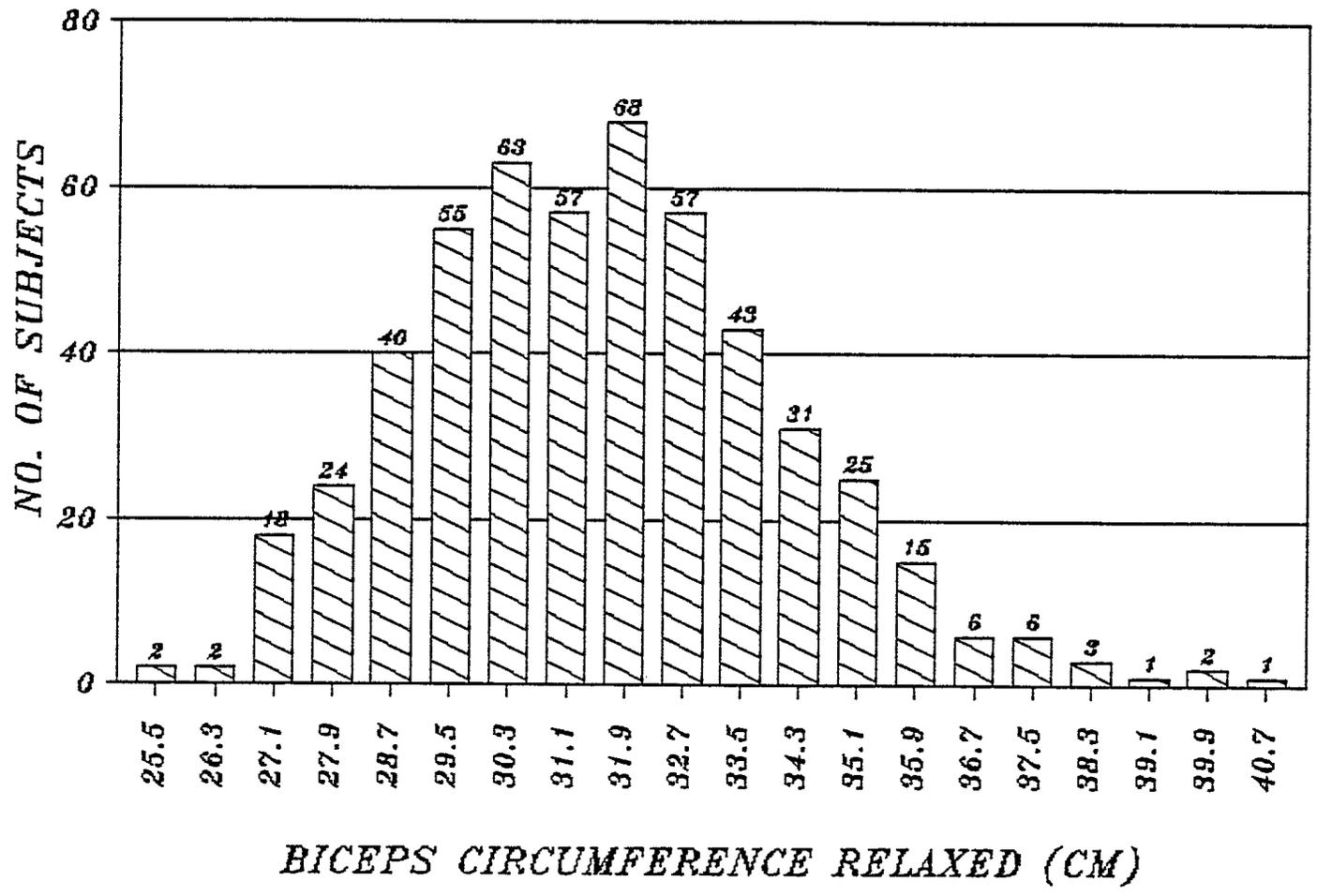
CM.	%ILE	IN.
26.80	1	10.55
27.15	2	10.69
27.35	3	10.77
27.50	4	10.83
27.70	5	10.91
28.50	10	11.22
28.90	15	11.38
29.40	20	11.57
29.80	25	11.73
30.10	30	11.85
30.50	35	12.01
30.80	40	12.13
31.20	45	12.28
31.50	50	12.40
31.80	55	12.52
32.20	60	12.68
32.40	65	12.76
32.80	70	12.91
33.20	75	13.07
33.50	80	13.19
34.40	85	13.54
34.80	90	13.70
36.00	95	14.17
36.20	96	14.25
36.80	97	14.49
37.40	98	14.72
38.70	99	15.24



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
25.100	MINIMUM VALUE	9.882
41.100	MAXIMUM VALUE	16.181
16.000	RANGE	6.299
31.620	MEAN	12.449
2.525	STANDARD DEVIATION	0.994
0.111	STANDARD ERROR (SEM)	0.044
6.374	VARIANCE	0.988
0.435	SKEWNESS	0.435
0.305	KURTOSIS	0.305

*Freq. Histogram: Biceps Circ. Relaxed*  
 MIN = 25.1    MAX = 41.1



**FOREARM CIRCUMFERENCE FLEXED:**

The maximum circumference of the lower arm positioned at a right angle to the horizontal upper arm. The fist is clenched.

**PERCENTILE TABLE**

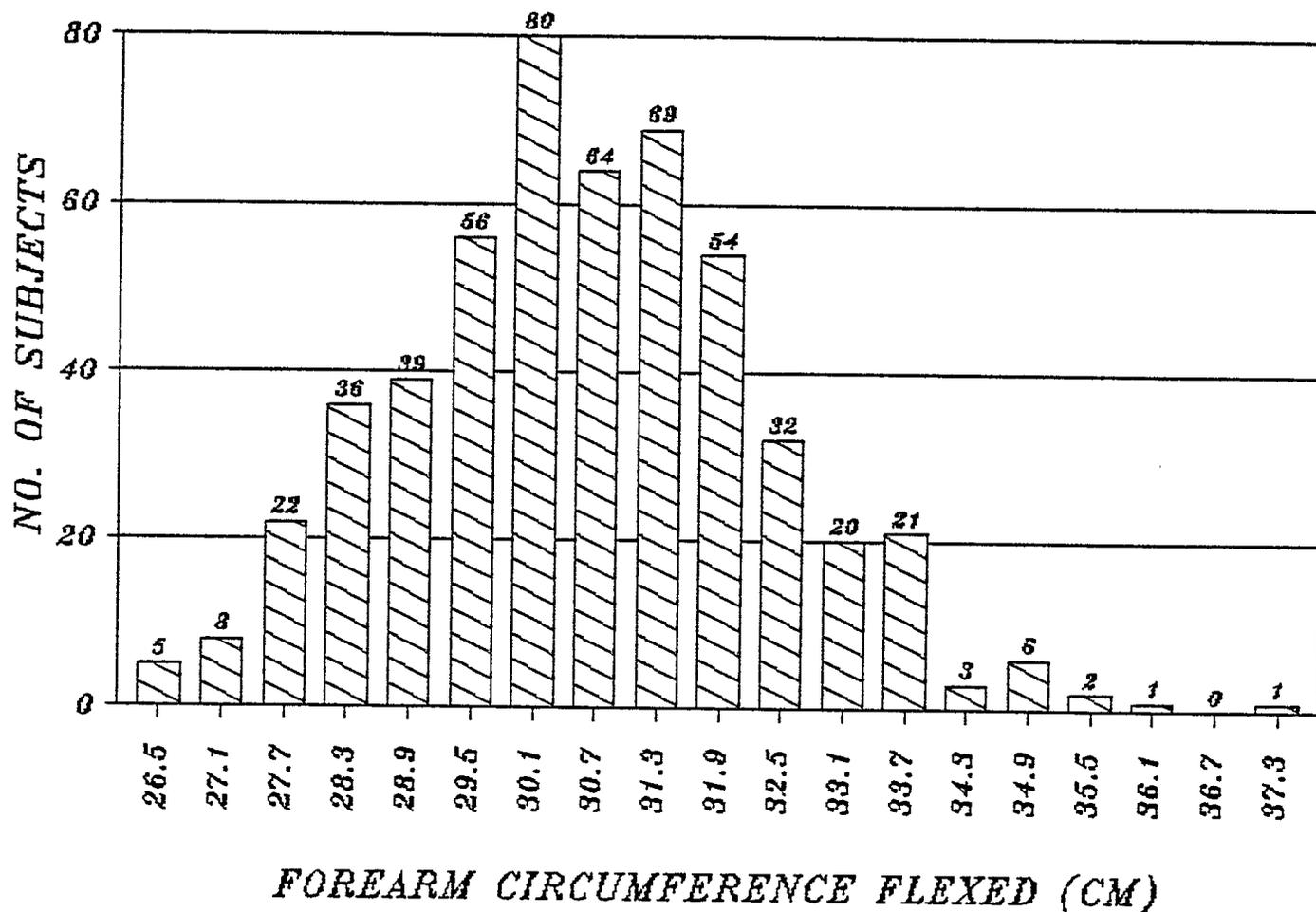
CM.	%ILE	IN.
26.80	1	10.55
27.35	2	10.77
27.50	3	10.83
27.60	4	10.87
27.80	5	10.94
28.30	10	11.14
28.80	15	11.34
29.20	20	11.50
29.50	25	11.61
29.80	30	11.73
29.90	35	11.77
30.20	40	11.89
30.30	45	11.93
30.60	50	12.05
30.80	55	12.13
31.10	60	12.24
31.30	65	12.32
31.50	70	12.40
31.70	75	12.48
32.00	80	12.60
32.40	85	12.76
32.90	90	12.95
33.60	95	13.23
33.70	96	13.27
34.00	97	13.39
34.60	98	13.62
35.00	99	13.78



**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
26.400	MINIMUM VALUE	10.394
37.300	MAXIMUM VALUE	14.685
10.900	RANGE	4.291
30.637	MEAN	12.062
1.748	STANDARD DEVIATION	0.688
0.077	STANDARD ERROR (SEM)	0.030
3.055	VARIANCE	0.474
0.273	SKEWNESS	0.273
0.217	KURTOSIS	0.217

*Freq. Histogram: Forearm Circ. Flexed*  
 MIN = 26.4 MAX = 37.3

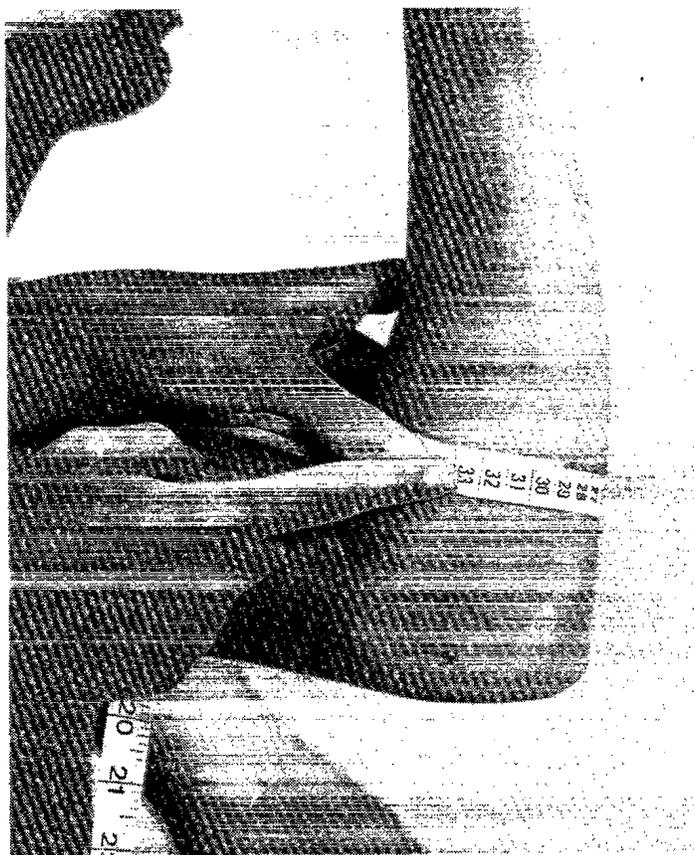


FOREARM CIRCUMFERENCE RELAXED:

The maximum circumference of the lower arm positioned at a right angle to the horizontal upper arm. The fist is relaxed.

PERCENTILE TABLE

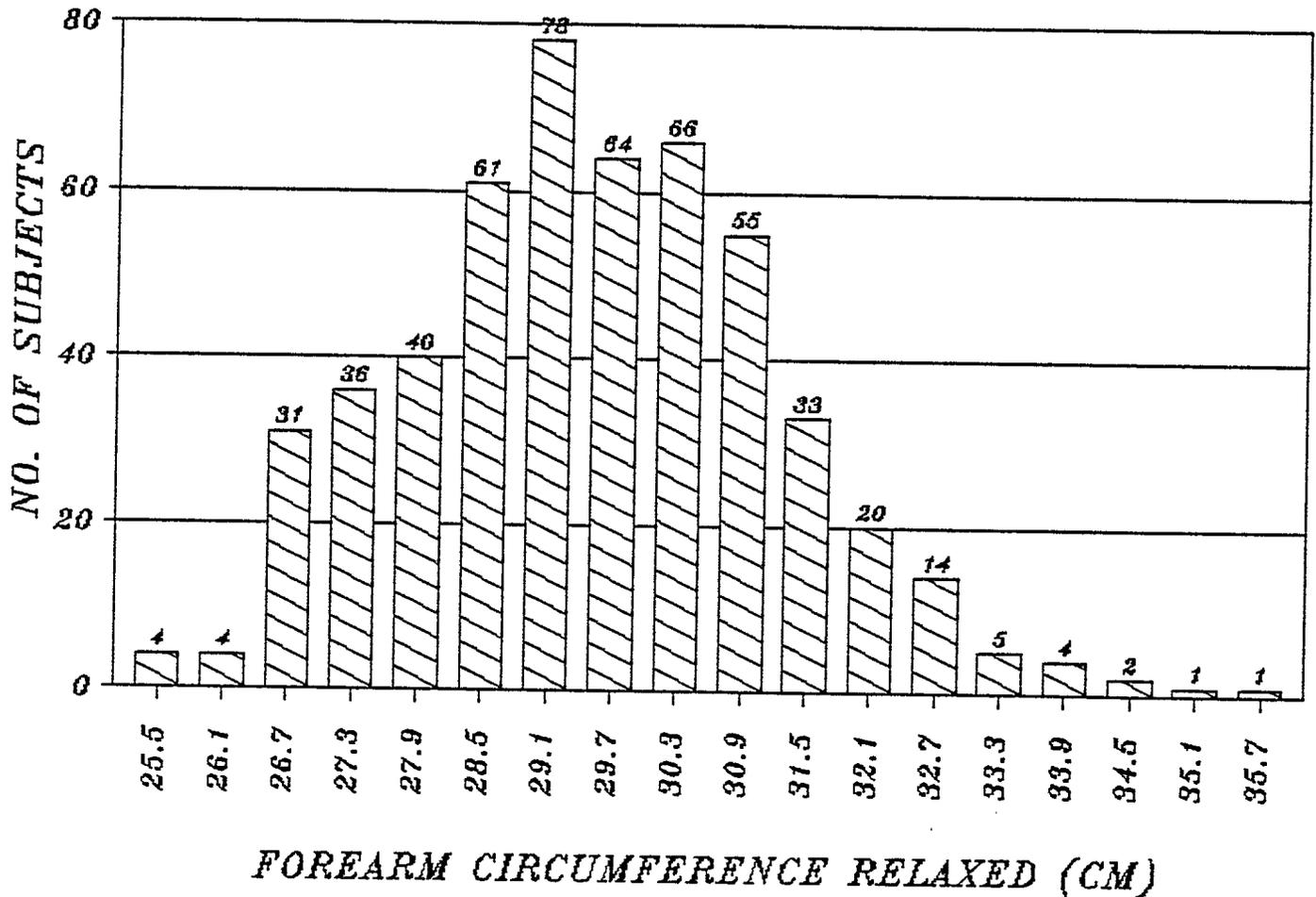
CM.	%ILE	IN.
26.00	1	10.24
26.50	2	10.43
26.60	3	10.47
26.70	4	10.51
26.80	5	10.55
27.20	10	10.71
27.70	15	10.91
28.00	20	11.02
28.40	25	11.18
28.60	30	11.26
28.90	35	11.38
29.10	40	11.46
29.30	45	11.54
29.50	50	11.61
29.60	55	11.65
30.00	60	11.81
30.20	65	11.89
30.50	70	12.01
30.70	75	12.09
30.90	80	12.17
31.30	85	12.32
31.80	90	12.52
32.50	95	12.80
32.70	96	12.87
32.90	97	12.95
33.20	98	13.07
34.00	99	13.39



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
25.500	MINIMUM VALUE	10.039
35.700	MAXIMUM VALUE	14.055
10.200	RANGE	4.016
29.556	MEAN	11.636
1.723	STANDARD DEVIATION	0.678
0.076	STANDARD ERROR (SEM)	0.030
2.968	VARIANCE	0.460
0.263	SKEWNESS	0.263
0.061	KURTOSIS	0.061

*Freq. Histogram: Forearm Circ. Relaxed*  
MIN = 25.5    MAX = 35.7



WRIST CIRCUMFERENCE:

The circumference of the wrist at the level of the tip of the styloid process of the radius.

PERCENTILE TABLE

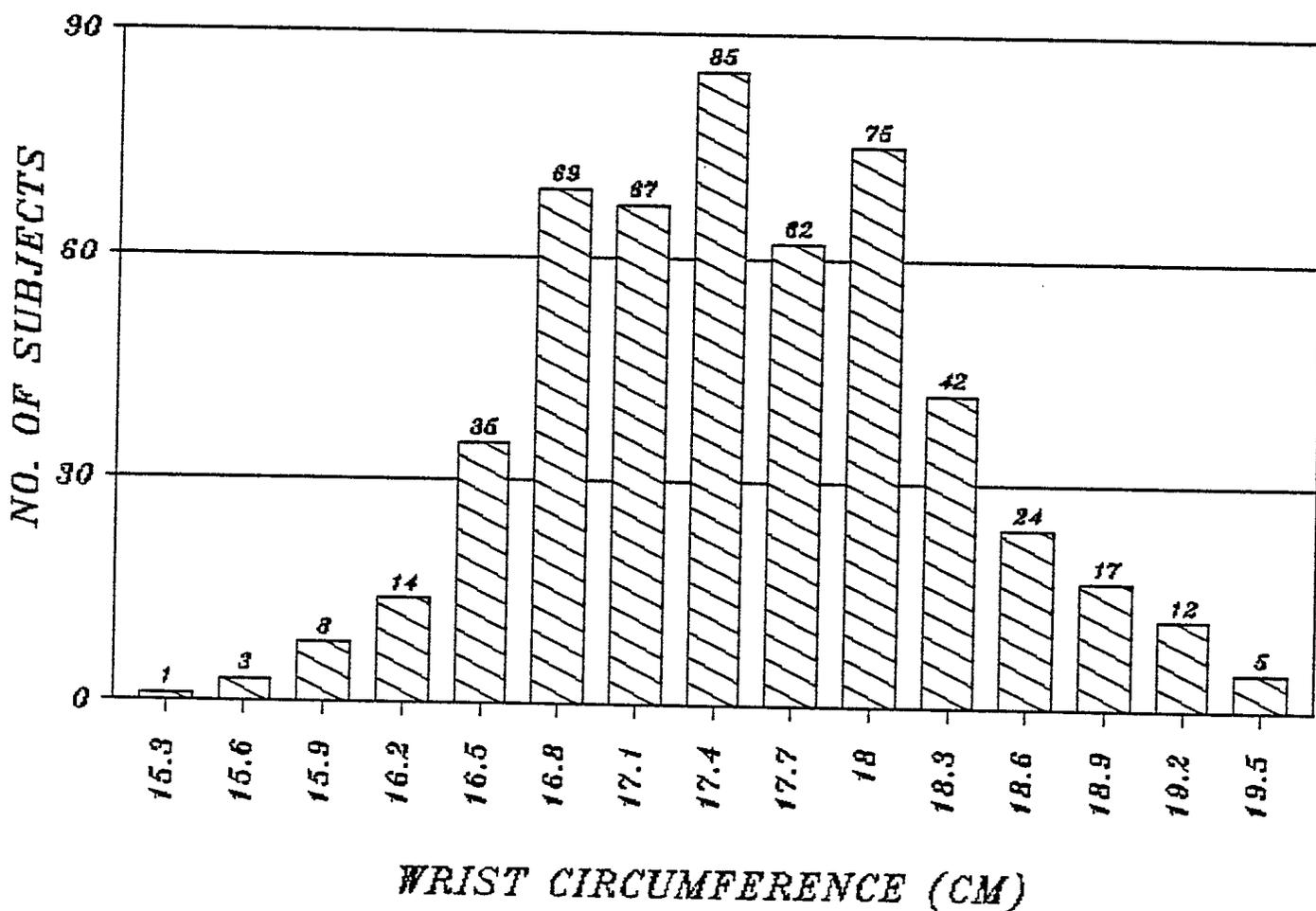
CM.	%ILE	IN.
15.80	1	6.22
16.00	2	6.30
16.20	3	6.38
16.20	4	6.38
16.30	5	6.42
16.60	10	6.54
16.70	15	6.57
16.80	20	6.61
16.90	25	6.65
17.00	30	6.69
17.20	35	6.77
17.30	40	6.81
17.40	45	6.85
17.50	50	6.89
17.60	55	6.93
17.70	60	6.97
17.80	65	7.01
17.90	70	7.05
18.00	75	7.09
18.10	80	7.13
18.30	85	7.20
18.50	90	7.28
18.90	95	7.44
18.90	96	7.44
19.10	97	7.52
19.20	98	7.56
19.50	99	7.68



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
15.300	MINIMUM VALUE	6.024
19.600	MAXIMUM VALUE	7.717
4.300	RANGE	1.693
17.508	MEAN	6.893
0.767	STANDARD DEVIATION	0.302
0.034	STANDARD ERROR (SEM)	0.013
0.588	VARIANCE	0.091
0.174	SKEWNESS	0.174
-0.116	KURTOSIS	-0.116

*Freq. Histogram For Wrist Circumference*  
MIN = 15.3    MAX = 19.6

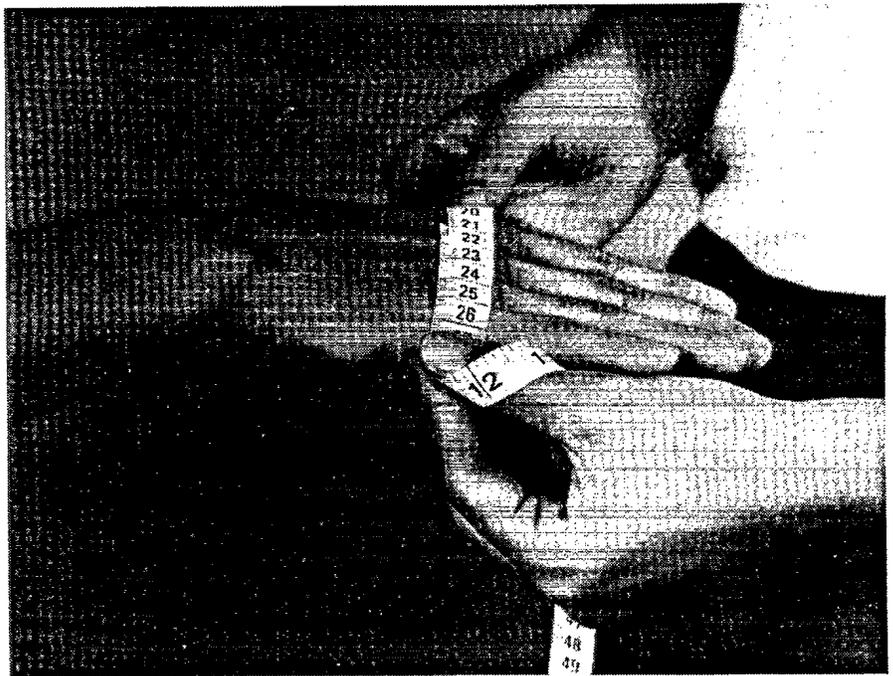


HAND CIRCUMFERENCE AROUND METACARPALE:

The subject stiffens his hand with the fingers extended and together. The thumb is held away from the hand. Measure the circumference around the hand at the level of the metacarpal-phalangeal joints of the palm.

PERCENTILE TABLE

CM.	%ILE	IN.
19.70	1	7.76
19.90	2	7.83
20.05	3	7.89
20.20	4	7.95
20.20	5	7.95
20.50	10	8.07
20.80	15	8.19
21.00	20	8.27
21.10	25	8.31
21.30	30	8.39
21.40	35	8.43
21.60	40	8.50
21.70	45	8.54
21.70	50	8.54
21.90	55	8.62
22.00	60	8.66
22.10	65	8.70
22.30	70	8.78
22.40	75	8.82
22.60	80	8.90
22.80	85	8.98
23.00	90	9.06
23.40	95	9.21
23.60	96	9.29
23.70	97	9.33
23.80	98	9.37
24.20	99	9.53

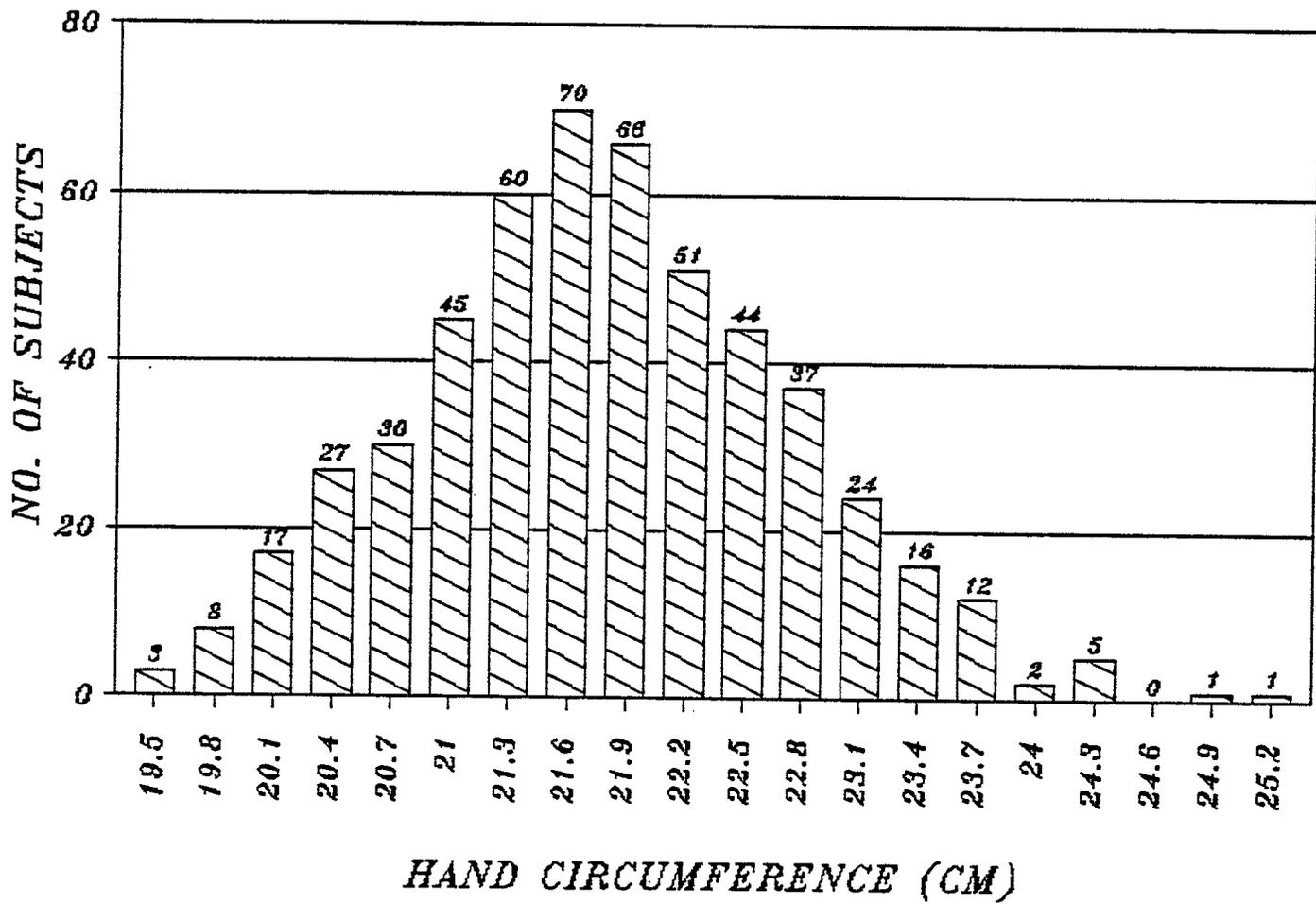


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
19.500	MINIMUM VALUE	7.677
25.100	MAXIMUM VALUE	9.882
5.600	RANGE	2.205
21.801	MEAN	8.583
0.963	STANDARD DEVIATION	0.379
0.042	STANDARD ERROR (SEM)	0.017
0.928	VARIANCE	0.144
0.226	SKEWNESS	0.226
0.001	KURTOSIS	0.001

# Freq. Histogram For Hand Circumference

MIN = 19.5    MAX = 25.1



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**STANDING CIRCUMFERENCES**

**USING THE**

**"MEASURING TAPE"**

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NECK CIRCUMFERENCE:

Subject stands erect. Holding the tape perpendicular to the long axis of the neck, measure the maximum circumference of the neck, including the "Adam's Apple" (hyoid bone).

PERCENTILE TABLE

CM.	ZILE	IN.
34.80	1	13.70
35.10	2	13.82
35.40	3	13.94
35.50	4	13.98
35.70	5	14.06
36.30	10	14.29
36.80	15	14.49
37.10	20	14.61
37.40	25	14.72
37.60	30	14.80
37.90	35	14.92
38.10	40	15.00
38.30	45	15.08
38.60	50	15.20
38.90	55	15.31
39.10	60	15.39
39.40	65	15.51
39.70	70	15.63
40.00	75	15.75
40.30	80	15.87
40.70	85	16.02
41.40	90	16.30
42.30	95	16.65
42.80	96	16.85
43.15	97	16.99
43.35	98	17.07
44.10	99	17.36

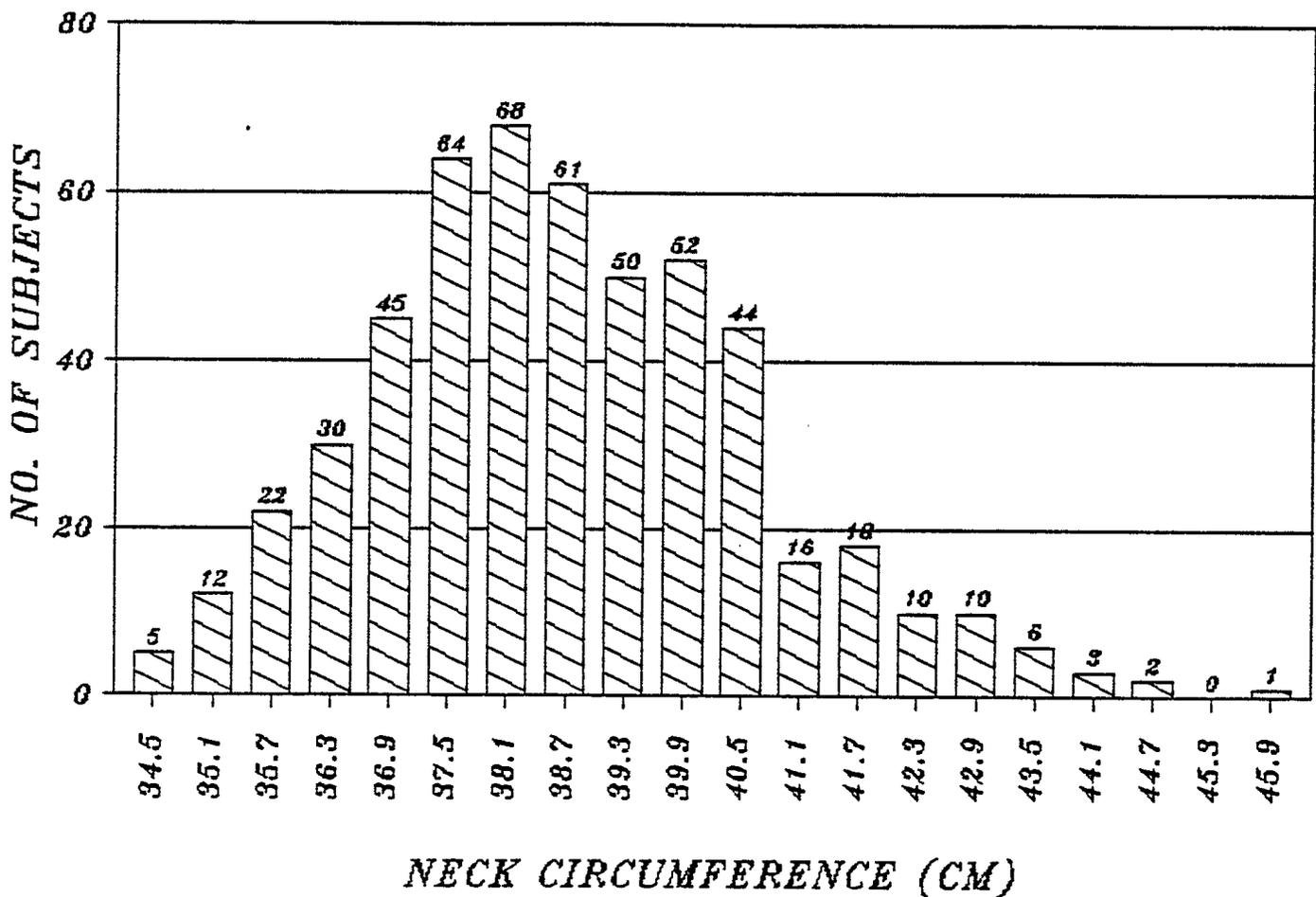


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
34.200	MINIMUM VALUE	13.465
46.200	MAXIMUM VALUE	18.189
12.000	RANGE	4.724
38.759	MEAN	15.259
3.896	VARIANCE	0.604
1.974	STANDARD DEVIATION	0.777
0.087	STANDARD ERROR (SEM)	0.034
0.434	SKEWNESS	0.434
0.212	KURTOSIS	0.212

# Freq. Histogram For Neck Circumference

MIN = 34.2    MAX = 46.2

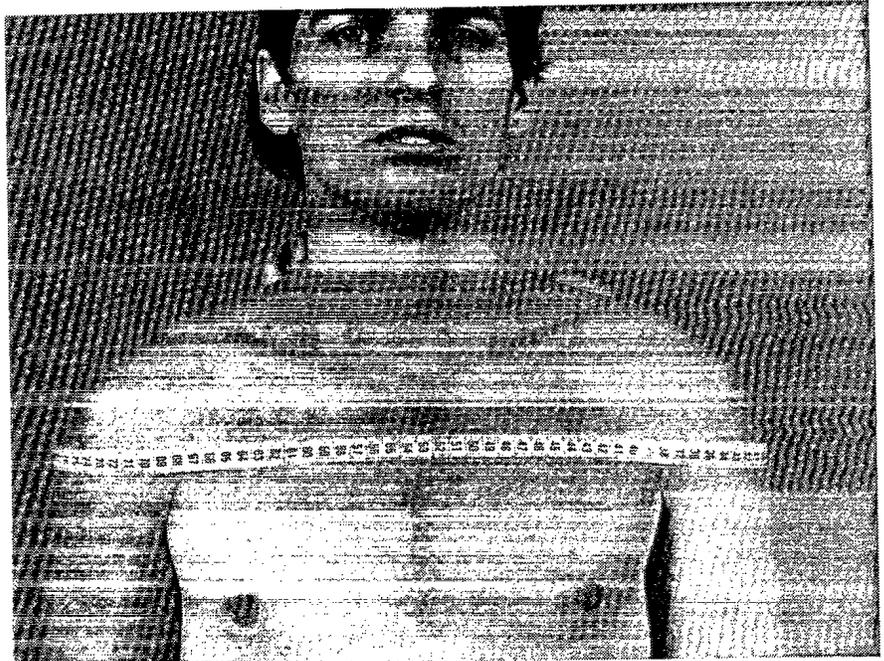


SHOULDER CIRCUMFERENCE:

Subject stands erect. Holding the tape in a horizontal plane, measure the maximum circumference of the shoulders at the level of the greatest lateral protrusion of the deltoid muscles.

PERCENTILE TABLE

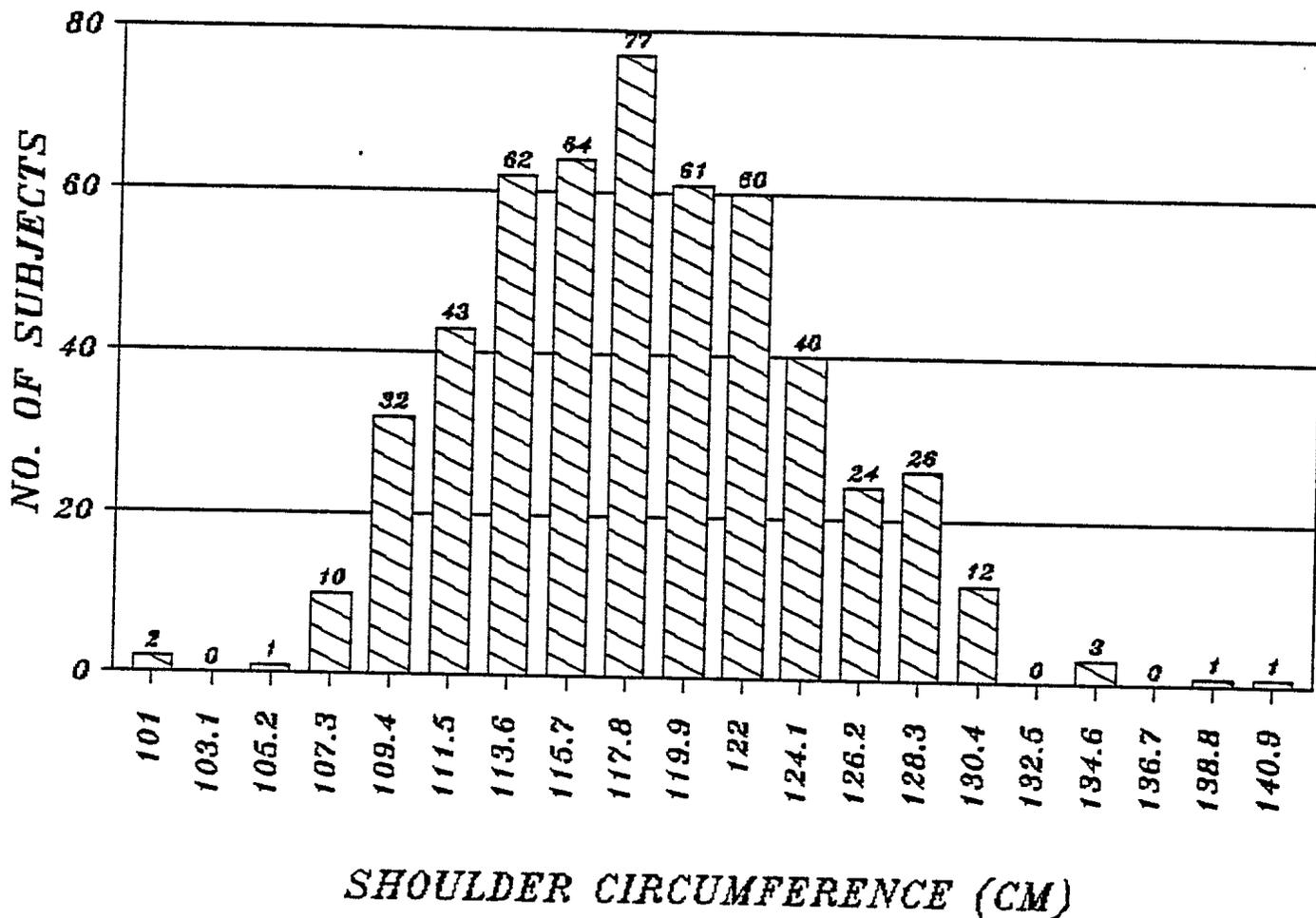
CM.	%ILE	IN.
106.80	1	42.05
107.40	2	42.28
108.65	3	42.78
109.30	4	43.03
109.60	5	43.15
110.90	10	43.66
112.10	15	44.13
113.20	20	44.57
114.00	25	44.88
114.80	30	45.20
115.80	35	45.59
116.50	40	45.87
117.30	45	46.18
118.10	50	46.50
118.70	55	46.73
119.40	60	47.01
120.40	65	47.40
121.30	70	47.76
122.50	75	48.23
123.20	80	48.50
124.70	85	49.09
126.30	90	49.72
128.60	95	50.63
128.90	96	50.75
129.90	97	51.14
130.75	98	51.48
134.00	99	52.76



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
100.600	MINIMUM VALUE	39.606
141.800	MAXIMUM VALUE	55.827
41.200	RANGE	16.220
118.342	MEAN	46.591
5.929	STANDARD DEVIATION	2.334
0.260	STANDARD ERROR (SEM)	0.102
35.153	VARIANCE	5.449
0.303	SKEWNESS	0.303
0.154	KURTOSIS	0.154

*Freq. Histogram: Shoulder Circumference*  
 MIN = 100.6 MAX = 141.8

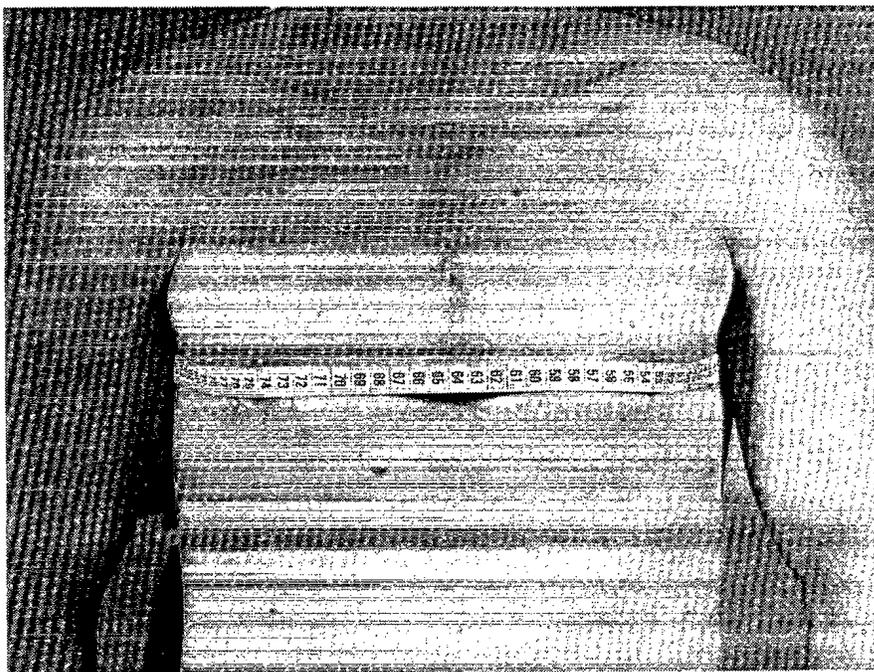


CHEST CIRCUMFERENCE:

Subject stands erect, his arms initially raised then lowered after the tape is in place. Holding the tape in a horizontal plane at the level of the nipples, measure the maximum circumference of the chest during normal breathing.

PERCENTILE TABLE

CM.	%ILE	IN.
88.10	1	34.68
89.10	2	35.08
90.00	3	35.43
91.00	4	35.83
91.30	5	35.94
93.60	10	36.85
94.70	15	37.28
95.80	20	37.72
96.80	25	38.11
97.60	30	38.43
98.80	35	38.90
99.70	40	39.25
100.30	45	39.49
101.40	50	39.92
102.10	55	40.20
103.20	60	40.63
104.60	65	41.18
105.60	70	41.57
106.70	75	42.01
108.00	80	42.52
109.00	85	42.91
111.10	90	43.74
113.60	95	44.72
114.20	96	44.96
115.25	97	45.37
117.60	98	46.30
120.30	99	47.36

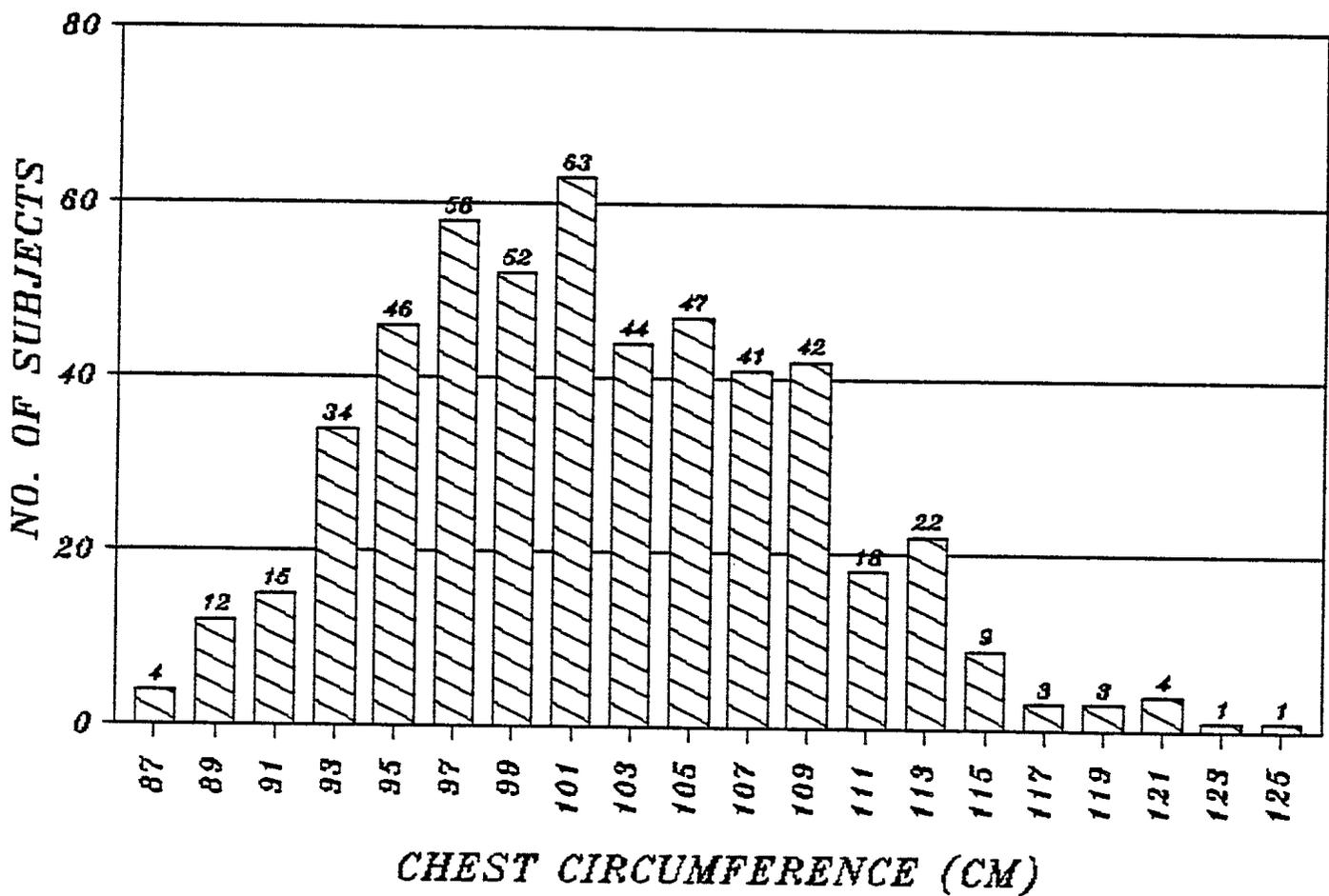


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
87.300	MINIMUM VALUE	34.370
125.800	MAXIMUM VALUE	49.527
38.500	RANGE	15.157
101.898	MEAN	40.117
6.873	STANDARD DEVIATION	2.706
0.302	STANDARD ERROR (SEM)	0.119
47.233	VARIANCE	7.321
0.364	SKEWNESS	0.364
-0.088	KURTOSIS	-0.088

# Freq. Histogram For Chest Circumference

MIN = 87.3    MAX = 125.8

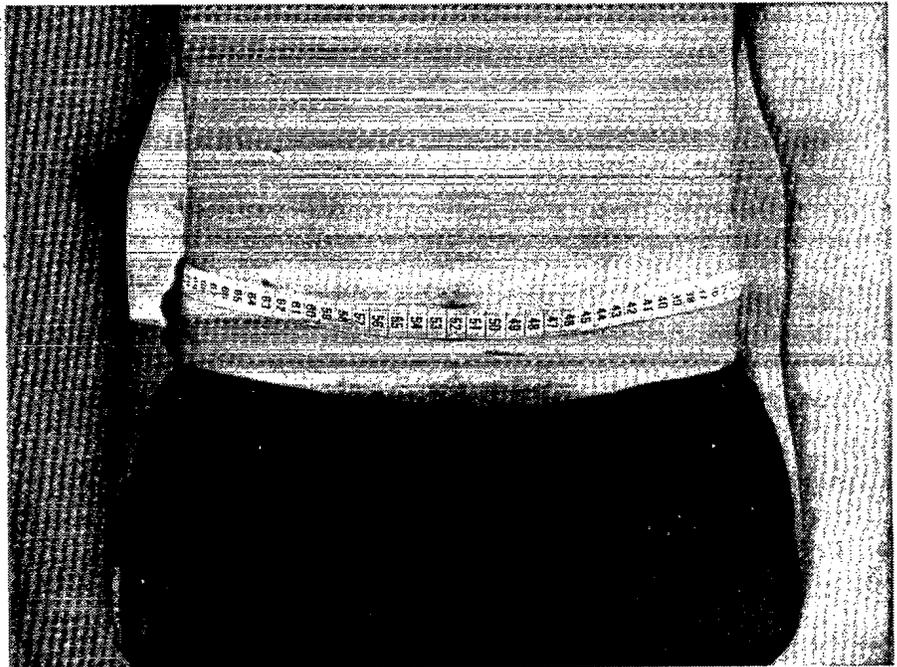


WAIST CIRCUMFERENCE (OMPHALION):

Subject stands erect with his head in the Frankfort Plane, heels together and weight distributed equally over both feet. With the tape held in the horizontal plane of the circumference of the trunk at the level of the omphalion. The reading is made at the average point of quiet respiration. The subject must not pull in his stomach.

PERCENTILE TABLE

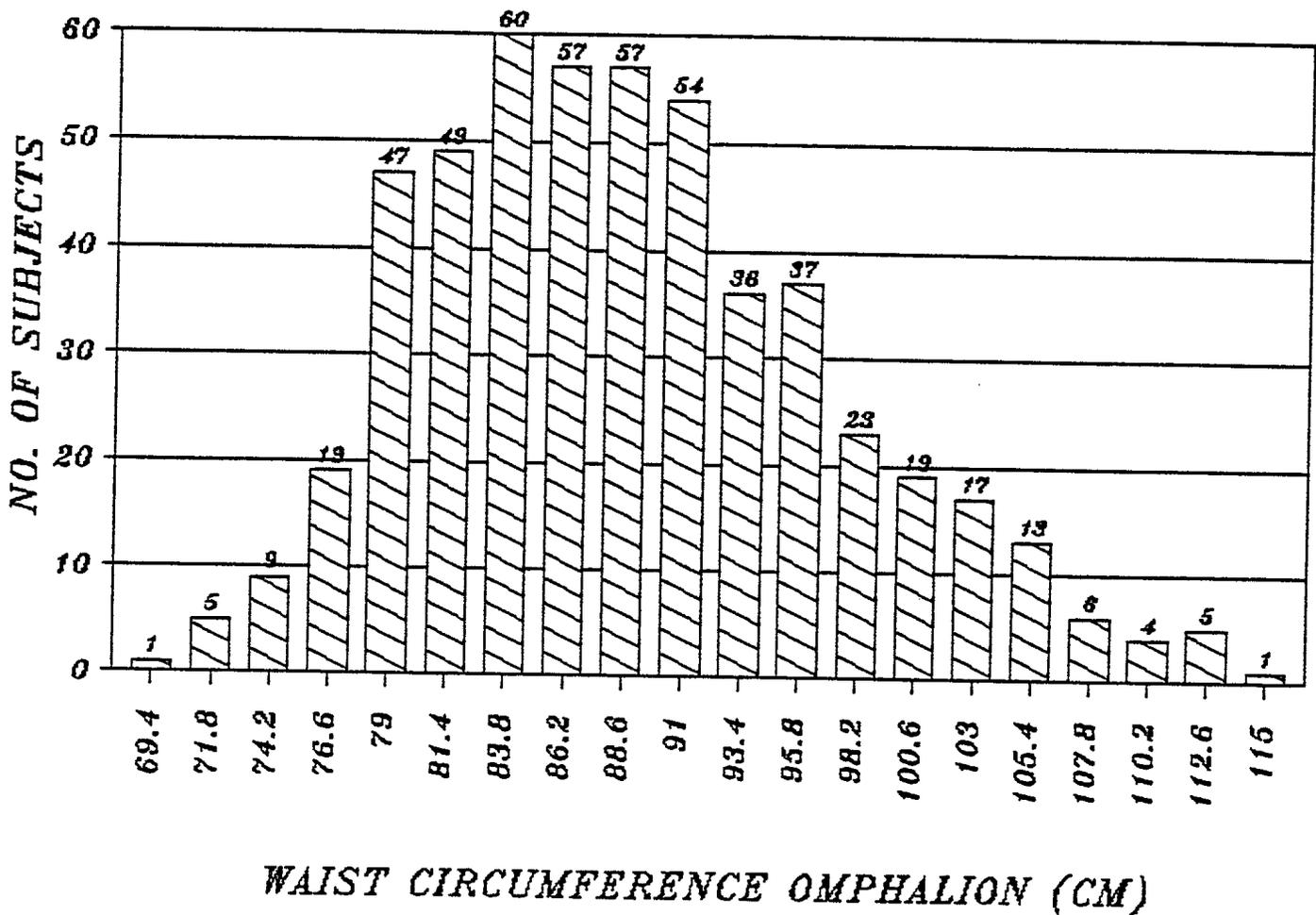
CM.	%ILE	IN.
72.50	1	28.54
74.60	2	29.37
75.30	3	29.65
76.50	4	30.12
77.00	5	30.31
78.90	10	31.06
80.20	15	31.57
81.40	20	32.05
82.60	25	32.52
83.50	30	32.87
84.80	35	33.39
85.90	40	33.82
86.90	45	34.21
87.90	50	34.61
89.10	55	35.08
90.00	60	35.43
91.00	65	35.83
92.80	70	36.54
94.40	75	37.17
95.70	80	37.68
98.30	85	38.70
101.20	90	39.84
104.60	95	41.18
105.60	96	41.57
107.35	97	42.26
109.20	98	42.99
112.30	99	44.21



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
68.300	MINIMUM VALUE	26.890
115.600	MAXIMUM VALUE	45.512
47.300	RANGE	18.622
88.916	MEAN	35.006
8.510	STANDARD DEVIATION	3.350
0.374	STANDARD ERROR (SEM)	0.147
72.424	VARIANCE	11.226
0.531	SKEWNESS	0.531
-0.046	KURTOSIS	-0.046

*Freq. Histogram: Waist Circ. Omphalion*  
 MIN = 68.3 MAX = 115.6

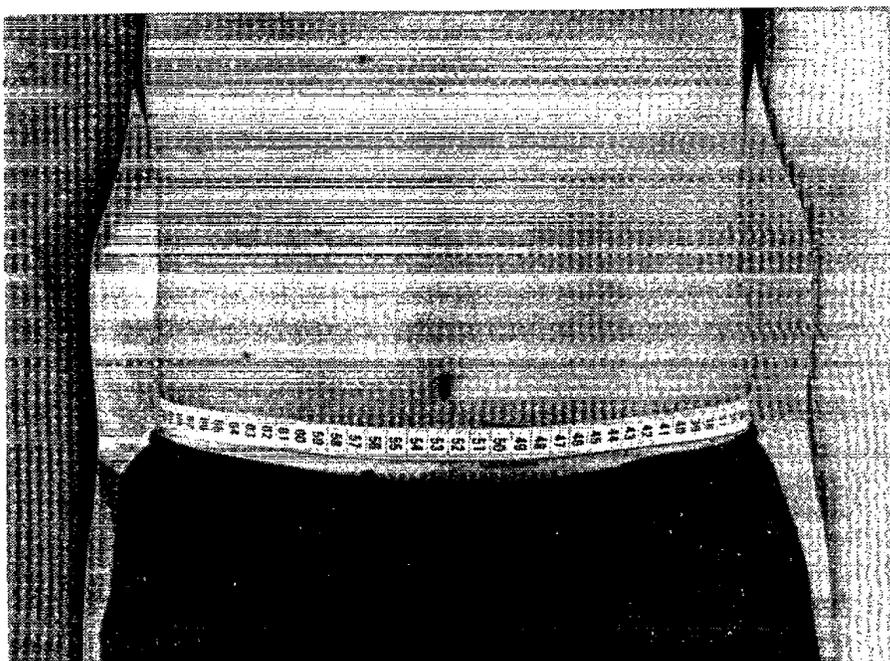


WAIST CIRCUMFERENCE (NATURAL):

Subject stands erect with his head in the Frankfort Plane, heels together and weight distributed equally over both feet. With the tape held in the horizontal plane the circumference of the trunk at the natural waist landmark is measured. The reading is made at the average point of quiet respiration. The subject must not pull in his stomach.

PERCENTILE TABLE

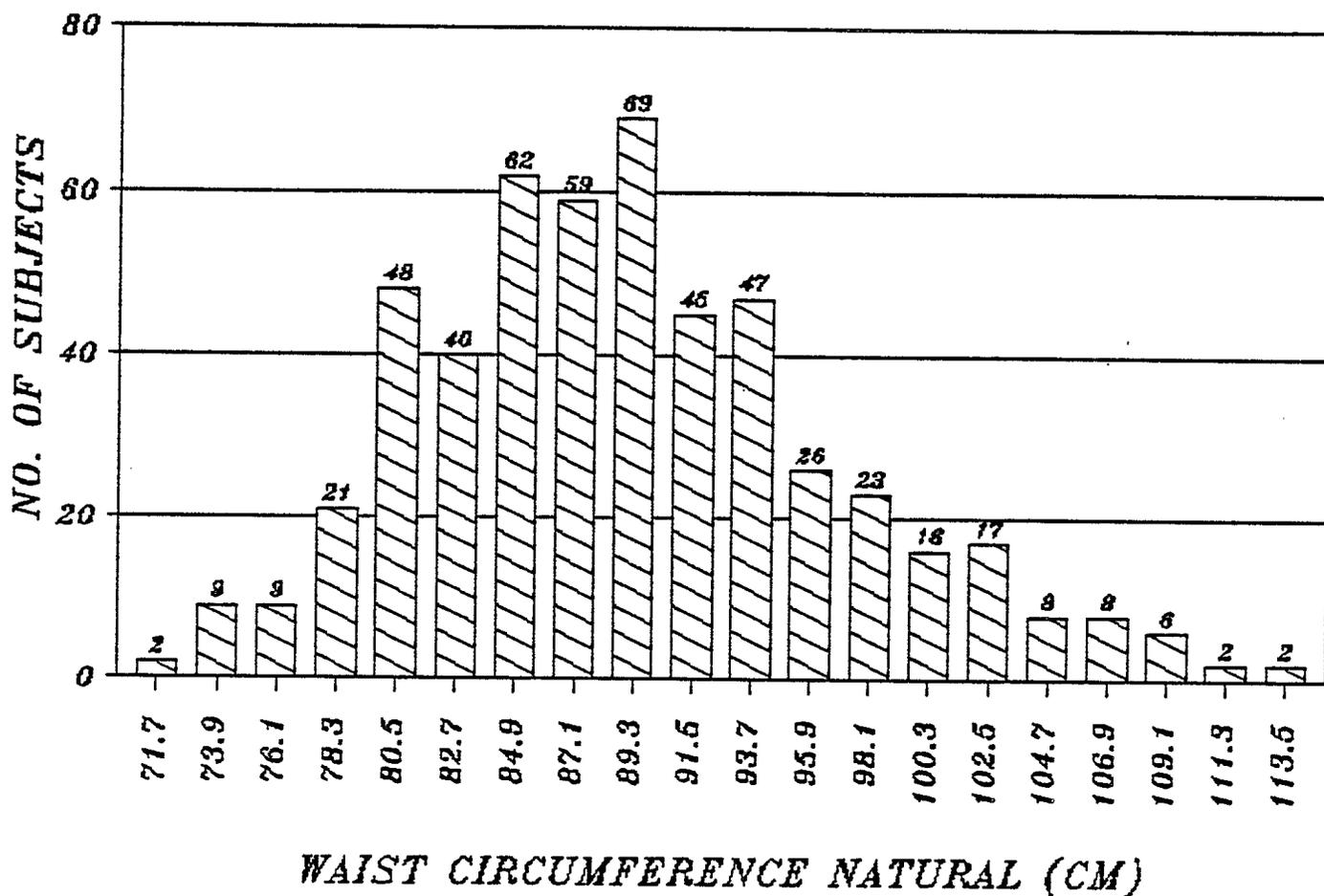
CM.	%ILE	IN.
74.00	1	29.13
74.85	2	29.47
76.50	3	30.12
77.30	4	30.43
77.90	5	30.67
79.90	10	31.46
81.40	15	32.05
82.70	20	32.56
83.90	25	33.03
84.80	30	33.39
85.50	35	33.66
86.80	40	34.17
87.70	45	34.53
88.60	50	34.88
89.30	55	35.16
90.10	60	35.47
91.30	65	35.94
92.60	70	36.46
94.00	75	37.01
95.20	80	37.48
97.50	85	38.39
99.90	90	39.33
104.60	95	41.18
105.40	96	41.50
106.15	97	41.79
108.10	98	42.56
109.70	99	43.19



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
70.900	MINIMUM VALUE	27.913
114.200	MAXIMUM VALUE	44.961
43.300	RANGE	17.047
89.255	MEAN	35.140
7.802	STANDARD DEVIATION	3.072
0.342	STANDARD ERROR (SEM)	0.135
60.871	VARIANCE	9.435
0.509	SKEWNESS	0.509
0.077	KURTOSIS	0.077

Freq. Histogram For Waist Circ. Natural  
 MIN = 70.9 MAX = 114.2

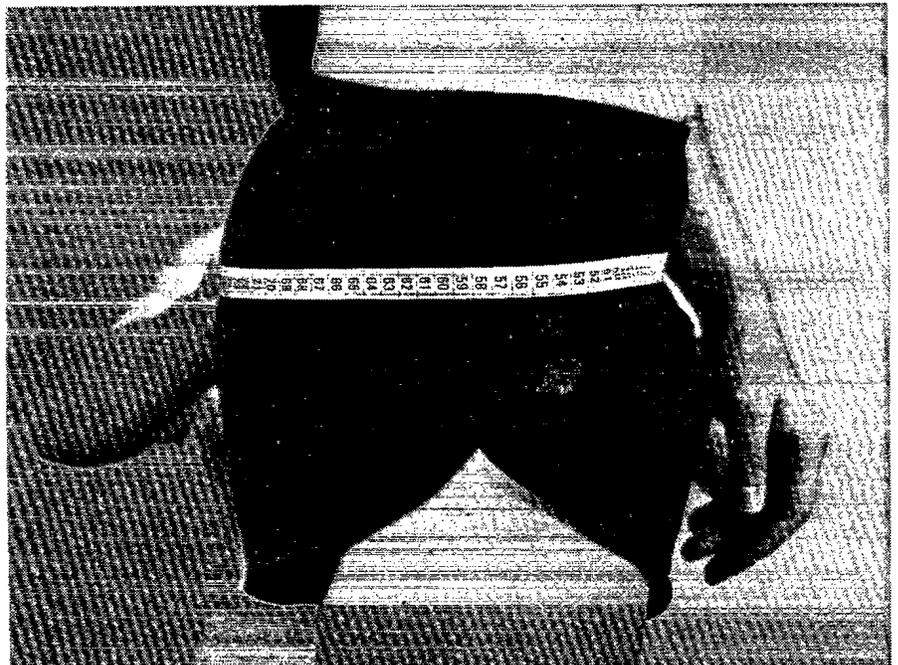


**BUTTOCK CIRCUMFERENCE:**

Subject stands erect. Holding the tape in a horizontal plane, measure the circumference around the hip region at the level of the buttock circumference landmark.

**PERCENTILE TABLE**

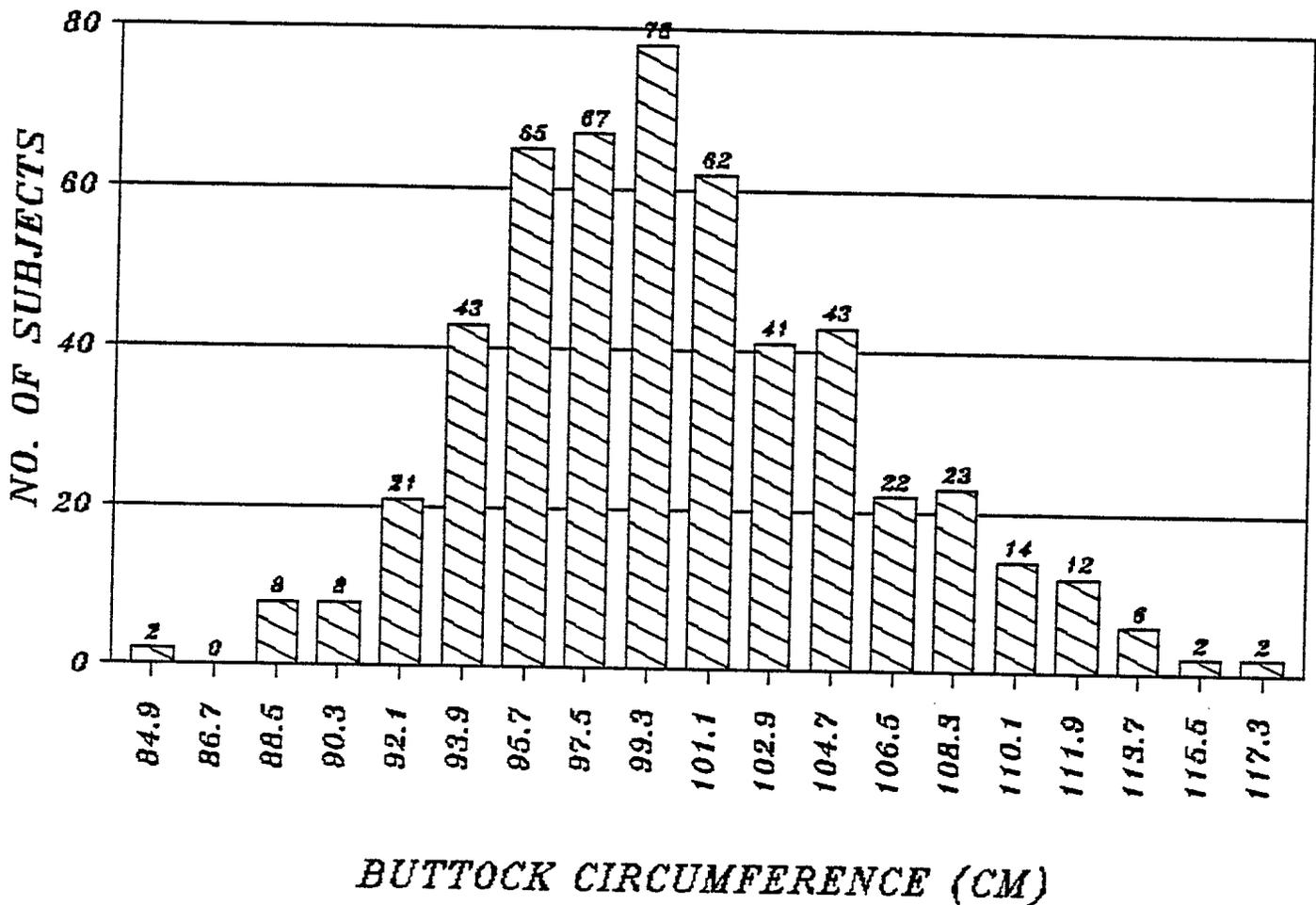
CM.	%ILE	IN.
88.40	1	34.80
89.35	2	35.18
90.45	3	35.61
91.80	4	36.14
92.00	5	36.22
93.60	10	36.85
94.80	15	37.32
95.30	20	37.52
96.20	25	37.87
96.80	30	38.11
97.50	35	38.39
98.20	40	38.66
98.80	45	38.90
99.50	50	39.17
100.20	55	39.45
100.90	60	39.72
101.70	65	40.04
102.40	70	40.31
103.40	75	40.71
104.70	80	41.22
105.90	85	41.69
108.30	90	42.64
110.00	95	43.31
111.10	96	43.74
111.85	97	44.04
112.70	98	44.37
114.40	99	45.04



**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
84.200	MINIMUM VALUE	33.150
117.100	MAXIMUM VALUE	46.102
32.900	RANGE	12.953
100.081	MEAN	39.402
5.559	STANDARD DEVIATION	2.189
0.244	STANDARD ERROR (SEM)	0.096
30.903	VARIANCE	4.790
0.410	SKEWNESS	0.410
0.071	KURTOSIS	0.071

*Freq. Histogram: Buttock Circumference*  
 MIN = 84.2 MAX = 117.1

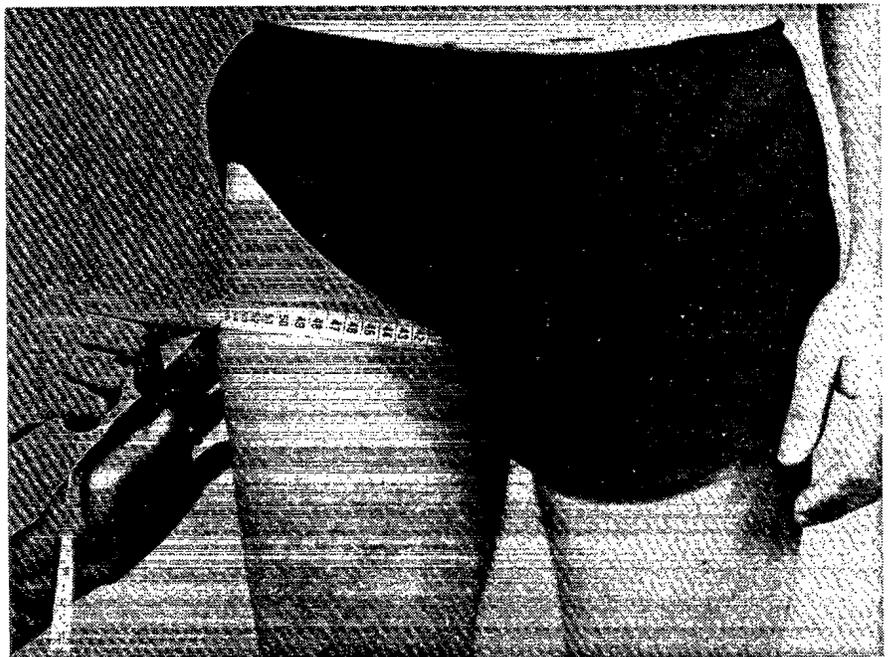


UPPER THIGH CIRCUMFERENCE:

The subject stands with his legs slightly apart. Holding the tape in a horizontal plane and as high in the crotch as possible, measure the circumference of the right thigh.

PERCENTILE TABLE

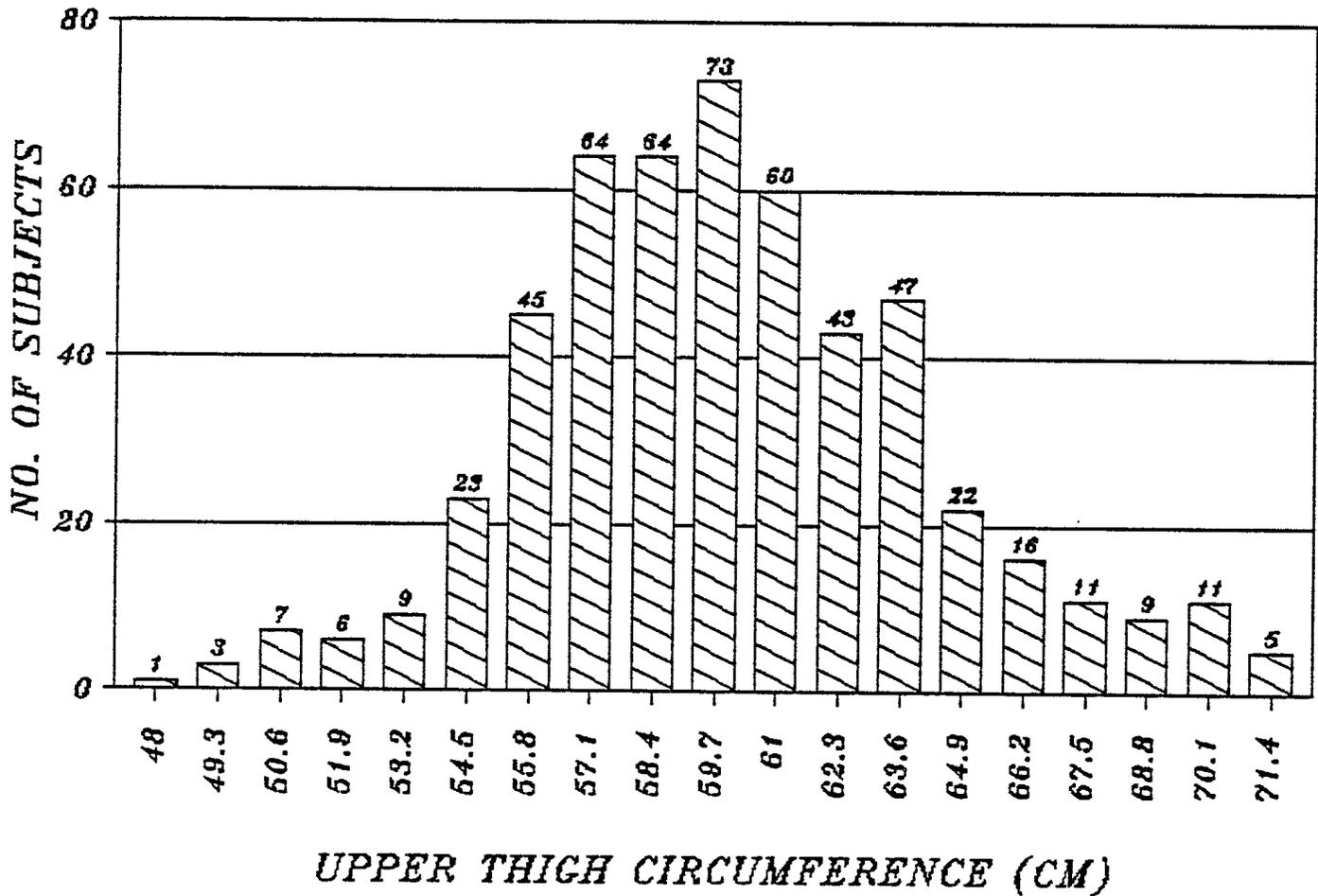
CM.	%ILE	IN.
50.10	1	19.72
51.20	2	20.16
52.10	3	20.51
53.20	4	20.94
53.80	5	21.18
55.30	10	21.77
56.00	15	22.05
56.70	20	22.32
57.10	25	22.48
57.60	30	22.68
58.30	35	22.95
58.80	40	23.15
59.30	45	23.35
59.90	50	23.58
60.20	55	23.70
60.60	60	23.86
61.30	65	24.13
61.90	70	24.37
62.70	75	24.68
63.30	80	24.92
64.10	85	25.24
65.60	90	25.83
68.00	95	26.77
68.60	96	27.01
69.90	97	27.52
70.10	98	27.60
70.80	99	27.87



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
47.400	MINIMUM VALUE	18.661
71.900	MAXIMUM VALUE	28.307
24.500	RANGE	9.646
60.043	MEAN	23.639
4.214	STANDARD DEVIATION	1.659
0.185	STANDARD ERROR (SEM)	0.073
17.761	VARIANCE	2.753
0.272	SKEWNESS	0.272
0.230	KURTOSIS	0.230

*Freq. Histogram For Upper Thigh Circ.*  
 MIN = 47.4    MAX = 71.9



LOWER THIGH CIRCUMFERENCE:

Subject stands. With the tape in a horizontal plane, measure the circumference of the right leg at the level of the lower thigh landmark.

PERCENTILE TABLE

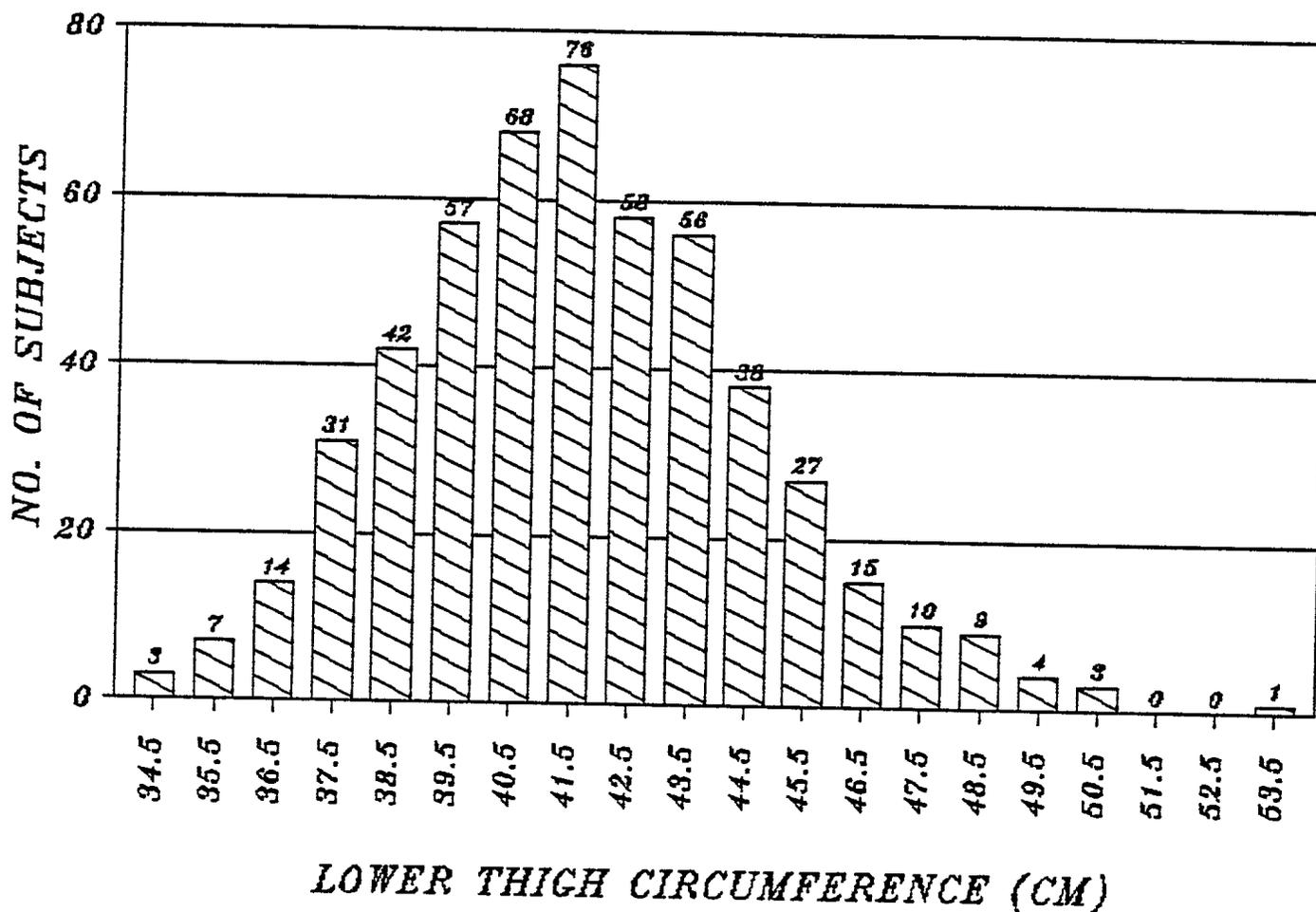
CM.	%ILE	IN.
35.30	1	13.90
36.05	2	14.19
36.70	3	14.45
36.90	4	14.53
37.20	5	14.65
38.00	10	14.96
38.60	15	15.20
39.20	20	15.43
39.70	25	15.63
40.10	30	15.79
40.50	35	15.94
40.90	40	16.10
41.20	45	16.22
41.50	50	16.34
41.80	55	16.46
42.30	60	16.65
42.70	65	16.81
43.20	70	17.01
43.50	75	17.13
44.10	80	17.36
44.80	85	17.64
45.70	90	17.99
47.50	95	18.70
47.90	96	18.86
48.15	97	18.96
48.70	98	19.17
49.70	99	19.57



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
34.600	MINIMUM VALUE	13.622
53.200	MAXIMUM VALUE	20.945
18.600	RANGE	7.323
41.743	MEAN	16.434
3.019	STANDARD DEVIATION	1.188
0.133	STANDARD ERROR (SEM)	0.052
9.113	VARIANCE	1.412
0.396	SKEWNESS	0.396
0.202	KURTOSIS	0.202

*Freq. Histogram For Lower Thigh Circ.*  
MIN = 34.6    MAX = 53.2

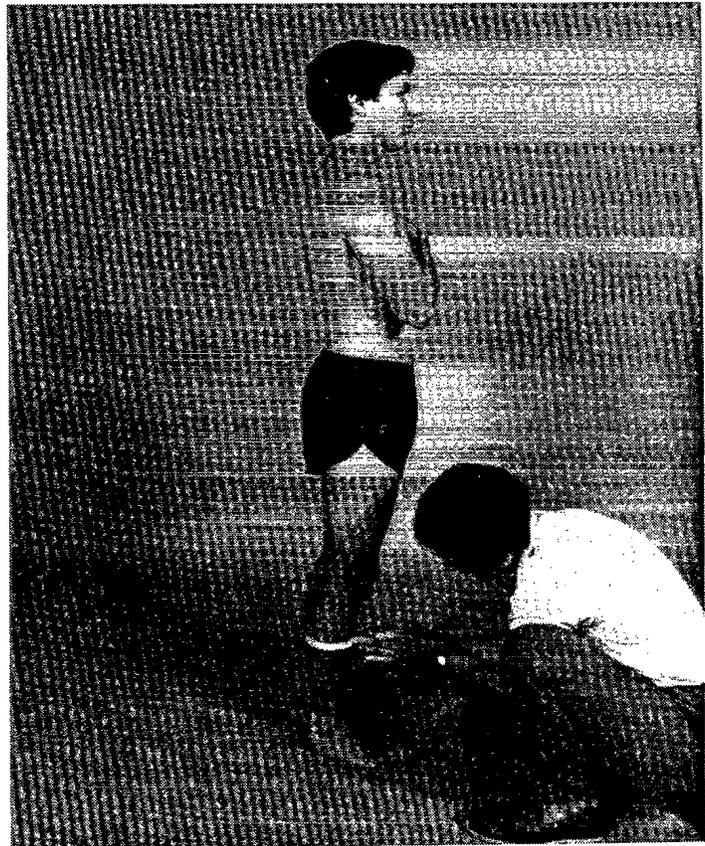


CALF CIRCUMFERENCE:

Subject stands erect. Holding the tape in a horizontal plane, measure the maximum circumference of the right calf at the level of the calf height landmark.

PERCENTILE TABLE

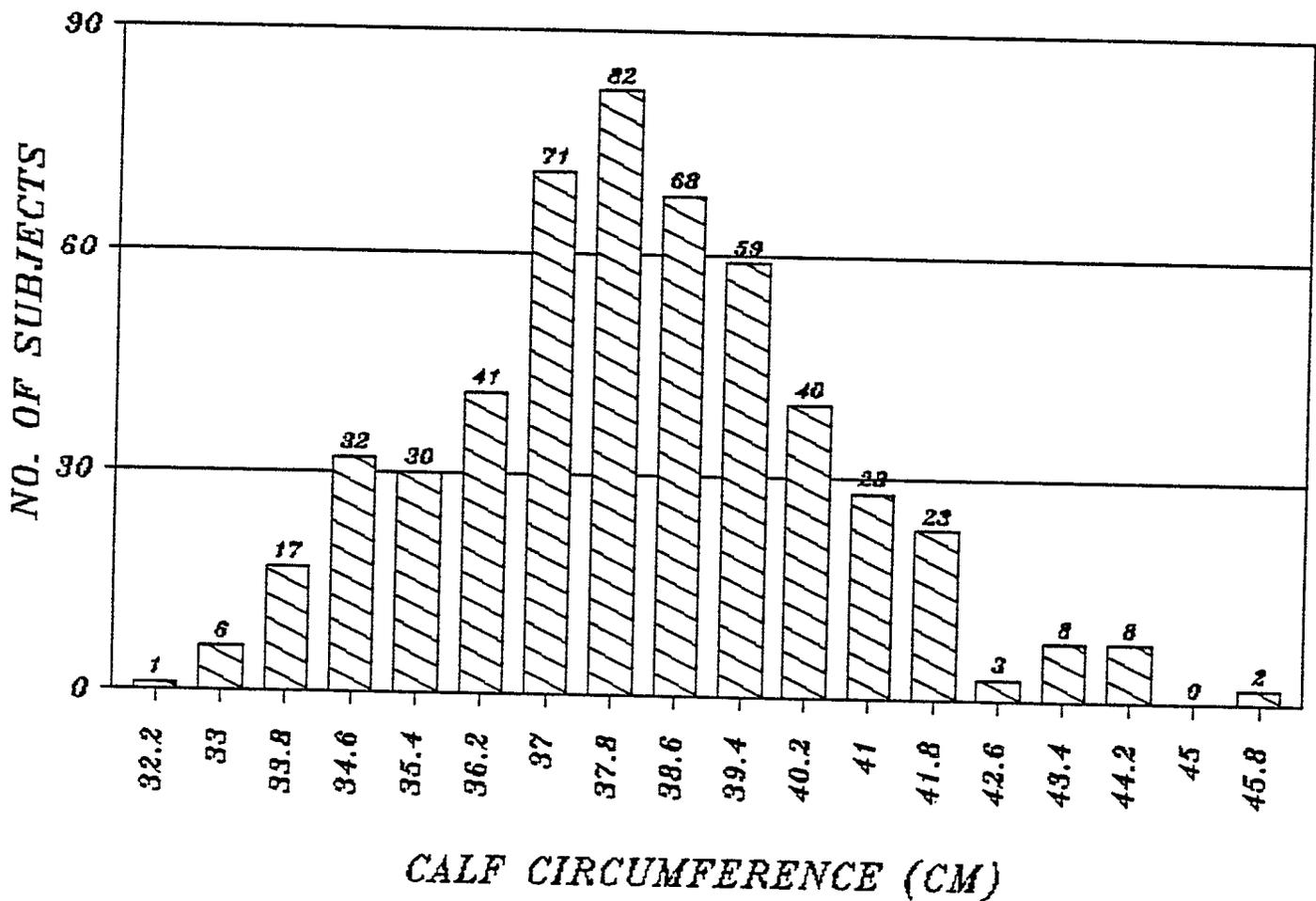
CM.	%ILE	IN.
33.10	1	13.03
33.60	2	13.23
33.90	3	13.35
34.20	4	13.46
34.30	5	13.50
34.90	10	13.74
35.60	15	14.02
36.30	20	14.29
36.70	25	14.45
37.00	30	14.57
37.30	35	14.69
37.50	40	14.76
37.80	45	14.88
38.00	50	14.96
38.30	55	15.08
38.60	60	15.20
39.00	65	15.35
39.20	70	15.43
39.60	75	15.59
40.00	80	15.75
40.50	85	15.94
41.30	90	16.26
42.00	95	16.54
42.30	96	16.65
43.30	97	17.05
43.85	98	17.26
44.50	99	17.52



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
32.200	MINIMUM VALUE	12.677
45.500	MAXIMUM VALUE	17.913
13.300	RANGE	5.236
38.148	MEAN	15.019
2.356	STANDARD DEVIATION	0.928
0.103	STANDARD ERROR (SEM)	0.041
5.551	VARIANCE	0.860
0.254	SKEWNESS	0.254
0.090	KURTOSIS	0.090

*Freq. Histogram For Calf Circumference*  
 MIN = 32.2 MAX = 45.5



ANKLE CIRCUMFERENCE:

Subject stands erect. Using the tape, measure the minimum circumference of the leg just above the ankle bones.

PERCENTILE TABLE

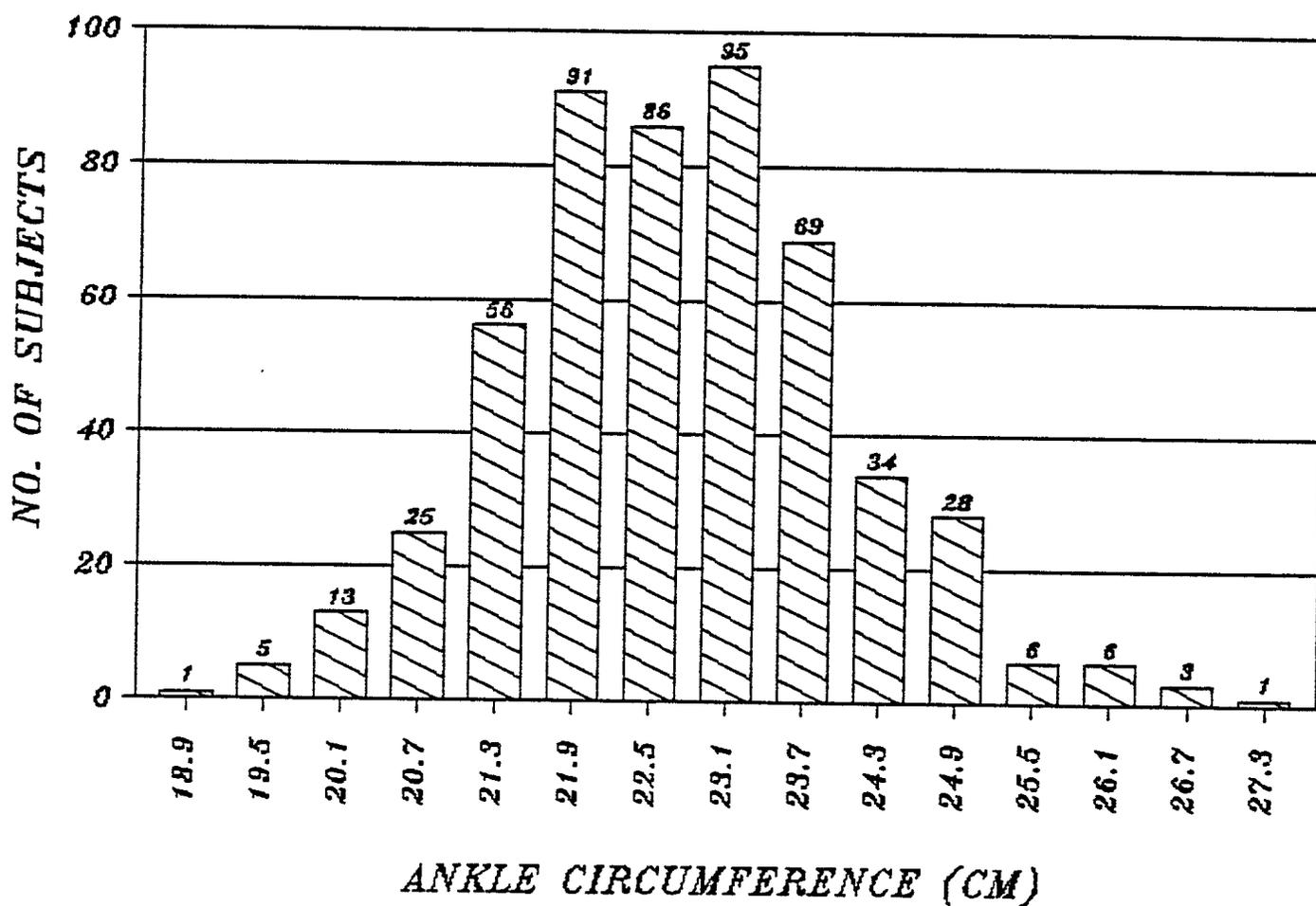
CM.	%ILE	IN.
19.60	1	7.72
20.10	2	7.91
20.30	3	7.99
20.70	4	8.15
20.70	5	8.15
21.20	10	8.35
21.40	15	8.43
21.70	20	8.54
22.00	25	8.66
22.10	30	8.70
22.20	35	8.74
22.40	40	8.82
22.60	45	8.90
22.70	50	8.94
22.90	55	9.02
23.00	60	9.06
23.20	65	9.13
23.40	70	9.21
23.60	75	9.29
23.80	80	9.37
24.10	85	9.49
24.60	90	9.69
25.00	95	9.84
25.20	96	9.92
25.30	97	9.96
25.80	98	10.16
26.40	99	10.39



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
18.800	MINIMUM VALUE	7.402
27.400	MAXIMUM VALUE	10.787
8.600	RANGE	3.386
22.772	MEAN	8.965
1.313	STANDARD DEVIATION	0.517
0.058	STANDARD ERROR (SEM)	0.023
1.725	VARIANCE	0.267
0.231	SKEWNESS	0.231
0.328	KURTOSIS	0.328

*Freq. Histogram For Ankle Circumference*  
 MIN = 18.8 MAX = 27.4

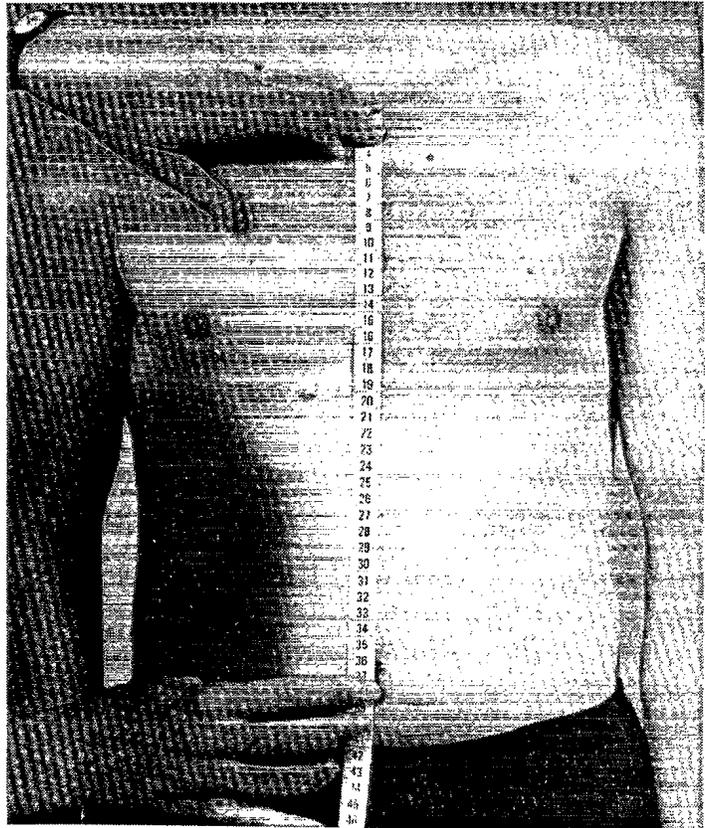


WAIST FRONT - OMPHALION:

Subject stands with his legs slightly apart. Using the tape, measure the surface distance from the suprasternal landmark to the center of the umbilicus.

PERCENTILE TABLE

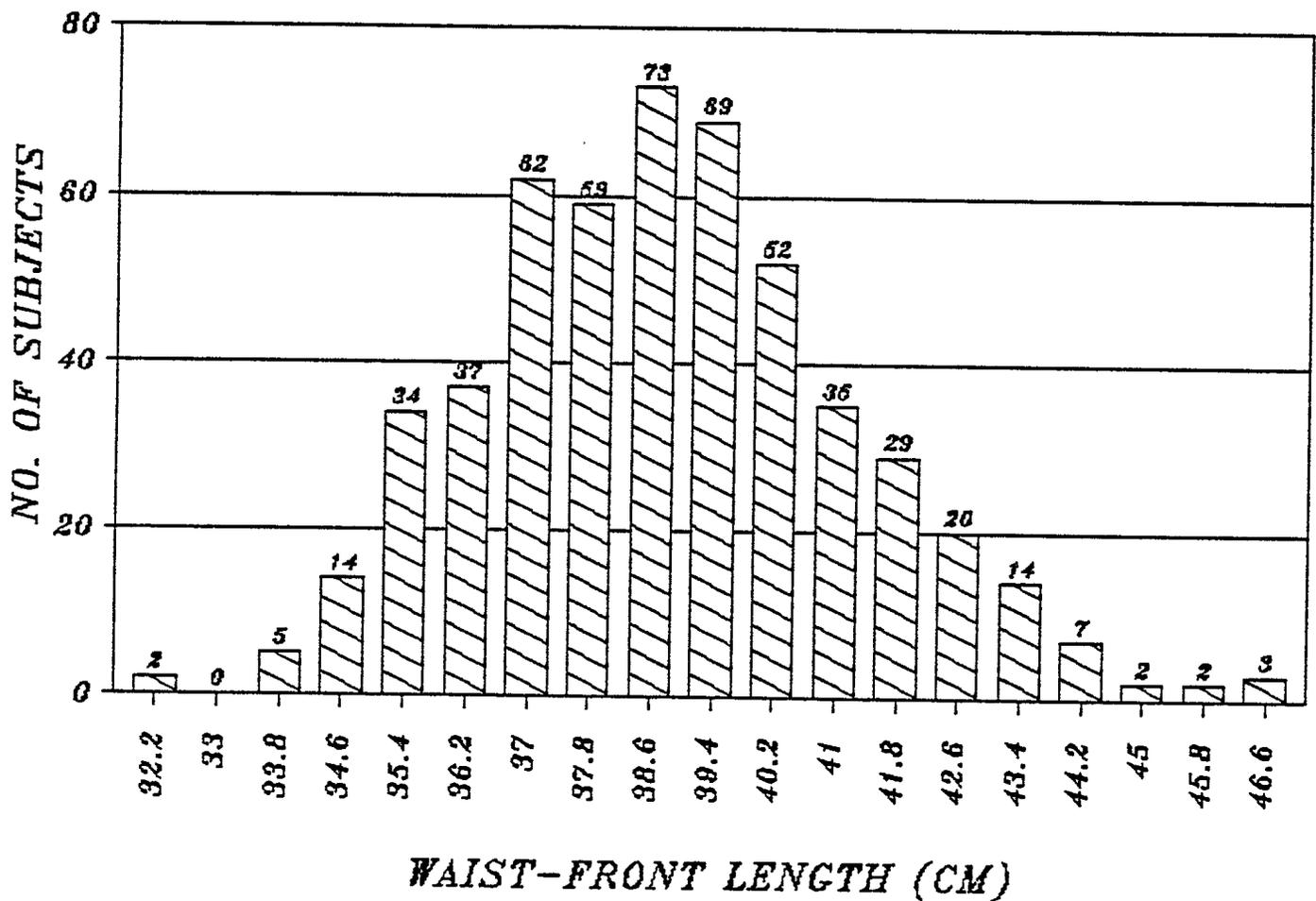
CM.	%ILE	IN.
34.10	1	13.43
34.50	2	13.58
34.75	3	13.68
35.00	4	13.78
35.20	5	13.86
35.80	10	14.09
36.40	15	14.33
36.90	20	14.53
37.20	25	14.65
37.50	30	14.76
37.80	35	14.88
38.20	40	15.04
38.50	45	15.16
38.70	50	15.24
39.00	55	15.35
39.30	60	15.47
39.60	65	15.59
40.00	70	15.75
40.40	75	15.91
40.80	80	16.06
41.40	85	16.30
42.20	90	16.61
43.20	95	17.01
43.40	96	17.09
43.80	97	17.24
44.30	98	17.44
45.50	99	17.91



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
32.000	MINIMUM VALUE	12.598
46.700	MAXIMUM VALUE	18.386
14.700	RANGE	5.787
38.891	MEAN	15.311
2.427	STANDARD DEVIATION	0.956
0.107	STANDARD ERROR (SEM)	0.042
5.891	VARIANCE	0.913
0.356	SKEWNESS	0.356
0.092	KURTOSIS	0.092

*Freq. Histogram For Waist-Front Length*  
 MIN = 32.0 MAX = 46.7

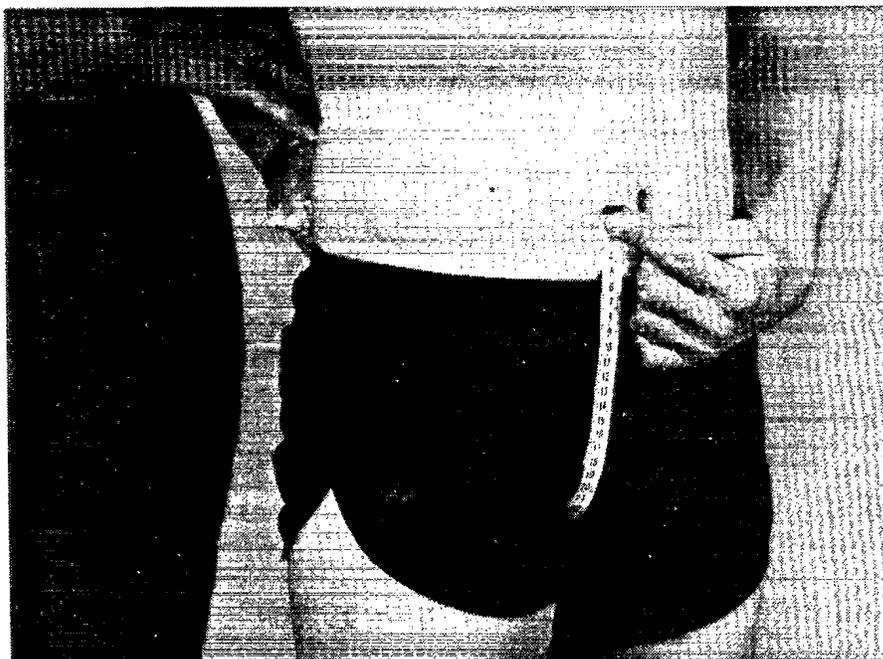


CROTCH LENGTH:

Subject stands with his legs slightly apart. Using the tape, measure the surface distance through the crotch and over the middle of the right buttock, from the center of the umbilicus to the omphalion waist level landmark, on the right side of the back.

PERCENTILE TABLE

CM.	%ILE	IN.
62.90	1	24.76
64.20	2	25.28
64.70	3	25.47
65.30	4	25.71
65.80	5	25.91
67.40	10	26.54
68.70	15	27.05
69.40	20	27.32
70.10	25	27.60
70.70	30	27.83
71.30	35	28.07
71.80	40	28.27
72.30	45	28.46
72.80	50	28.66
73.30	55	28.86
73.90	60	29.09
74.40	65	29.29
75.00	70	29.53
75.50	75	29.72
76.20	80	30.00
76.90	85	30.28
77.90	90	30.67
79.70	95	31.38
80.20	96	31.57
80.55	97	31.71
81.90	98	32.24
83.80	99	32.99

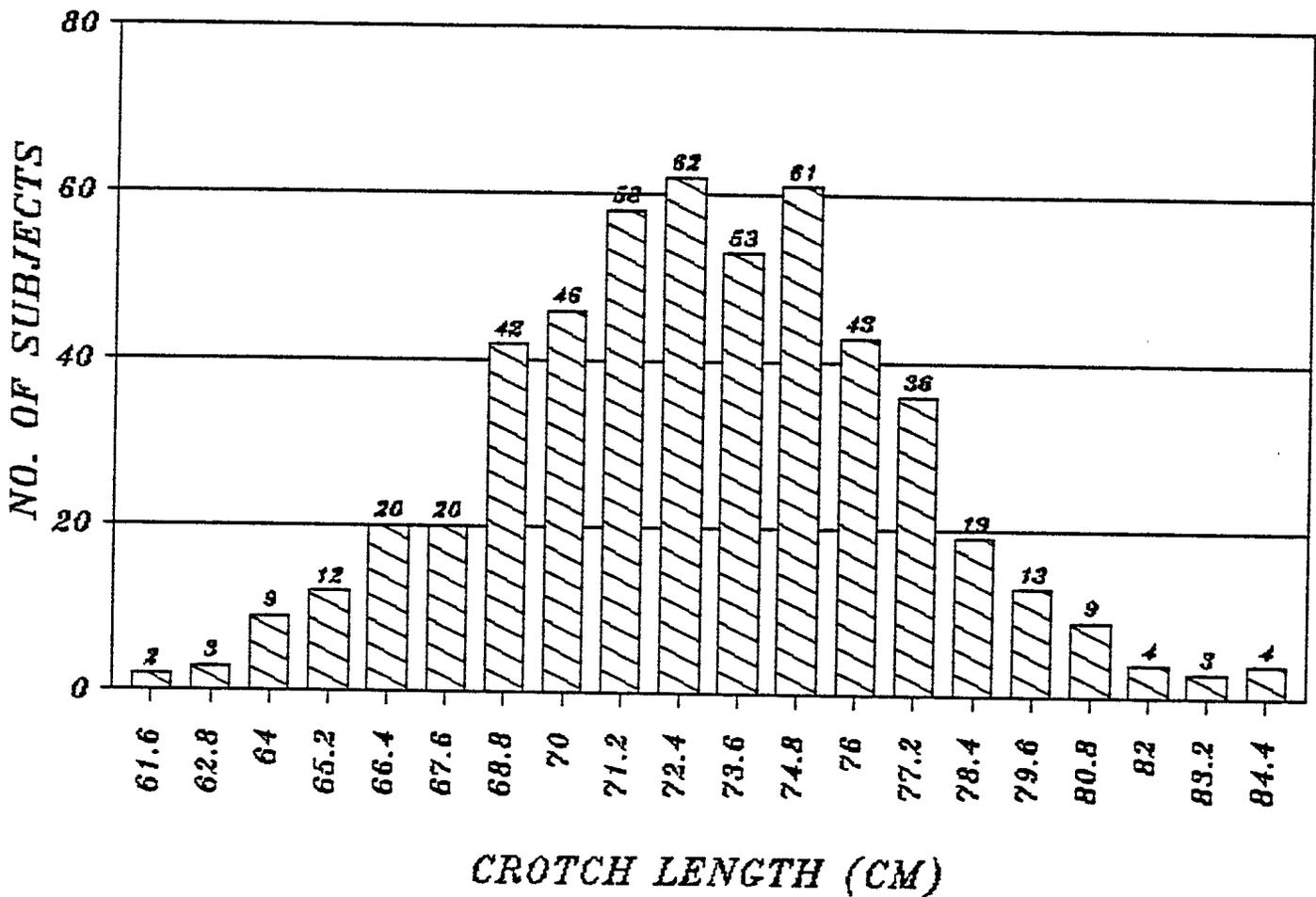


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
61.000	MINIMUM VALUE	24.016
85.000	MAXIMUM VALUE	33.465
24.000	RANGE	9.449
72.824	MEAN	28.671
4.125	STANDARD DEVIATION	1.624
0.181	STANDARD ERROR (SEM)	0.071
17.019	VARIANCE	2.638
0.047	SKEWNESS	0.047
0.073	KURTOSIS	0.073

# Frequency Histogram For Crotch Length

MIN = 61.0    MAX = 85.0

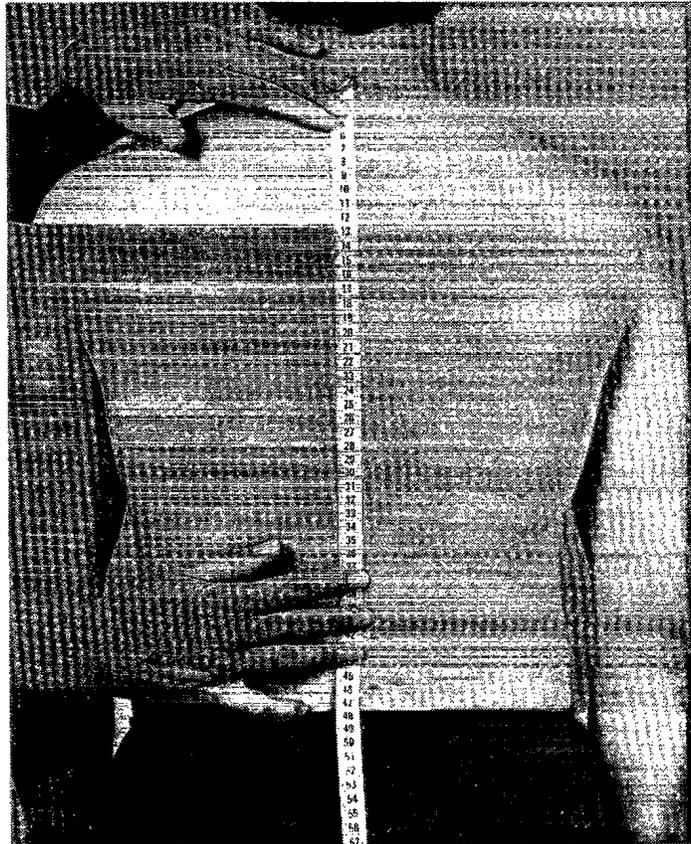


WAIST BACK - OMPHALION:

Subject stands erect. Using the tape, measure the surface distance from the cervical to the omphalion waist back landmark.

PERCENTILE TABLE

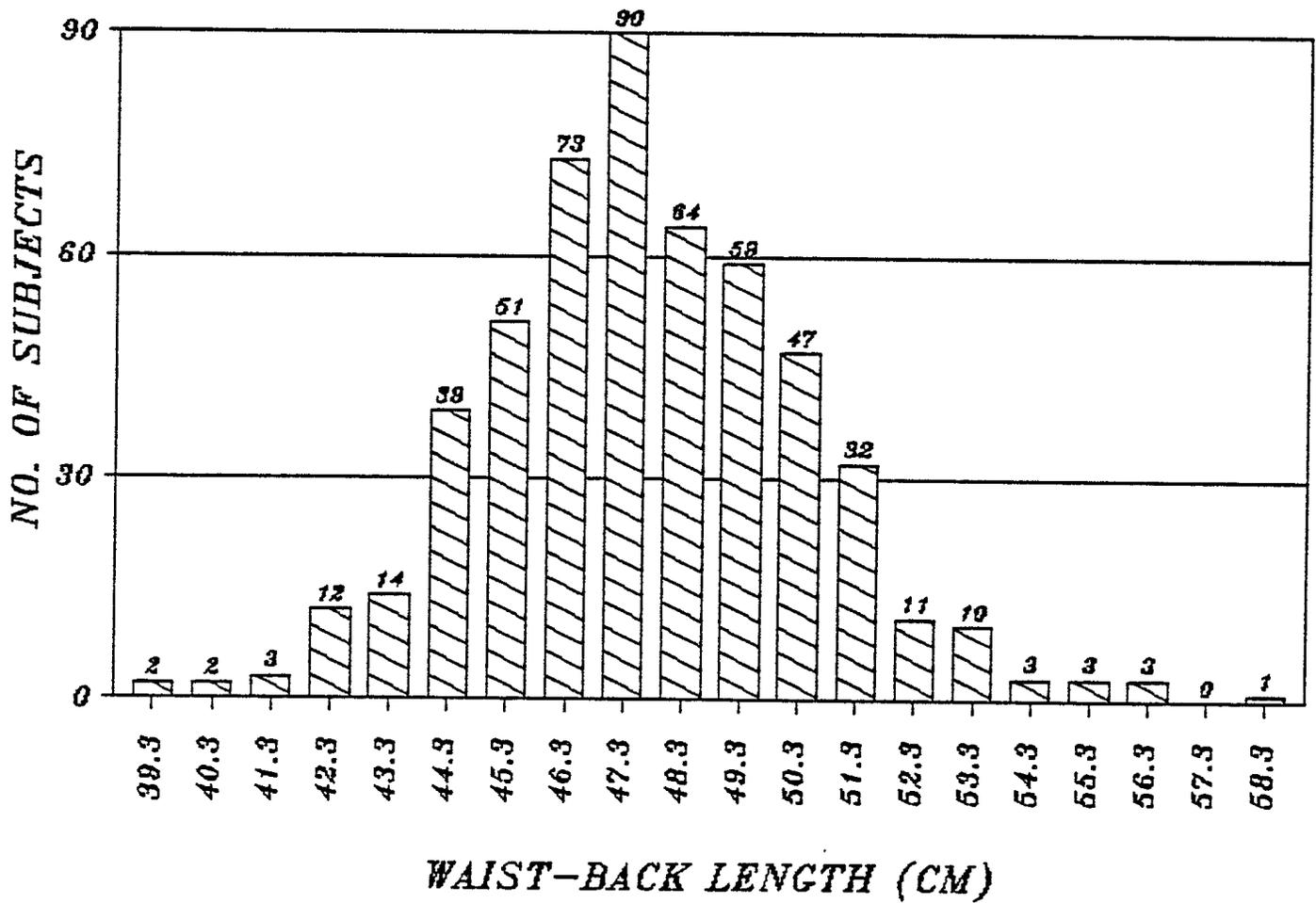
CM.	%ILE	IN.
41.10	1	16.18
42.20	2	16.61
42.50	3	16.73
43.10	4	16.97
43.60	5	17.17
44.50	10	17.52
45.00	15	17.72
45.50	20	17.91
45.90	25	18.07
46.20	30	18.19
46.60	35	18.35
47.00	40	18.50
47.20	45	18.58
47.60	50	18.74
47.80	55	18.82
48.30	60	19.02
48.70	65	19.17
49.00	70	19.29
49.40	75	19.45
50.00	80	19.69
50.30	85	19.80
51.20	90	20.16
52.20	95	20.55
52.70	96	20.75
53.25	97	20.96
53.80	98	21.18
55.50	99	21.85



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
38.800	MINIMUM VALUE	15.276
58.400	MAXIMUM VALUE	22.992
19.600	RANGE	7.717
47.717	MEAN	18.786
2.748	STANDARD DEVIATION	1.082
0.121	STANDARD ERROR (SEM)	0.047
7.551	VARIANCE	1.170
0.243	SKEWNESS	0.243
0.670	KURTOSIS	0.670

*Freq. Histogram For Waist-Back Length*  
 MIN = 38.8 MAX = 58.4

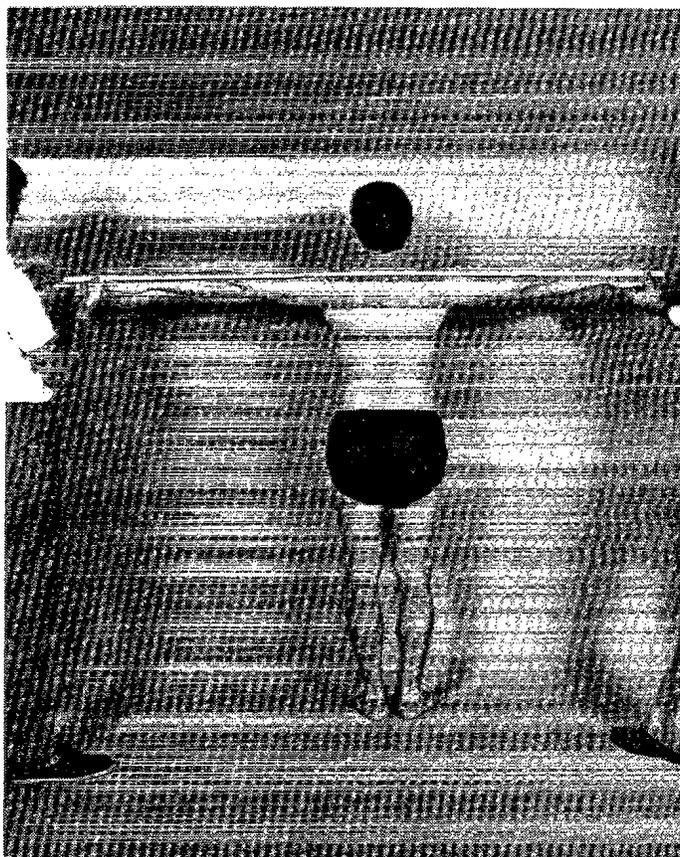


ARM SPAN:

The distance between the tips of the right and left middle fingers when the subject's arms are maximally extended laterally.

PERCENTILE TABLE

CM.	%ILE	IN.
166.20	1	65.43
167.20	2	65.83
168.10	3	66.18
169.20	4	66.61
170.70	5	67.20
172.90	10	68.07
174.50	15	68.70
175.80	20	69.21
176.90	25	69.65
178.30	30	70.20
179.20	35	70.55
180.00	40	70.87
181.00	45	71.26
182.00	50	71.65
183.10	55	72.09
184.00	60	72.44
184.90	65	72.80
186.00	70	73.23
187.00	75	73.62
189.00	80	74.41
191.00	85	75.20
193.00	90	75.98
196.20	95	77.24
197.30	96	77.68
199.35	97	78.48
200.75	98	79.04
202.30	99	79.65

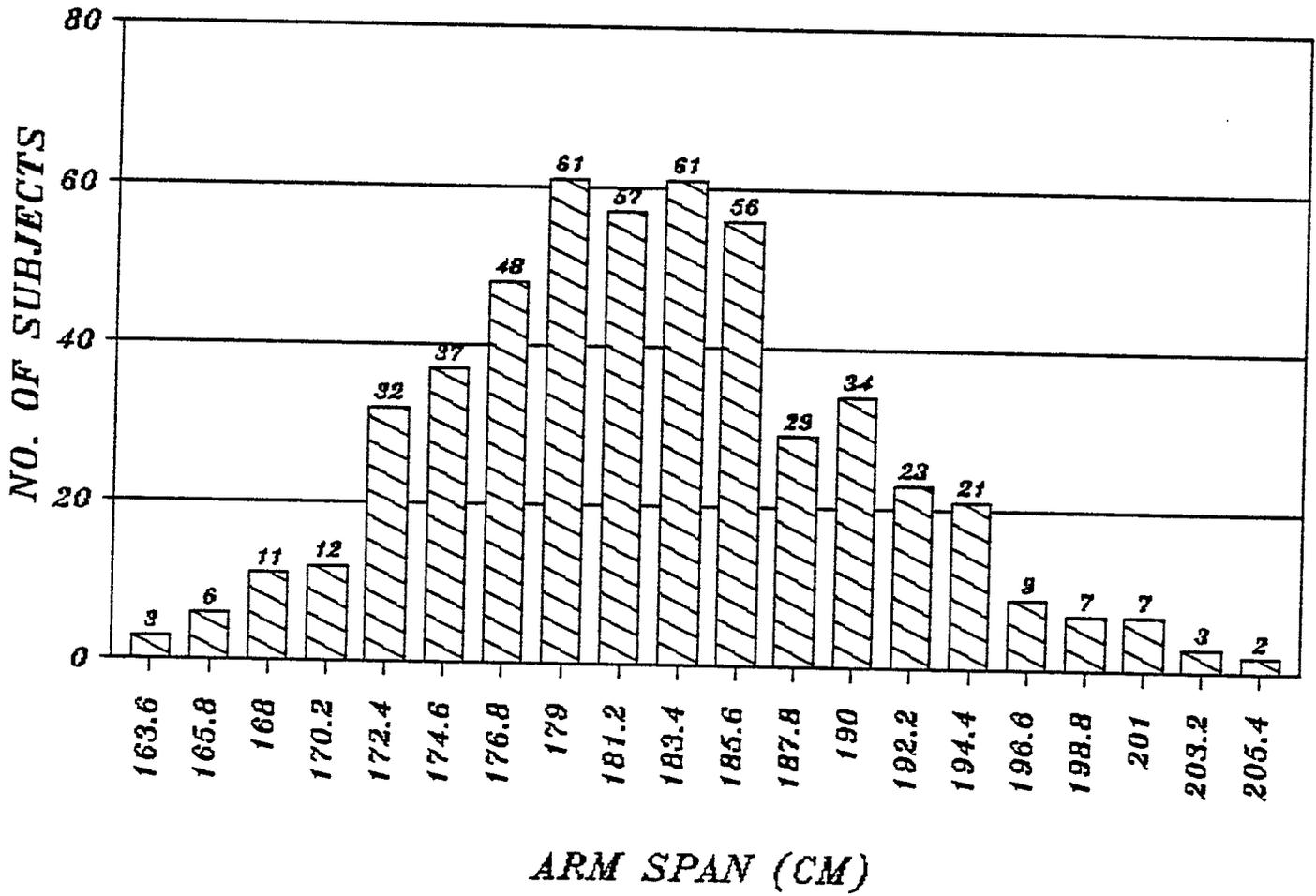


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
163.300	MINIMUM VALUE	64.291
205.900	MAXIMUM VALUE	81.063
42.600	RANGE	16.772
182.458	MEAN	71.834
7.779	STANDARD DEVIATION	3.062
0.341	STANDARD ERROR (SEM)	0.134
60.508	VARIANCE	9.379
0.302	SKEWNESS	0.302
-0.044	KURTOSIS	-0.044

# Frequency Histogram For Arm Span

MIN = 163.3    MAX = 205.9



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STANDING MEASUREMENTS  
USING THE  
SHORTENED "FREE STANDING ANTHROPOMETER"

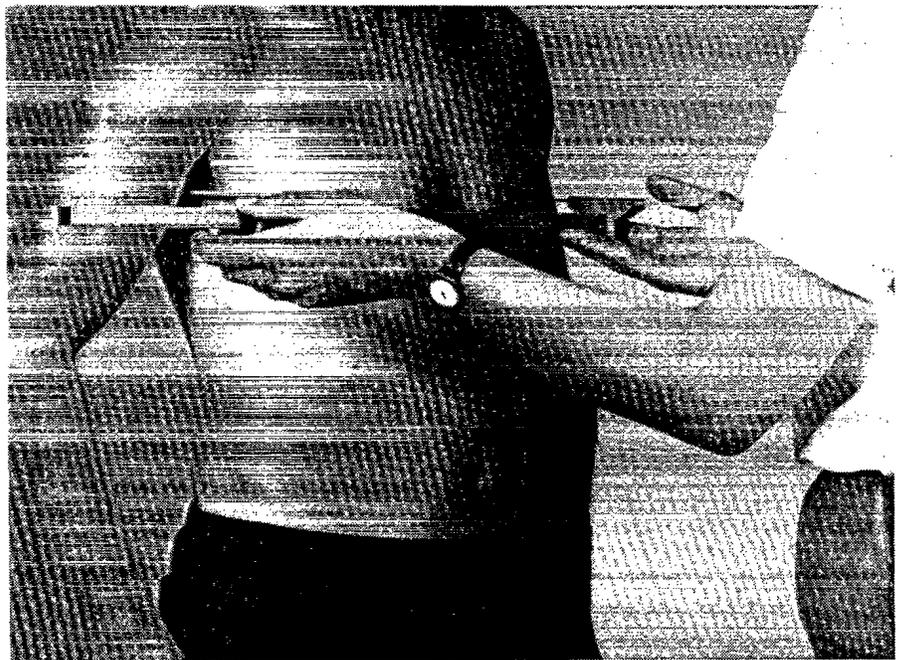
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CHEST BREADTH:

Subject stands erect with his arms initially raised and then lowered when the instrument is in place. Holding the instrument with light skin contact at the level of the subject's nipples, measure the horizontal breadth of the chest during normal breathing.

PERCENTILE TABLE

CM.	%ILE	IN.
29.50	1	11.61
29.75	2	11.71
30.05	3	11.83
30.30	4	11.93
30.50	5	12.01
31.00	10	12.20
31.50	15	12.40
31.90	20	12.56
32.30	25	12.72
32.60	30	12.83
32.90	35	12.95
33.20	40	13.07
33.50	45	13.19
33.80	50	13.31
34.10	55	13.43
34.40	60	13.54
34.60	65	13.62
35.00	70	13.78
35.40	75	13.94
35.70	80	14.06
36.10	85	14.21
36.60	90	14.41
37.70	95	14.84
37.90	96	14.92
38.10	97	15.00
38.35	98	15.10
39.70	99	15.63

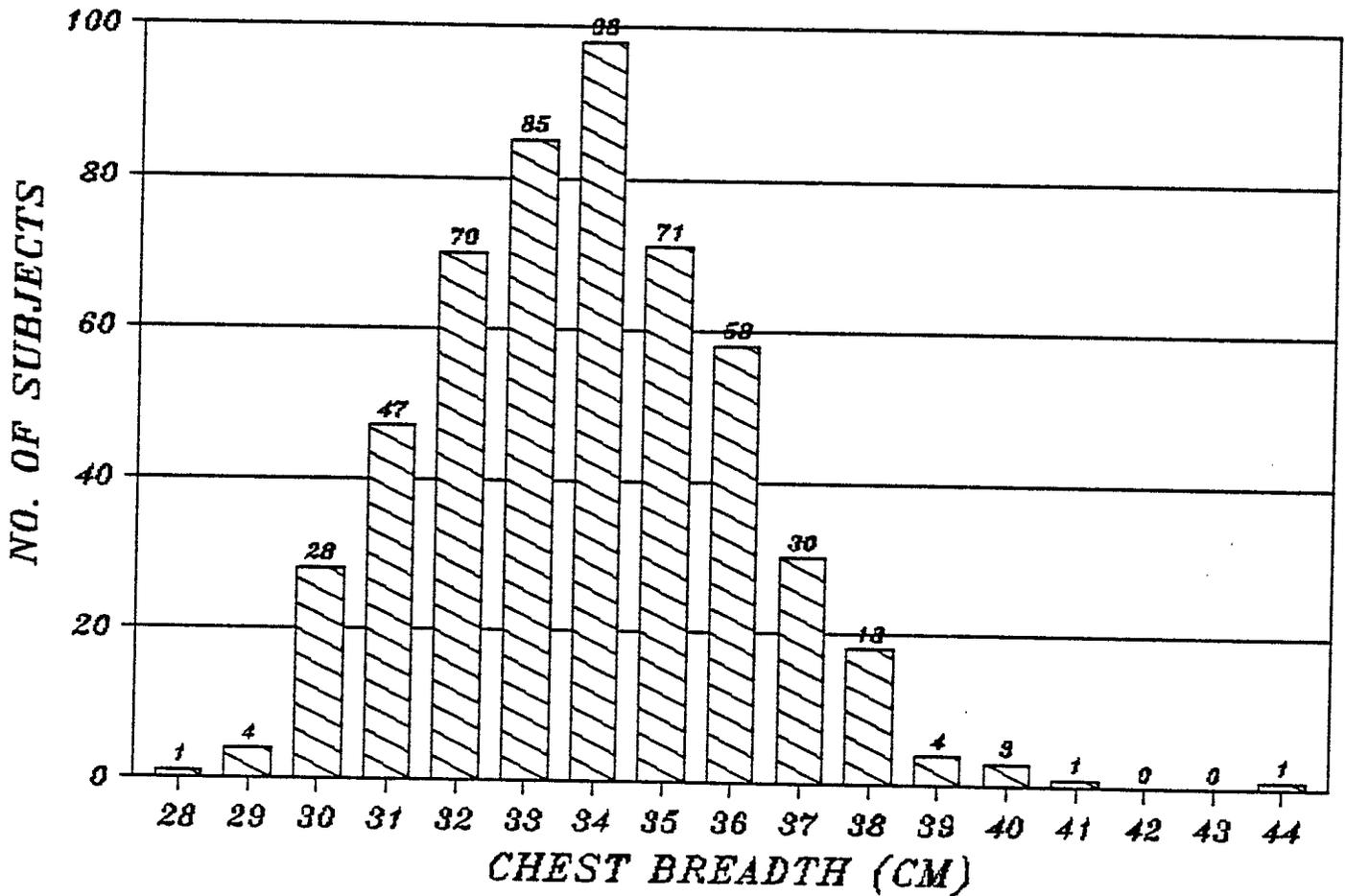


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
27.900	MINIMUM VALUE	10.984
44.000	MAXIMUM VALUE	17.323
16.100	RANGE	6.339
33.853	MEAN	13.328
2.207	STANDARD DEVIATION	0.869
0.097	STANDARD ERROR (SEM)	0.038
4.869	VARIANCE	0.755
0.346	SKEWNESS	0.346
0.406	KURTOSIS	0.406

# Frequency Histogram For Chest Breadth

MIN = 27.9    MAX = 44.0

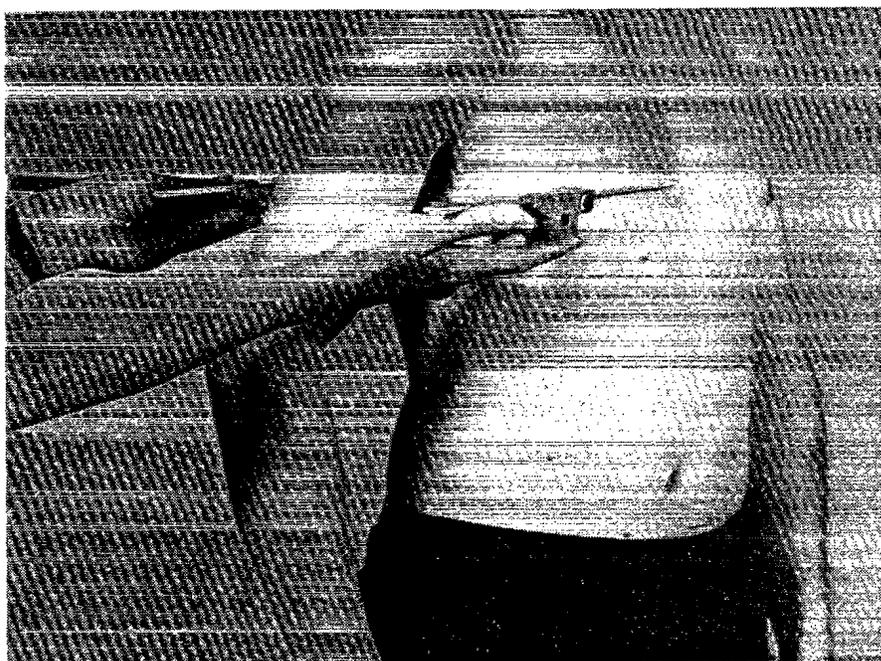


CHEST DEPTH:

Subject stands erect with his arms initially raised and then lowered after the instrument is in place. Holding the anthropometer horizontally on the subject's right side at the level of the nipples, measure the depth of the chest during normal breathing.

PERCENTILE TABLE

CM.	%ILE	IN.
19.60	1	7.72
20.15	2	7.93
20.50	3	8.07
20.60	4	8.11
20.80	5	8.19
21.50	10	8.46
21.80	15	8.58
22.20	20	8.74
22.50	25	8.86
22.70	30	8.94
23.00	35	9.06
23.40	40	9.21
23.70	45	9.33
24.00	50	9.45
24.20	55	9.53
24.40	60	9.61
24.80	65	9.76
25.20	70	9.92
25.50	75	10.04
25.90	80	10.20
26.40	85	10.39
26.90	90	10.59
27.70	95	10.91
28.20	96	11.10
28.55	97	11.24
28.85	98	11.36
30.00	99	11.81

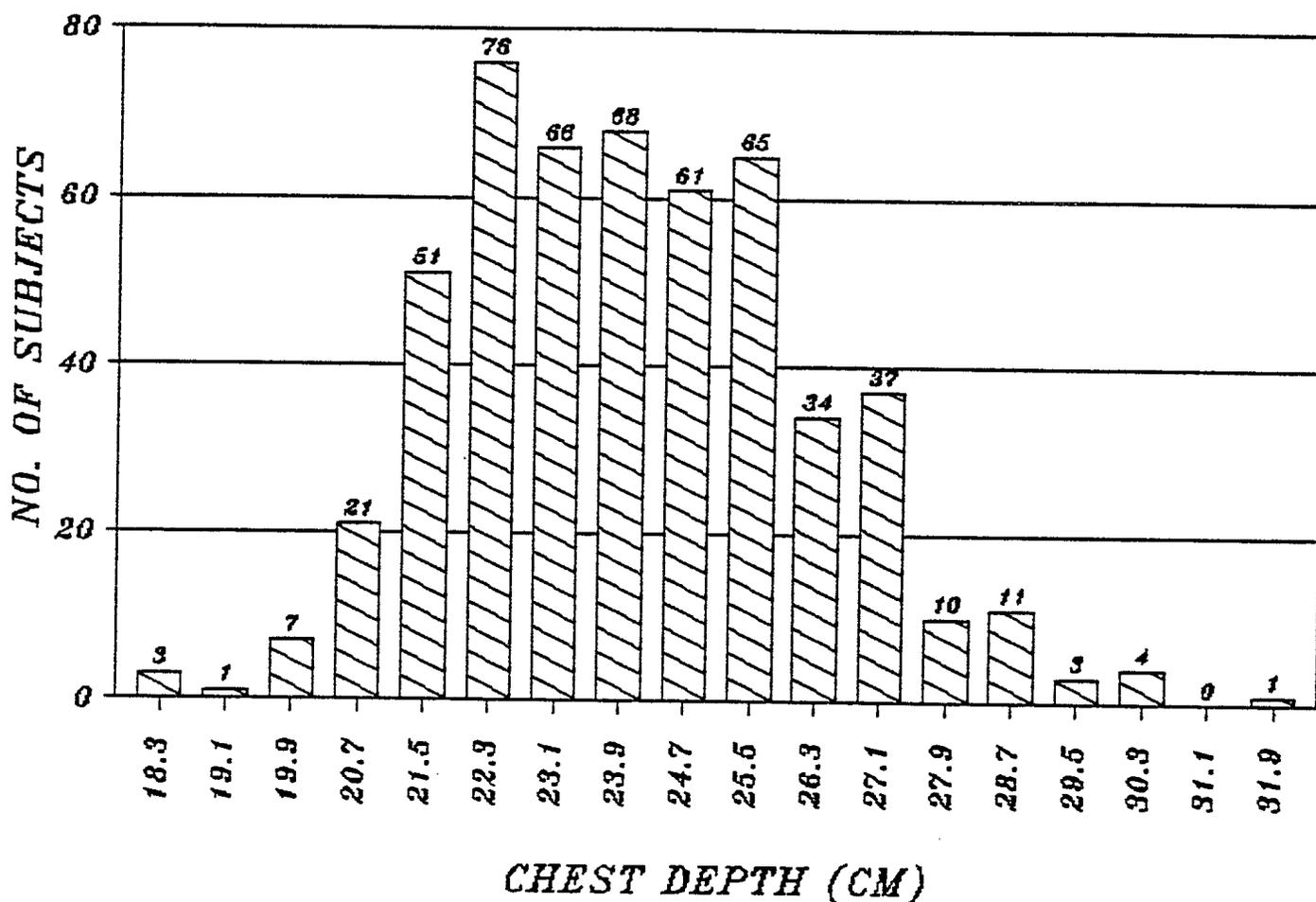


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
18.000	MINIMUM VALUE	7.087
32.300	MAXIMUM VALUE	12.717
14.300	RANGE	5.630
24.072	MEAN	9.477
2.166	STANDARD DEVIATION	0.853
0.095	STANDARD ERROR (SEM)	0.037
4.690	VARIANCE	0.727
0.370	SKEWNESS	0.370
0.170	KURTOSIS	0.170

# Frequency Histogram For Chest Depth

MIN = 18.0    MAX = 32.3

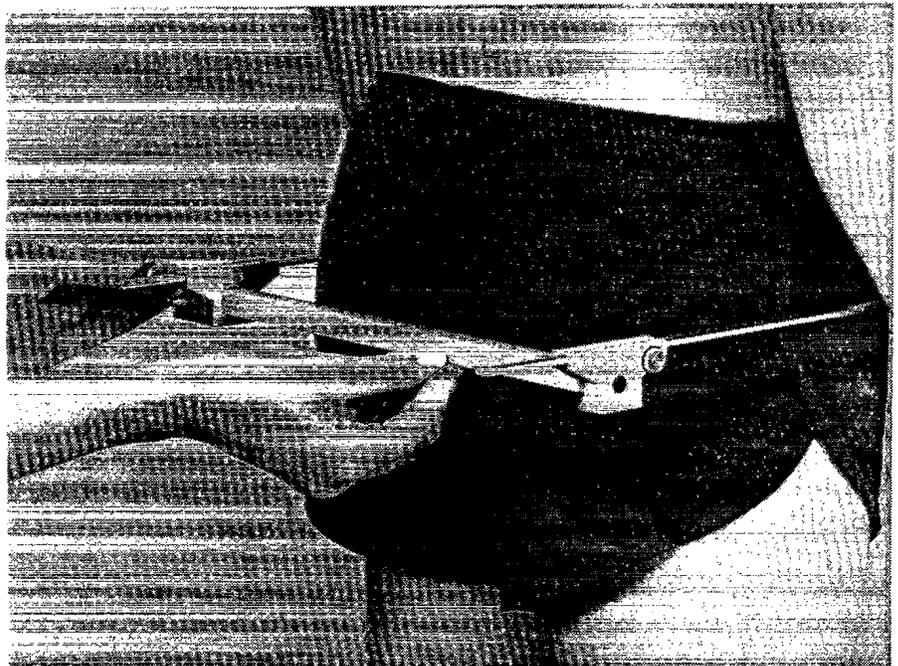


HIP BREADTH STANDING:

Subject stands erect. Using the anthropometer, measure horizontally across the widest portion of the hips.

PERCENTILE TABLE

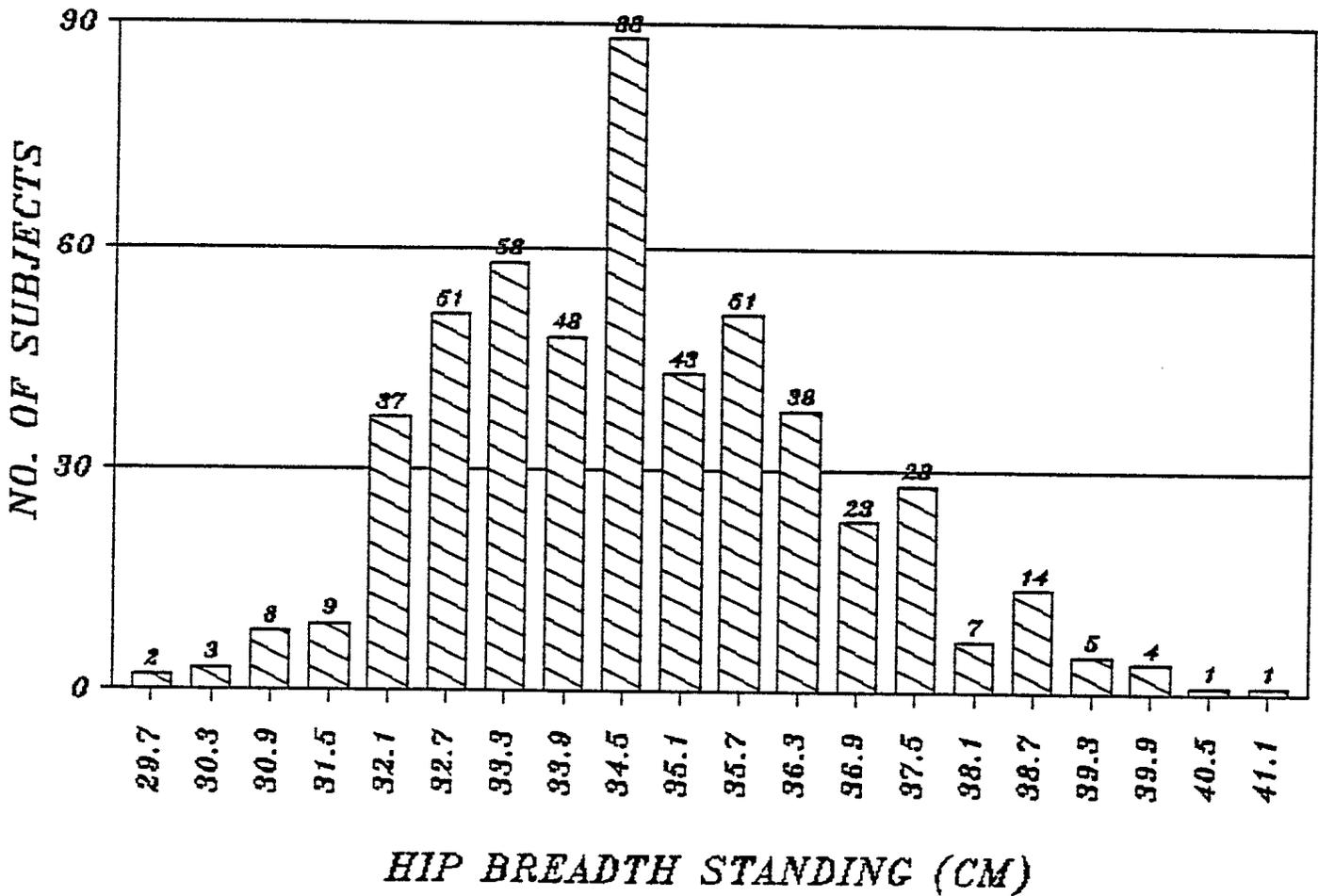
CM.	%ILE	IN.
30.50	1	12.01
31.00	2	12.20
31.40	3	12.36
31.70	4	12.48
31.80	5	12.52
32.30	10	12.72
32.70	15	12.87
33.00	20	12.99
33.30	25	13.11
33.50	30	13.19
33.80	35	13.31
34.10	40	13.43
34.30	45	13.50
34.50	50	13.58
34.70	55	13.66
35.00	60	13.78
35.30	65	13.90
35.70	70	14.06
36.00	75	14.17
36.30	80	14.29
36.60	85	14.41
37.30	90	14.69
38.40	95	15.12
38.70	96	15.24
38.90	97	15.31
39.15	98	15.41
39.70	99	15.63



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
29.800	MINIMUM VALUE	11.732
41.000	MAXIMUM VALUE	16.142
11.200	RANGE	4.409
34.684	MEAN	13.655
1.946	STANDARD DEVIATION	0.766
0.085	STANDARD ERROR (SEM)	0.034
3.786	VARIANCE	0.587
0.381	SKEWNESS	0.381
-0.006	KURTOSIS	-0.006

*Freq. Histogram: Hip Breadth Standing*  
 MIN = 29.8 MAX = 41.0



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**CHART MEASUREMENTS**

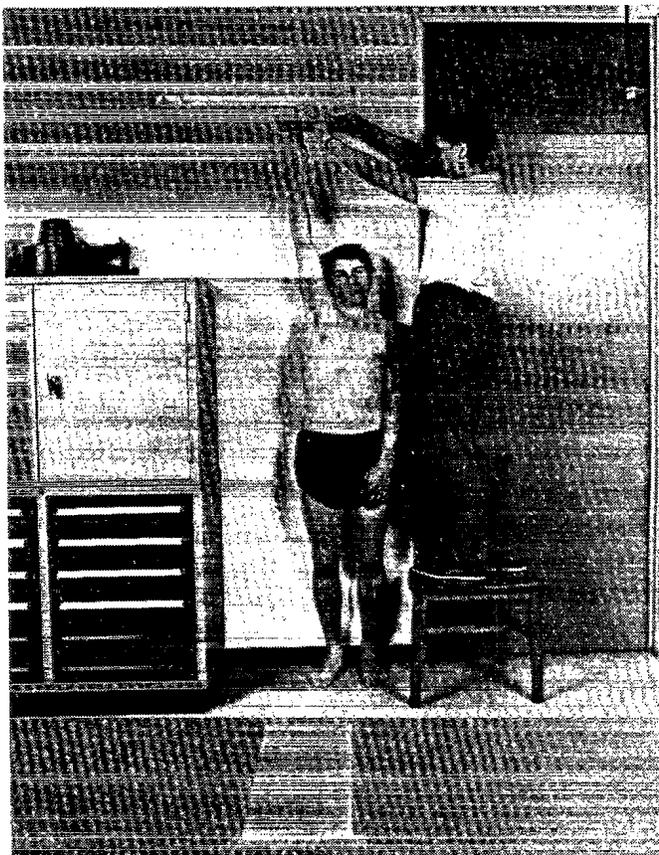
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OVERHEAD REACH: [From DCIEM survey of CF Women, 1978]

Subject stands erect, with heels together, and buttocks and shoulders against the wall. The right arm is extended vertically upward, while the heels remain in contact with standing surface. With the right arm fully extended, the tips of the phalanges are used to push a measuring block up the wall to a maximum vertical height. The vertical distance from the standing surface to the block is measured with the anthropometer.

PERCENTILE TABLE

CM.	%ILE	IN.
208.00	1	81.89
210.90	2	83.03
211.90	3	83.43
212.60	4	83.70
213.30	5	83.98
216.50	10	85.24
218.70	15	86.10
220.90	20	86.97
222.30	25	87.52
223.60	30	88.03
224.80	35	88.50
226.00	40	88.98
227.20	45	89.45
228.40	50	89.92
229.50	55	90.35
230.80	60	90.87
232.00	65	91.34
233.30	70	91.85
235.00	75	92.52
236.80	80	93.23
239.00	85	94.09
241.50	90	95.08
245.70	95	96.73
248.00	96	97.64
249.10	97	98.07
250.95	98	98.80
253.40	99	99.76

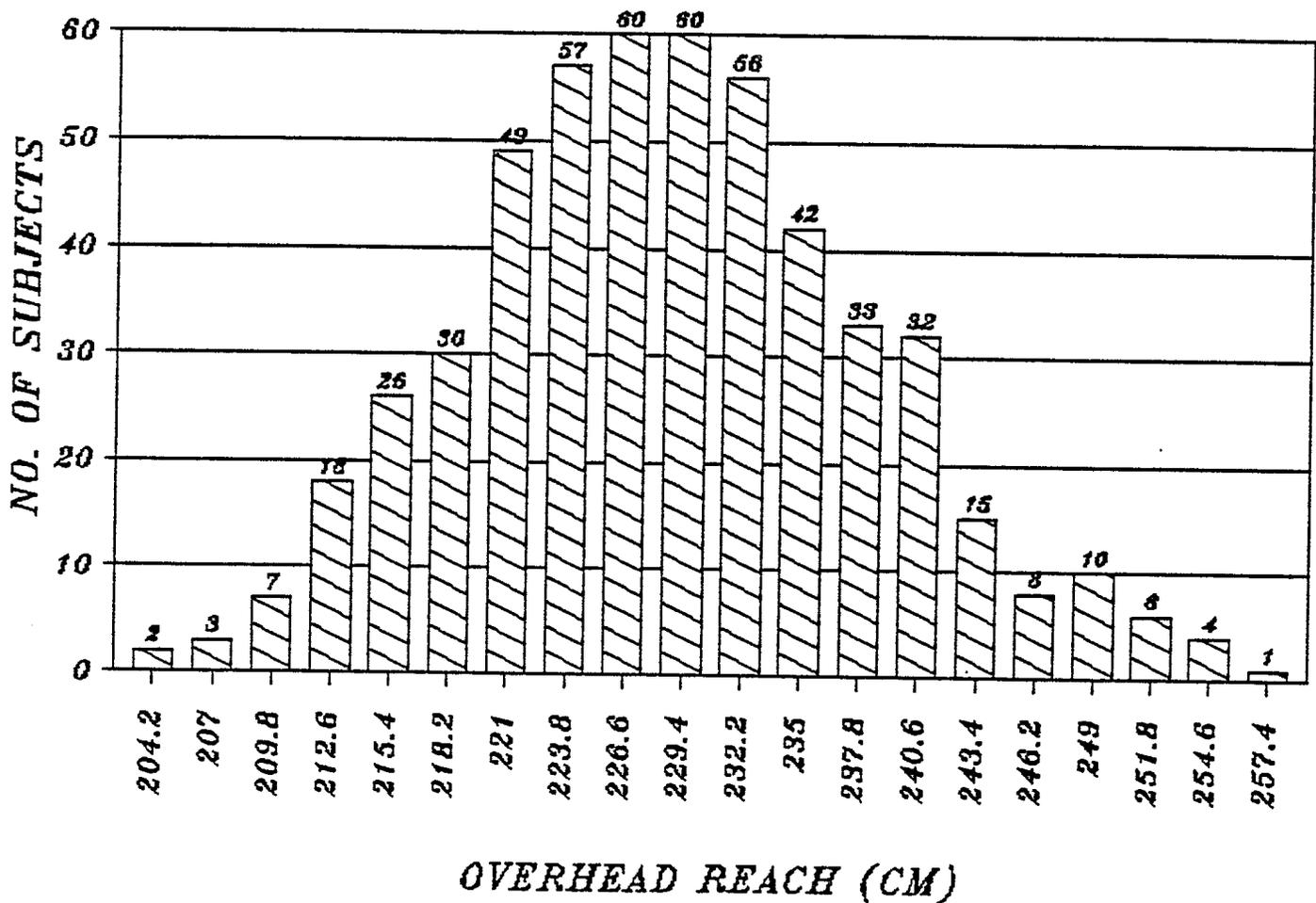


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
204.000	MINIMUM VALUE	80.315
257.500	MAXIMUM VALUE	101.378
53.500	RANGE	21.063
228.832	MEAN	90.091
9.618	STANDARD DEVIATION	3.787
0.422	STANDARD ERROR (SEM)	0.166
92.509	VARIANCE	14.339
0.246	SKEWNESS	0.246
-0.093	KURTOSIS	-0.093

# Frequency Histogram For Overhead Reach

MIN = 204.0    MAX = 257.5

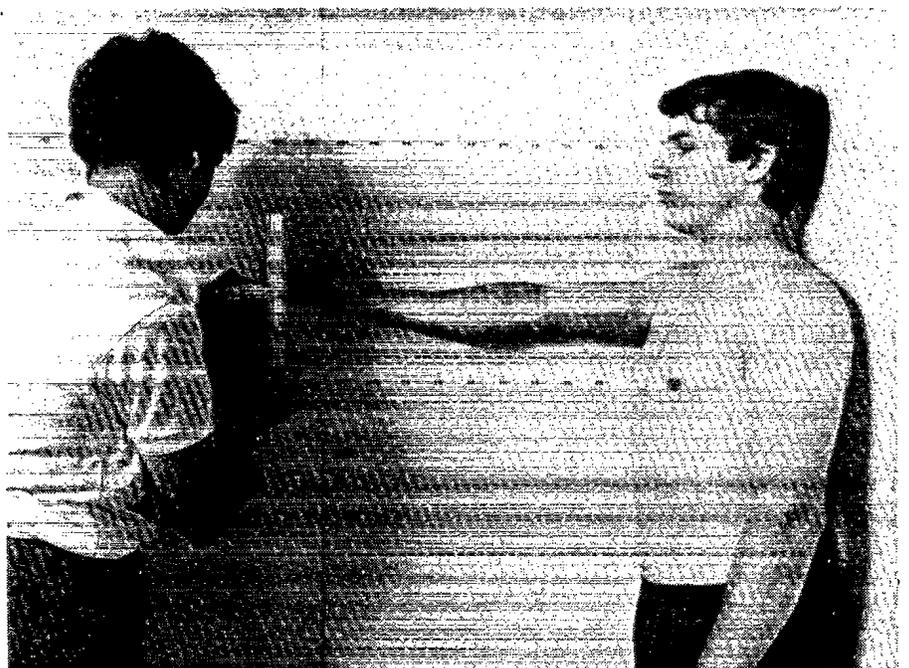


FUNCTIONAL REACH (Also called "THUMB-TIP REACH"):

Subject stands erect, his back against a wall, his right arm extended forward parallel to the floor, the tip of the index finger touching the tip of his extended thumb, the thumb in the plane of the the extended arm, and his right shoulder relaxed and touching the wall. Using the anthropometer, measure the horizontal distance from the wall to the tip of the thumb.

PERCENTILE TABLE

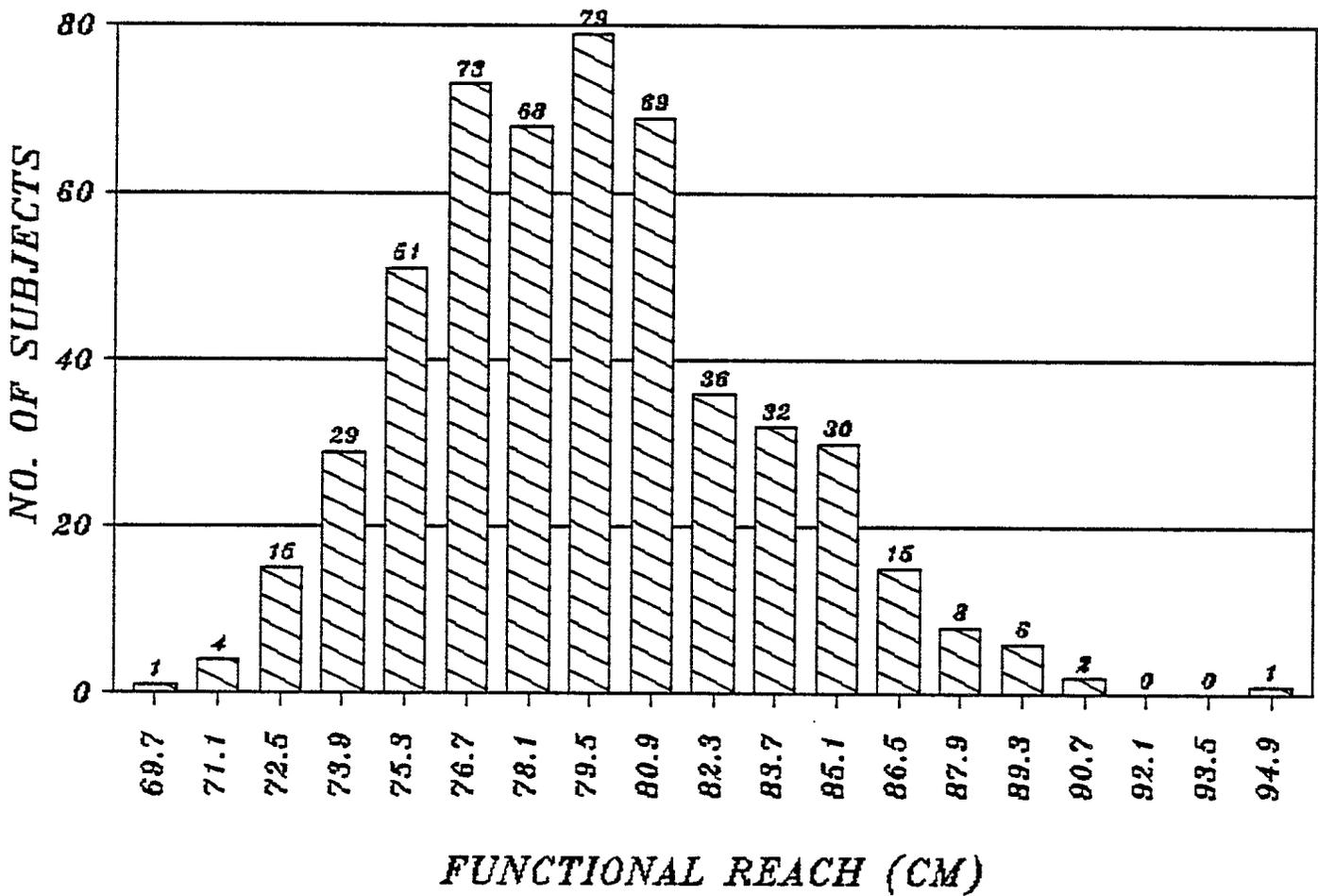
CM.	%ILE	IN.
71.50	1	28.15
72.20	2	28.43
72.75	3	28.64
73.30	4	28.86
73.60	5	28.98
74.80	10	29.45
75.50	15	29.72
76.20	20	30.00
76.80	25	30.24
77.20	30	30.39
77.70	35	30.59
78.10	40	30.75
78.70	45	30.98
79.10	50	31.14
79.60	55	31.34
80.10	60	31.54
80.50	65	31.69
81.20	70	31.97
81.70	75	32.17
82.60	80	32.52
83.60	85	32.91
85.00	90	33.46
86.30	95	33.98
86.90	96	34.21
87.40	97	34.41
88.30	98	34.76
89.40	99	35.20



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
69.200	MINIMUM VALUE	37.283
95.600	MAXIMUM VALUE	48.898
26.400	RANGE	11.614
79.440	MEAN	43.290
3.884	STANDARD DEVIATION	2.041
0.170	STANDARD ERROR (SEM)	0.090
15.083	VARIANCE	4.167
0.453	SKEWNESS	0.125
0.290	KURTOSIS	-0.089

*Freq. Histogram For Functional Reach*  
 MIN = 69.2 MAX = 95.6



FOOT LENGTH:

Subject stands with his right foot in the foot box, the foot just touching the side and rear wall, and his weight equally distributed on both feet. With the block touching the tip of the longest toe, measure foot length from the rear wall, using the scale on the floor of the box.

PERCENTILE TABLE

CM.	%ILE	IN.
23.60	1	9.29
24.35	2	9.59
24.60	3	9.69
24.80	4	9.76
24.90	5	9.80
25.20	10	9.92
25.40	15	10.00
25.70	20	10.12
25.90	25	10.20
26.00	30	10.24
26.20	35	10.31
26.30	40	10.35
26.50	45	10.43
26.70	50	10.51
26.90	55	10.59
27.00	60	10.63
27.20	65	10.71
27.30	70	10.75
27.60	75	10.87
27.80	80	10.94
28.00	85	11.02
28.40	90	11.18
28.80	95	11.34
28.90	96	11.38
29.00	97	11.42
29.25	98	11.52
29.80	99	11.73

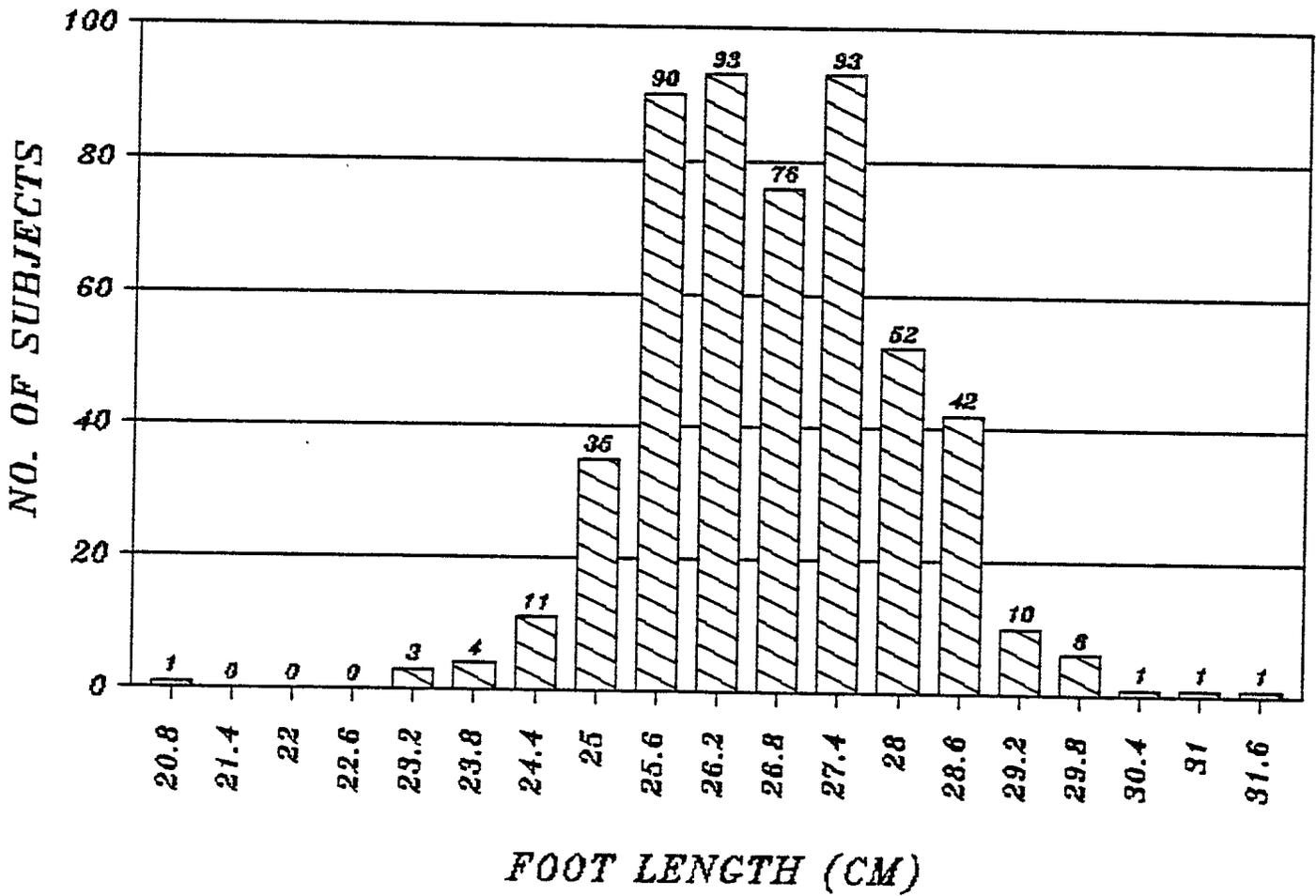


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
20.700	MINIMUM VALUE	8.150
31.600	MAXIMUM VALUE	12.441
10.900	RANGE	4.291
26.740	MEAN	10.527
1.265	STANDARD DEVIATION	0.498
0.056	STANDARD ERROR (SEM)	0.022
1.601	VARIANCE	0.248
0.017	SKEWNESS	0.017
0.954	KURTOSIS	0.954

# Frequency Histogram For Foot Length

MIN = 20.7    MAX = 31.6



FOOT BREADTH:

Subject stands with his right foot in the foot box, the foot just touching the side and rear wall, its long axis parallel to the side wall, and his weight equally distributed on both feet. With the block touching the widest part of the foot, measure foot width from the side wall, using the scale on the floor of the box.

PERCENTILE TABLE

CM.	%ILE	IN.
8.70	1	3.43
8.80	2	3.46
8.90	3	3.50
9.00	4	3.54
9.00	5	3.54
9.20	10	3.62
9.30	15	3.66
9.40	20	3.70
9.50	25	3.74
9.50	30	3.74
9.60	35	3.78
9.70	40	3.82
9.80	45	3.86
9.80	50	3.86
9.90	55	3.90
9.90	60	3.90
10.00	65	3.94
10.10	70	3.98
10.20	75	4.02
10.30	80	4.06
10.40	85	4.09
10.60	90	4.17
10.80	95	4.25
10.90	96	4.29
11.00	97	4.33
11.05	98	4.35
11.20	99	4.41

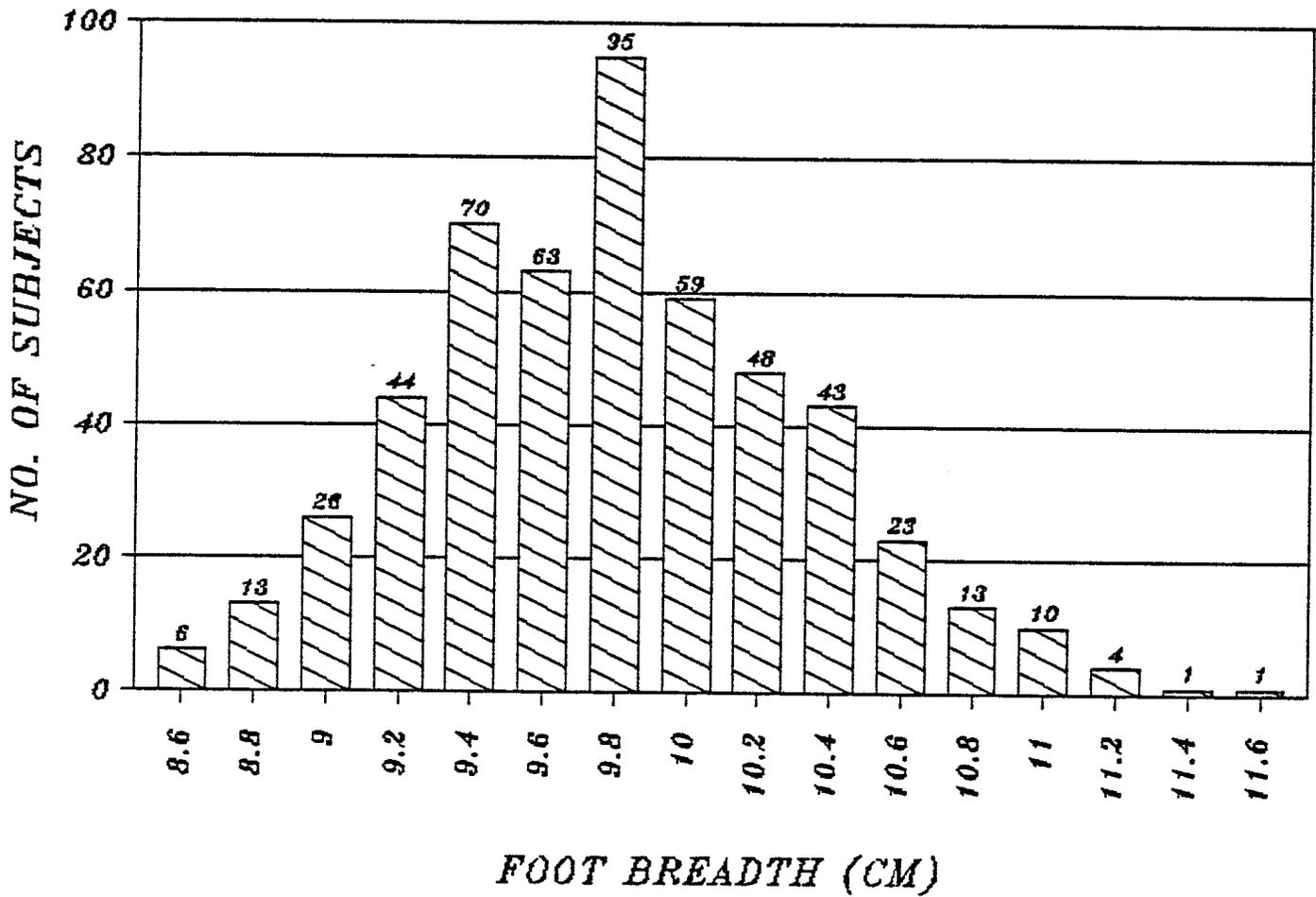


DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
8.600	MINIMUM VALUE	3.386
11.600	MAXIMUM VALUE	4.567
3.000	RANGE	1.181
9.851	MEAN	3.879
0.535	STANDARD DEVIATION	0.211
0.023	STANDARD ERROR (SEM)	0.009
0.286	VARIANCE	0.044
0.276	SKEWNESS	0.276
-0.086	KURTOSIS	-0.086

# Frequency Histogram For Foot Breadth

MIN = 8.6 MAX = 11.6



**BUTTOCK-HEEL LENGTH:**

Measure the distance from the base of the heel to a wall, against which the subject sits erect with his leg maximally extended forward along the sitting surface.

**PERCENTILE TABLE**

CM.	%ILE	IN.
99.20	1	39.06
100.05	2	39.39
100.70	3	39.65
101.30	4	39.88
101.50	5	39.96
103.30	10	40.67
104.60	15	41.18
105.30	20	41.46
106.50	25	41.93
107.40	30	42.28
108.00	35	42.52
108.80	40	42.83
109.40	45	43.07
110.00	50	43.31
110.80	55	43.62
111.30	60	43.82
112.10	65	44.13
113.00	70	44.49
114.30	75	45.00
115.50	80	45.47
116.50	85	45.87
117.90	90	46.42
120.00	95	47.24
121.20	96	47.72
122.05	97	48.05
122.45	98	48.21
123.50	99	48.62

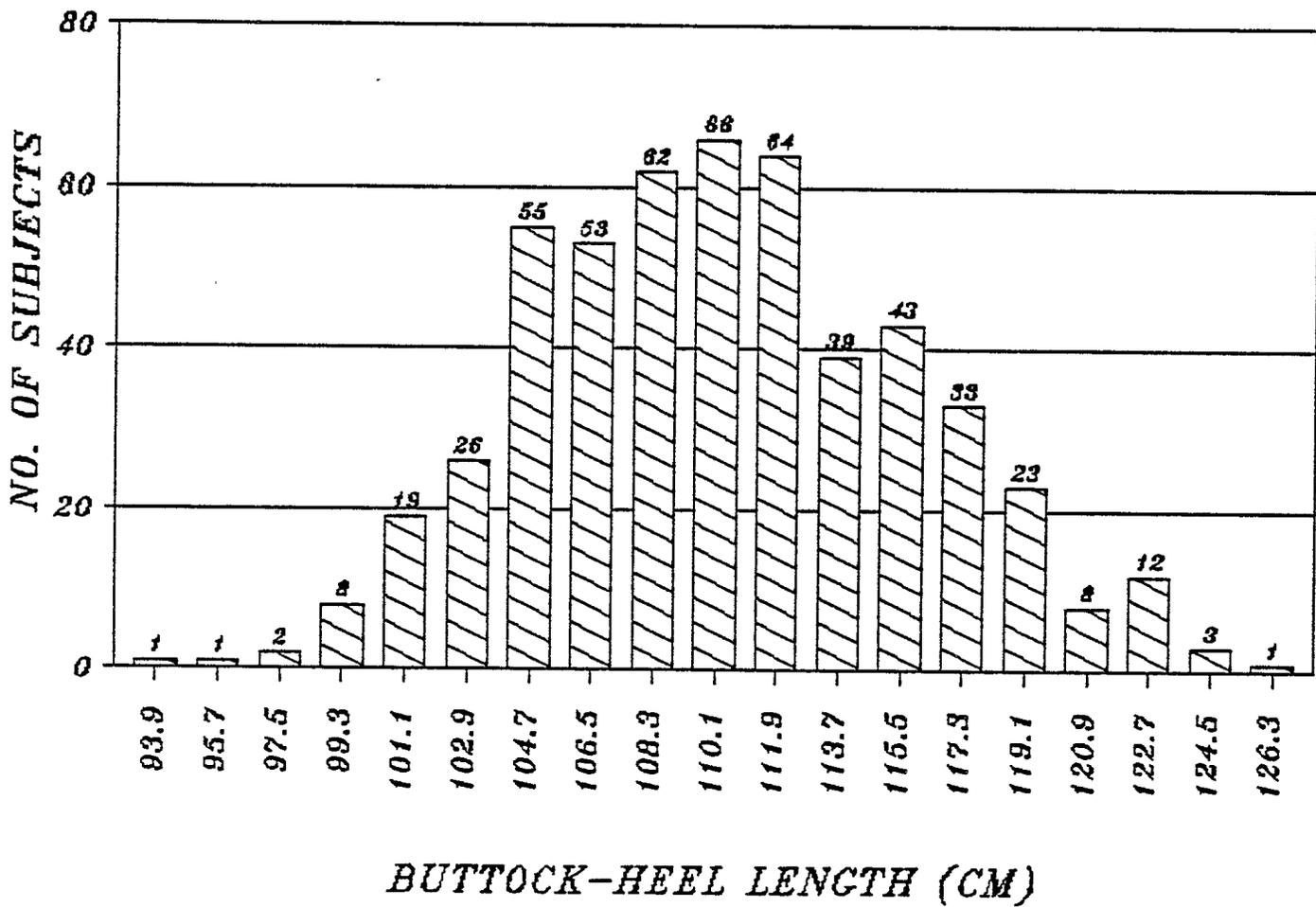


**DESCRIPTIVE STATISTICS**

CM.		IN.
519	NUMBER OF CASES	519
93.400	MINIMUM VALUE	36.772
126.800	MAXIMUM VALUE	49.921
33.400	RANGE	13.150
110.391	MEAN	43.461
5.600	STANDARD DEVIATION	2.205
0.246	STANDARD ERROR (SEM)	0.097
31.361	VARIANCE	4.861
0.209	SKEWNESS	0.209
-0.232	KURTOSIS	-0.232

# Freq. Histogram For Buttock-Heel Length

MIN = 93.4    MAX = 126.8



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SITTING MEASURE  
USING THE  
FULL LENGTH "FREE STANDING ANTHROPOMETER"  
AND TAPE MEASURE

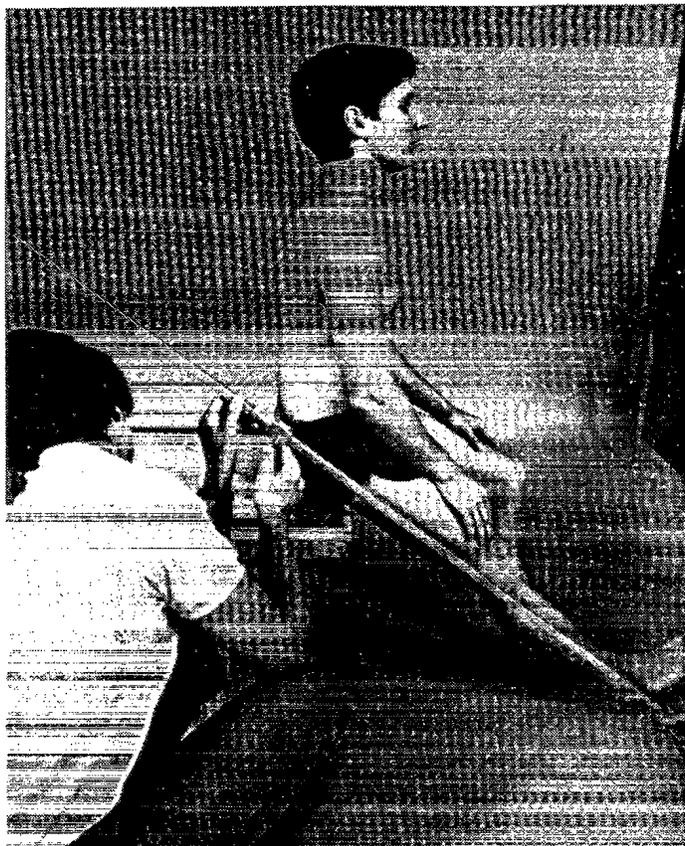
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FUNCTIONAL LEG LENGTH:

The distance from the waist level to the heel, is measured posteriorly from the long axis of the leg with the subject sitting erect on the edge of a chair. The leg is extended forward with the knee straightened.

PERCENTILE TABLE

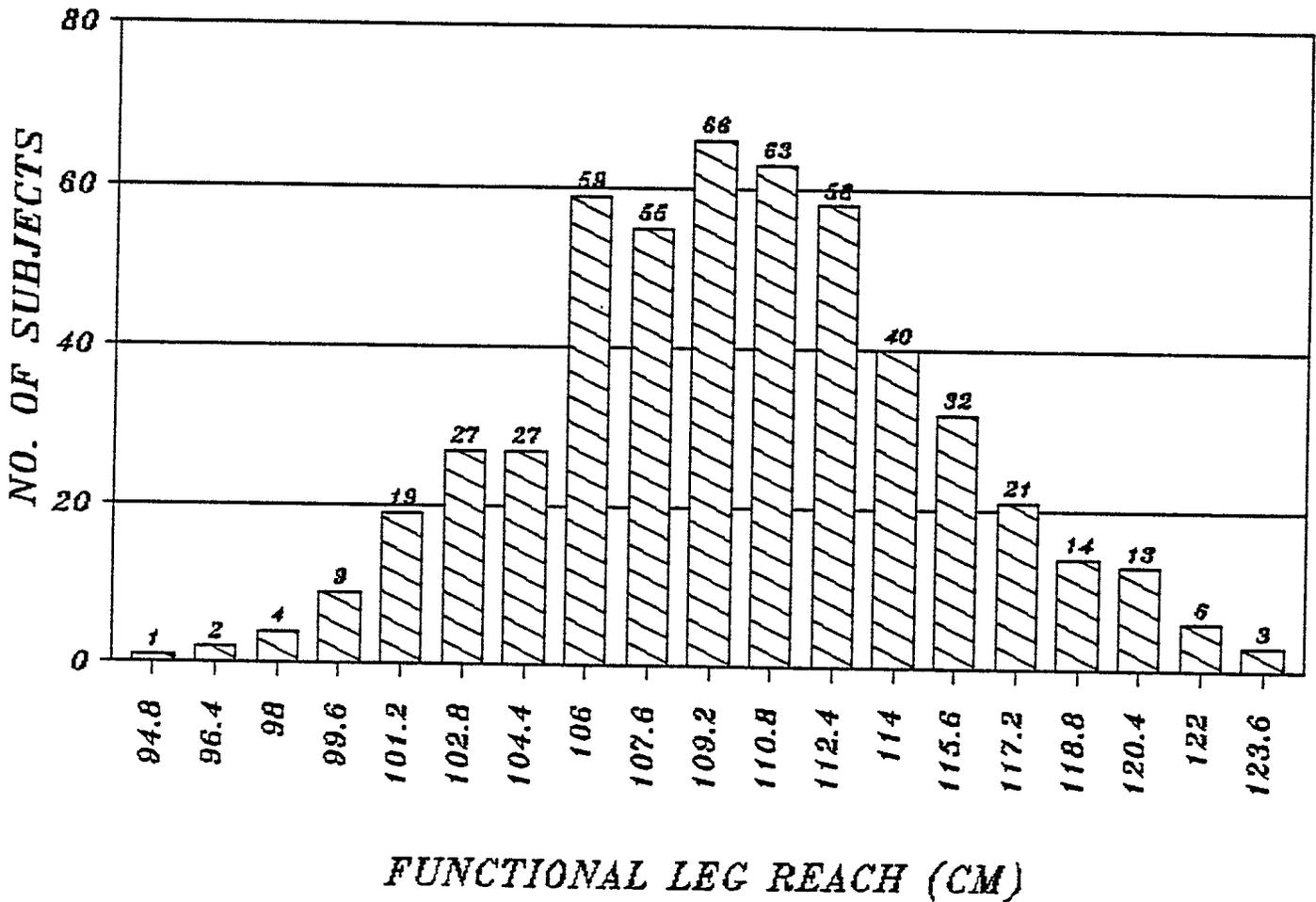
CM.	%ILE	IN.
98.60	1	38.82
99.40	2	39.13
100.30	3	39.49
100.80	4	39.68
101.50	5	39.96
103.30	10	40.67
104.80	15	41.26
105.80	20	41.65
106.40	25	41.89
107.00	30	42.13
107.90	35	42.48
108.60	40	42.76
109.30	45	43.03
109.80	50	43.23
110.40	55	43.46
111.10	60	43.74
111.80	65	44.02
112.60	70	44.33
113.20	75	44.57
114.30	80	45.00
115.40	85	45.43
116.90	90	46.02
119.10	95	46.89
119.80	96	47.17
120.40	97	47.40
121.15	98	47.70
122.60	99	48.27



DESCRIPTIVE STATISTICS

CM.		IN.
519	NUMBER OF CASES	519
94.700	MINIMUM VALUE	27.244
124.200	MAXIMUM VALUE	37.638
29.500	RANGE	10.394
109.958	MEAN	31.276
5.185	STANDARD DEVIATION	1.529
0.228	STANDARD ERROR (SEM)	0.067
26.884	VARIANCE	2.338
0.125	SKEWNESS	0.453
-0.089	KURTOSIS	0.290

*Freq. Histogram: Functional Leg Length*  
 MIN = 94.7 MAX = 124.2



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**APPENDIX E**

**CORRELATION MATRIX**

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LEGEND FOR CORRELATION MATRIX

AGE	= AGE IN YEARS	ACROMBR	= BIACROMIAL BREADTH
PERHT	= PERCEIVED HEIGHT	HEADLN	= HEAD LENGTH
PERWT	= PERCEIVED WEIGHT	HEADHT	= HEAD HEIGHT
WT	= WEIGHT (MASS)	MENTVERT	= MENTON-VERTEX HEIGHT
HT	= HEIGHT (STATURE)	HEADBR	= HEAD BREADTH
CERVHT	= CERVICAL HEIGHT	HANDLEN	= HAND LENGTH
LUMBHT	= LUMBAR (L4-L5) HEIGHT	PALMLN	= PALM LENGTH
ACRHT	= ACROMIAL HEIGHT	HANDBR	= HAND BREADTH
SHLDRHT	= SHOULDER HEIGHT	HANDTH	= HAND THICKNESS
ELBHT	= ELBOW HEIGHT	HEADCIRC	= HEAD CIRCUMFERENCE
WRISTHT	= WRIST HEIGHT	BICFLEXD	= BICEPS CIRCUMFERENCE FLEXED
TROCHHT	= TROCHANTERIC HEIGHT	BICRELXD	= BICEPS CIRCUMFERENCE RELAXED
KNEEHT	= KNEE HEIGHT	FORARMFL	= FOREARM CIRCUMFERENCE FLEXED
CALFCIRC	= CALF CIRCUMFERENCE	FORARMRL	= FOREARM CIRCUMFERENCE RELAXED
CALFHT	= CALF HEIGHT	WRSTCIRC	= WRIST CIRCUMFERENCE
ANKLEHT	= ANKLE HEIGHT	HANDCIRC	= HAND CIRCUMFERENCE
WAISHTOM	= WAIST HEIGHT OMPHALION	NECKCIRC	= NECK CIRCUMFERENCE
WAISHTNA	= WAIST HEIGHT NATURAL	SHLDR CIR	= SHOULDER CIRCUMFERENCE
SUPRAHT	= SUPRASTERNAL HEIGHT	CHESTCIR	= CHEST CIRCUMFERENCE
POPHT	= POPLITEAL HEIGHT	WAICIROM	= WAIST CIRCUMFERENCE OMPHALION
KNHTSIT	= KNEE HEIGHT SITTING	WAICIRNA	= WAIST CIRCUMFERENCE NATURAL
SITHTRLD	= SITTING HEIGHT RELAXED	BUTCIRC	= BUTTOCK CIRCUMFERENCE
BUTPOPHT	= BUTTOCK POPLITEAL HEIGHT	UPTHCIRC	= UPPER THIGH CIRCUMFERENCE
SITHT	= SITTING HEIGHT ERECT	LWRTHCIR	= LOWER THIGH CIRCUMFERENCE
EYEHTSIT	= EYE HEIGHT SITTING	ANKLCIRC	= ANKLE CIRCUMFERENCE
ACRHTSIT	= ACROMIAL HEIGHT SITTING	WAISTFRN	= WAIST FRONT LENGTH
ELBRSTHT	= ELBOW RESTING HEIGHT	CROTCHLN	= CROTCH LENGTH
WAIHTSIT	= WAIST HEIGHT SITTING	WAISTBK	= WAIST BACK LENGTH
THIGHCL	= THIGH CLEARANCE	SPAN	= ARM SPAN
VERTRCDN	= VERTICAL REACH DOWN	CHESTBR	= CHEST BREADTH
SHELBLNG	= SHOULDER-ELBOW LENGTH	CHESTDP	= CHEST DEPTH
ELBFNGTP	= ELBOW-FINGERTIP LENGTH	HIPBRSTD	= HIP BREADTH STANDING
ELBOWCOG	= ELBOW-CENTER OF GRIP LENGTH	OVRHDRCH	= OVERHEAD REACH
ELBWSTLN	= ELBOW-WRIST LENGTH	FUNCRCH	= FUNCTIONAL REACH
BUTKNLNG	= BUTTOCK-KNEE LENGTH	FOOTLNG	= FOOT LENGTH
HIPBSIT	= HIP BREADTH SITTING	FOOTBRD	= FOOT BREADTH
ELBELBBR	= ELBOW-ELBOW BREADTH	BUTHELNG	= BUTTOCK-HEEL LENGTH
BIDELTBR	= BIDELOID BREADTH	FUNCLEG	= FUNCTIONAL LEG LENGTH

PEARSON CORRELATION MATRIX

	AGE	PERHT	PERWT	WT	HT
AGE	1.000				
PERHT	-0.111	1.000			
PERWT	0.162	0.537	1.000		
WT	0.168	0.506	0.947	1.000	
HT	-0.132	0.906	0.586	0.559	1.000
CERVHT	-0.093	0.899	0.594	0.571	0.982
LUMBHT	-0.114	0.814	0.518	0.486	0.883
ACRHT	-0.059	0.885	0.600	0.586	0.965
SHLDRHT	-0.065	0.877	0.601	0.590	0.961
ELBHT	-0.081	0.863	0.591	0.580	0.937
WRISTHT	-0.073	0.815	0.540	0.540	0.882
TROCHHT	-0.137	0.814	0.448	0.417	0.879
KNEEHT	-0.048	0.806	0.559	0.537	0.878
CALFCIRC	0.068	0.297	0.746	0.784	0.336
CALFHT	-0.042	0.622	0.475	0.459	0.706
ANKLEHT	0.003	0.397	0.290	0.298	0.424
WAISHTOM	-0.176	0.853	0.453	0.429	0.916
WAISHTNA	-0.123	0.795	0.358	0.315	0.848
SUPRAHT	-0.104	0.897	0.588	0.568	0.982
POPHT	-0.121	0.804	0.511	0.472	0.884
KNHTSIT	-0.091	0.821	0.649	0.632	0.902
SITHTRLD	-0.135	0.680	0.464	0.455	0.788
BUTPOPHT	-0.053	0.687	0.511	0.501	0.734
SITHT	-0.128	0.716	0.476	0.456	0.815
EYEHTSIT	-0.103	0.652	0.437	0.421	0.756
ACRHTSIT	0.025	0.637	0.498	0.511	0.720
ELBRSTHT	-0.001	0.201	0.186	0.217	0.241
WAIHTSIT	-0.030	0.172	-0.041	-0.068	0.202
THIGHCL	0.053	0.312	0.699	0.737	0.316
VERTRCDN	-0.029	0.766	0.560	0.536	0.851
SHELBLNG	0.037	0.710	0.531	0.516	0.795
ELBFNGTP	-0.070	0.744	0.571	0.554	0.827
ELBOWCOG	-0.104	0.715	0.558	0.543	0.786
ELBWSTLN	-0.102	0.701	0.539	0.527	0.780
BUTKNLNG	-0.021	0.763	0.686	0.686	0.811
HIPBRSIT	0.141	0.400	0.804	0.863	0.441
ELBELBBR	0.311	0.194	0.745	0.807	0.208
BIDELTBR	-0.007	0.335	0.755	0.805	0.380
ACROMBR	-0.105	0.460	0.521	0.519	0.505
HEADLN	-0.124	0.297	0.382	0.404	0.338
HEADHT	-0.177	0.265	0.231	0.245	0.293
MENTVERT	-0.076	0.405	0.352	0.349	0.444
HEADBR	0.241	0.099	0.321	0.348	0.086
HANDLEN	-0.040	0.621	0.492	0.477	0.711
PALMLEN	-0.036	0.541	0.486	0.480	0.617
HANDBR	0.067	0.435	0.475	0.487	0.473
HANDTH	0.246	0.266	0.423	0.463	0.281
HEADCIRC	-0.006	0.310	0.489	0.514	0.348
BICFLEXD	0.048	0.184	0.707	0.755	0.215

	AGE	PERHT	PERWT	WT	HT
BICRELXD	0.118	0.171	0.732	0.778	0.194
FORARMFL	0.099	0.297	0.693	0.744	0.320
FORARMRL	0.132	0.289	0.728	0.777	0.310
WRSTCIRC	0.237	0.405	0.676	0.707	0.450
HANDCIRC	0.107	0.438	0.553	0.572	0.468
NECKCIRC	0.203	0.231	0.734	0.792	0.242
SHLDR CIR	0.045	0.318	0.800	0.847	0.360
CHESTCIR	0.302	0.223	0.785	0.842	0.245
WAICIROM	0.426	0.209	0.803	0.854	0.236
WAICIRNA	0.389	0.251	0.811	0.864	0.276
BUTTCIRC	0.209	0.375	0.873	0.921	0.414
UPTHCIRC	0.045	0.283	0.815	0.864	0.302
LWRTHCIR	0.102	0.278	0.768	0.802	0.302
ANKLCIRC	0.049	0.366	0.669	0.694	0.402
WAISTFRN	0.227	0.432	0.601	0.611	0.510
CROTCHLN	0.103	0.431	0.487	0.523	0.428
WAISTBK	0.125	0.556	0.591	0.575	0.629
SPAN	-0.070	0.767	0.561	0.545	0.848
CHESTBR	0.141	0.282	0.718	0.782	0.296
CHESTDP	0.376	0.176	0.714	0.765	0.193
HIPBRSTD	0.225	0.417	0.752	0.799	0.453
OVRHDRCH	-0.133	0.846	0.578	0.556	0.936
FUNCRC	0.043	0.692	0.556	0.548	0.749
FOOTLNG	-0.004	0.639	0.522	0.509	0.707
FOOTBRD	-0.029	0.380	0.507	0.516	0.452
BUTHELNG	-0.016	0.808	0.602	0.595	0.858
FUNCLEG	-0.057	0.828	0.560	0.536	0.896

	CERVHT	LUMBHT	ACRHT	SHLDRHT	ELBHT
CERVHT	1.000				
LUMBHT	0.894	1.000			
ACRHT	0.974	0.899	1.000		
SHLDRHT	0.969	0.892	0.996	1.000	
ELBHT	0.941	0.862	0.970	0.969	1.000
WRISTHT	0.880	0.785	0.916	0.917	0.959
TROCHHT	0.892	0.895	0.888	0.881	0.833
KNEEHT	0.896	0.871	0.891	0.891	0.845
CALFCIRC	0.335	0.285	0.337	0.342	0.343
CALFHT	0.717	0.716	0.721	0.714	0.703
ANKLEHT	0.425	0.362	0.431	0.423	0.424
WAISHTOM	0.925	0.901	0.918	0.910	0.870
WAISHTNA	0.856	0.835	0.845	0.838	0.804
SUPRAHT	0.978	0.899	0.969	0.966	0.942
POPHT	0.892	0.862	0.880	0.881	0.830
KNHTSIT	0.912	0.868	0.904	0.903	0.864
SITHTRLD	0.732	0.579	0.710	0.708	0.723
BUTPOPHT	0.750	0.767	0.756	0.751	0.706
SHTHT	0.763	0.573	0.734	0.733	0.749
EYEHTSIT	0.705	0.530	0.684	0.683	0.709
ACRHTSIT	0.713	0.556	0.755	0.758	0.775

	CERVHT	LUMBHT	ACRHT	SHLDRHT	ELBHT
ELBRSTHT	0.224	0.060	0.271	0.279	0.397
WAIHTSIT	0.192	0.160	0.177	0.177	0.182
THIGHCL	0.344	0.334	0.356	0.354	0.375
VERTRCDN	0.869	0.827	0.856	0.850	0.756
SHELBLNG	0.816	0.785	0.817	0.812	0.693
ELBFGTTP	0.835	0.789	0.816	0.813	0.764
ELBOWCOG	0.804	0.777	0.789	0.787	0.735
ELBWSTLN	0.798	0.793	0.787	0.781	0.736
BUTKNLNG	0.838	0.822	0.842	0.833	0.793
HIPBR SIT	0.456	0.373	0.471	0.473	0.479
ELBELBBR	0.232	0.165	0.268	0.276	0.275
BIDELTBR	0.379	0.307	0.391	0.401	0.374
ACROMBR	0.495	0.388	0.446	0.438	0.390
HEADLN	0.324	0.220	0.319	0.329	0.332
HEADHT	0.256	0.233	0.246	0.244	0.244
MENTVERT	0.420	0.374	0.393	0.398	0.376
HEADBR	0.094	0.158	0.124	0.119	0.113
HANDLEN	0.705	0.655	0.690	0.689	0.648
PALMLN	0.612	0.555	0.603	0.604	0.572
HANDBR	0.466	0.398	0.452	0.449	0.421
HANDTH	0.296	0.246	0.304	0.302	0.294
HEADCIRC	0.332	0.303	0.344	0.348	0.355
BICFLEXD	0.213	0.165	0.223	0.233	0.249
BICRELXD	0.199	0.157	0.216	0.224	0.245
FORARMFL	0.323	0.262	0.326	0.329	0.340
FORARMRL	0.314	0.258	0.320	0.324	0.334
WRSTCIRC	0.446	0.384	0.448	0.448	0.435
HANDCIRC	0.467	0.409	0.462	0.453	0.438
NECKCIRC	0.266	0.197	0.282	0.289	0.283
SHLDR CIR	0.363	0.287	0.369	0.378	0.352
CHESTCIR	0.269	0.232	0.302	0.310	0.294
WAICIR OM	0.268	0.215	0.299	0.300	0.295
WAICIR NA	0.308	0.250	0.338	0.339	0.335
BUTT CIR	0.428	0.356	0.446	0.445	0.453
UPTH CIR	0.314	0.265	0.326	0.330	0.346
LWRTH CIR	0.293	0.218	0.304	0.310	0.322
ANKL CIR	0.396	0.336	0.388	0.392	0.386
WAISTFRN	0.491	0.349	0.489	0.496	0.511
CROTCHLN	0.424	0.300	0.436	0.419	0.429
WAISTBK	0.671	0.471	0.616	0.617	0.619
SPAN	0.859	0.812	0.837	0.826	0.750
CHESTBR	0.307	0.239	0.333	0.342	0.332
CHESTDP	0.230	0.196	0.263	0.265	0.258
HIPBR STD	0.471	0.388	0.489	0.487	0.486
OVRHDRCH	0.943	0.878	0.933	0.930	0.877
FUNCRCH	0.772	0.701	0.752	0.750	0.680
FOOTLNG	0.712	0.674	0.688	0.681	0.661
FOOTBRD	0.436	0.408	0.426	0.430	0.408
BUTHELNG	0.876	0.850	0.876	0.867	0.825
FUNCLEG	0.915	0.895	0.910	0.905	0.865

	WRISTHT	TROCHHT	KNEEHT	CALFCIRC	CALFHT
WRISTHT	1.000				
TROCHHT	0.753	1.000			
KNEEHT	0.771	0.885	1.000		
CALFCIRC	0.325	0.212	0.326	1.000	
CALFHT	0.651	0.710	0.752	0.235	1.000
ANKLEHT	0.430	0.363	0.438	0.251	0.372
WAISHTOM	0.805	0.919	0.890	0.234	0.719
WAISHTNA	0.752	0.851	0.802	0.148	0.633
SUPRAHT	0.886	0.889	0.893	0.334	0.710
POPHT	0.757	0.897	0.933	0.273	0.742
KNHTSIT	0.789	0.889	0.939	0.430	0.768
SITHRLD	0.715	0.535	0.549	0.292	0.438
BUTPOPHT	0.628	0.760	0.747	0.247	0.585
SITHT	0.740	0.540	0.553	0.296	0.445
EYEHTSIT	0.700	0.493	0.500	0.276	0.397
ACRHTSIT	0.766	0.503	0.529	0.304	0.436
ELBRSTHT	0.456	-0.009	0.036	0.123	0.057
WAIHTSIT	0.191	0.151	0.078	-0.094	0.046
THIGHCL	0.343	0.247	0.355	0.653	0.385
VERTCDN	0.641	0.843	0.858	0.311	0.693
SHELBLNG	0.601	0.786	0.777	0.303	0.618
ELBFNGTP	0.654	0.805	0.842	0.338	0.690
ELBOWCOG	0.620	0.785	0.815	0.323	0.673
ELBWSTLN	0.608	0.798	0.815	0.293	0.691
BUTKNLNG	0.730	0.803	0.813	0.453	0.700
HIPBRST	0.441	0.295	0.418	0.683	0.382
ELBELBBR	0.257	0.122	0.258	0.594	0.241
BIDELTBR	0.338	0.262	0.344	0.636	0.293
ACROMBR	0.338	0.408	0.445	0.408	0.344
HEADLN	0.330	0.248	0.307	0.338	0.303
HEADHT	0.229	0.221	0.230	0.253	0.272
MENTVERT	0.335	0.364	0.383	0.269	0.341
HEADBR	0.101	0.077	0.142	0.295	0.153
HANDLEN	0.575	0.652	0.695	0.336	0.536
PALMLEN	0.515	0.542	0.599	0.357	0.477
HANDBR	0.394	0.398	0.422	0.403	0.346
HANDTH	0.284	0.204	0.295	0.387	0.313
HEADCIRC	0.336	0.248	0.327	0.435	0.327
BICFLEXD	0.226	0.111	0.202	0.642	0.197
BICRELXD	0.232	0.095	0.189	0.652	0.207
FORARMFL	0.319	0.217	0.293	0.675	0.265
FORARMRL	0.307	0.202	0.287	0.706	0.260
WRSTCIRC	0.405	0.340	0.416	0.599	0.348
HANDCIRC	0.413	0.395	0.417	0.484	0.377
NECKCIRC	0.266	0.145	0.262	0.623	0.281
SHLDR CIR	0.317	0.245	0.351	0.676	0.319
CHESTCIR	0.268	0.174	0.305	0.613	0.279
WAICROM	0.271	0.138	0.299	0.616	0.275
WAICIRNA	0.310	0.171	0.327	0.624	0.304
BUTTCIRC	0.414	0.271	0.396	0.739	0.377
UPTHCIRC	0.312	0.188	0.302	0.746	0.308

	WRISTHT	TROCHHT	KNEEHT	CALFCIRC	CALFHT
LWRTHCIR	0.297	0.184	0.280	0.752	0.236
ANKLCIRC	0.366	0.295	0.395	0.790	0.251
WAISTFRN	0.504	0.281	0.375	0.407	0.287
CROTCHLN	0.419	0.284	0.322	0.409	0.303
WAISTBK	0.585	0.446	0.510	0.369	0.399
SPAN	0.648	0.821	0.832	0.343	0.678
CHESTBR	0.319	0.203	0.305	0.578	0.288
CHESTDP	0.237	0.139	0.267	0.571	0.253
HIPBRSTD	0.451	0.314	0.433	0.619	0.382
OVRHDRCH	0.794	0.883	0.878	0.343	0.695
FUNCRCH	0.584	0.722	0.772	0.321	0.616
FOOTLNG	0.608	0.637	0.666	0.409	0.552
FOOTBRD	0.389	0.371	0.422	0.494	0.380
BUTHELNG	0.753	0.848	0.868	0.346	0.717
FUNCLEG	0.796	0.897	0.879	0.308	0.721

	ANKLEHT	WAISHTOM	WAISHTNA	SUPRAHT	POPHT
ANKLEHT	1.000				
WAISHTOM	0.413	1.000			
WAISHTNA	0.331	0.874	1.000		
SUPRAHT	0.422	0.925	0.855	1.000	
POPHT	0.390	0.900	0.829	0.891	1.000
KNHTSIT	0.430	0.895	0.801	0.907	0.954
SITHTRLD	0.333	0.595	0.570	0.748	0.539
BUTPOPHT	0.303	0.758	0.689	0.748	0.742
SITHT	0.330	0.605	0.588	0.767	0.552
EYEHTSIT	0.315	0.555	0.542	0.712	0.492
ACRHTSIT	0.324	0.560	0.527	0.713	0.491
ELBRSTHT	0.122	0.052	0.065	0.235	0.000
WAIHTSIT	-0.007	0.146	0.397	0.203	0.124
THIGHCL	0.237	0.271	0.164	0.336	0.276
VERTRCDN	0.381	0.861	0.769	0.855	0.848
SHELBLNG	0.359	0.799	0.722	0.800	0.757
ELBFNGTP	0.366	0.814	0.732	0.826	0.844
ELBOWCOG	0.304	0.788	0.707	0.795	0.820
ELBWSTRLN	0.285	0.796	0.714	0.790	0.810
BUTKNLNG	0.416	0.832	0.707	0.829	0.776
HIPBR SIT	0.287	0.324	0.228	0.452	0.347
ELBELBBR	0.177	0.116	0.038	0.227	0.197
BIDELTBR	0.167	0.303	0.175	0.376	0.312
ACROMBR	0.179	0.461	0.372	0.476	0.455
HEADLN	0.216	0.262	0.196	0.315	0.281
HEADHT	0.179	0.250	0.190	0.265	0.207
MENTVERT	0.230	0.366	0.329	0.411	0.379
HEADBR	0.152	0.081	0.006	0.096	0.085
HANDLEN	0.347	0.668	0.584	0.701	0.692
PALMLEN	0.285	0.553	0.471	0.605	0.587
HANDBR	0.353	0.417	0.330	0.462	0.405
HANDTH	0.326	0.229	0.145	0.285	0.222

	ANKLEHT	WAISHTOM	WAISHTNA	SUPRAHT	POPHT
HEADCIRC	0.215	0.281	0.186	0.336	0.279
BICFLEXD	0.162	0.126	0.026	0.222	0.158
BICRELXD	0.157	0.104	0.011	0.208	0.138
FORARMFL	0.253	0.224	0.132	0.325	0.226
FORARMRL	0.242	0.211	0.122	0.319	0.223
WRSTCIRC	0.297	0.339	0.273	0.450	0.366
HANDCIRC	0.352	0.413	0.310	0.459	0.386
NECKCIRC	0.162	0.147	0.040	0.244	0.200
SHLDRCIR	0.176	0.286	0.144	0.363	0.303
CHESTCIR	0.132	0.168	0.043	0.269	0.228
WAICIROM	0.184	0.112	0.029	0.259	0.208
WAICIRNA	0.207	0.160	0.064	0.298	0.236
BUTTCIRC	0.232	0.297	0.191	0.425	0.329
UPTHCIRC	0.153	0.199	0.106	0.308	0.242
LWRTHCIR	0.174	0.177	0.110	0.298	0.247
ANKLCIRC	0.305	0.295	0.238	0.403	0.360
WAISTFRN	0.204	0.220	0.280	0.541	0.335
CROTCHLN	0.244	0.439	0.294	0.425	0.286
WAISTBK	0.240	0.375	0.428	0.606	0.483
SPAN	0.389	0.850	0.748	0.847	0.815
CHESTBR	0.171	0.220	0.096	0.303	0.241
CHESTDP	0.180	0.132	0.009	0.227	0.172
HIPBRSTD	0.327	0.360	0.272	0.461	0.361
OVHRDRCH	0.371	0.920	0.828	0.938	0.880
FUNCRCH	0.368	0.728	0.649	0.751	0.752
FOOTLNG	0.252	0.648	0.589	0.692	0.670
FOOTBRD	0.251	0.373	0.308	0.433	0.417
BUTHELNG	0.434	0.857	0.763	0.869	0.837
FUNCLEG	0.389	0.904	0.905	0.914	0.883

	KNHTSIT	SITHTRLD	BUTPOPHT	SITHT	EYEHTSIT
KNHTSIT	1.000				
SITHTRLD	0.583	1.000			
BUTPOPHT	0.756	0.413	1.000		
SITHT	0.587	0.919	0.369	1.000	
EYEHTSIT	0.530	0.877	0.333	0.950	1.000
ACRHTSIT	0.547	0.790	0.377	0.854	0.823
ELBRSTHT	0.051	0.522	-0.075	0.592	0.592
WAIHTSIT	0.087	0.343	-0.032	0.381	0.387
THIGHCL	0.417	0.217	0.274	0.227	0.203
VERTRCDN	0.867	0.549	0.708	0.570	0.517
SHELBLNG	0.778	0.523	0.676	0.540	0.488
ELBFNGTP	0.871	0.557	0.677	0.573	0.516
ELBOWCOG	0.840	0.505	0.667	0.508	0.452
ELBWSTRLN	0.832	0.489	0.679	0.490	0.442
BUTKNLNG	0.841	0.468	0.815	0.476	0.438
HIPBR SIT	0.498	0.381	0.400	0.398	0.378
ELBELBBR	0.342	0.140	0.289	0.118	0.095
BIDELTBR	0.444	0.337	0.334	0.315	0.286

	KNHTSIT	SITHTRLD	BUTPOPHT	SITHT	EYEHTSIT
ACROMBR	0.508	0.413	0.358	0.417	0.381
HEADLN	0.343	0.329	0.191	0.344	0.317
HEADHT	0.260	0.292	0.172	0.301	0.202
MENTVERT	0.410	0.385	0.296	0.401	0.276
HEADBR	0.149	0.036	0.104	0.034	0.012
HANDLEN	0.723	0.515	0.527	0.554	0.496
PALMLN	0.619	0.459	0.473	0.500	0.444
HANDBR	0.488	0.381	0.346	0.413	0.375
HANDTH	0.312	0.224	0.189	0.259	0.232
HEADCIRC	0.357	0.325	0.254	0.324	0.295
BICFLEXD	0.308	0.202	0.219	0.189	0.188
BICRELXD	0.299	0.173	0.229	0.160	0.158
FORARMFL	0.380	0.290	0.256	0.290	0.274
FORARMRL	0.385	0.279	0.265	0.274	0.256
WRSTCIRC	0.493	0.396	0.367	0.402	0.354
HANDCIRC	0.500	0.366	0.365	0.385	0.351
NECKCIRC	0.343	0.199	0.237	0.199	0.158
SHLDR CIR	0.439	0.299	0.331	0.294	0.269
CHESTCIR	0.362	0.162	0.325	0.141	0.130
WAICIROM	0.355	0.146	0.320	0.147	0.128
WAICIRNA	0.385	0.187	0.345	0.185	0.166
BUTTCIRC	0.495	0.349	0.420	0.351	0.335
UPTHCIRC	0.415	0.256	0.325	0.247	0.241
LWRTHCIR	0.435	0.290	0.298	0.266	0.256
ANKLCIRC	0.501	0.337	0.305	0.339	0.304
WAISTFRN	0.402	0.582	0.309	0.598	0.575
CROTCHLN	0.397	0.393	0.313	0.413	0.410
WAISTBK	0.542	0.583	0.415	0.637	0.589
SPAN	0.842	0.580	0.665	0.603	0.544
CHESTBR	0.371	0.244	0.288	0.240	0.207
CHESTDP	0.308	0.099	0.277	0.092	0.097
HIPBRSTD	0.495	0.365	0.406	0.387	0.372
OVRHDRCH	0.898	0.662	0.741	0.686	0.632
FUNCRCH	0.780	0.507	0.659	0.514	0.464
FOOTLNG	0.720	0.523	0.514	0.555	0.498
FOOTBRD	0.508	0.377	0.296	0.395	0.360
BUTHELNG	0.877	0.530	0.769	0.534	0.486
FUNCLEG	0.893	0.585	0.773	0.597	0.554

	ACRHTSIT	ELBRSTHT	WAIHTSIT	THIGHCL	VERTCDN
ACRHTSIT	1.000				
ELBRSTHT	0.758	1.000			
WAIHTSIT	0.353	0.321	1.000		
THIGHCL	0.303	0.147	-0.128	1.000	
VERTCDN	0.550	-0.035	0.114	0.322	1.000
SHELBLNG	0.557	-0.072	0.114	0.325	0.911
ELBFGTP	0.527	0.049	0.110	0.333	0.925
ELBOWCOG	0.478	0.016	0.088	0.352	0.876
ELBWSTLN	0.476	0.013	0.093	0.359	0.856

	ACRHTSIT	ELBRSTHT	WAIHTSIT	THIGHCL	VERTRCDN
BUTKNLNG	0.496	0.003	-0.027	0.521	0.796
HIPBRSIT	0.464	0.253	-0.026	0.648	0.436
ELBELBBR	0.237	0.116	-0.158	0.580	0.243
BIDELTBR	0.334	0.124	-0.078	0.568	0.400
ACROMBR	0.282	-0.035	0.059	0.320	0.533
HEADLN	0.312	0.168	0.002	0.284	0.281
HEADHT	0.208	0.090	-0.078	0.250	0.236
MENTVERT	0.291	0.075	0.021	0.257	0.403
HEADBR	0.097	0.012	-0.118	0.326	0.164
HANDLEN	0.505	0.108	0.101	0.263	0.797
PALMLN	0.469	0.131	0.066	0.290	0.681
HANDBR	0.374	0.096	0.034	0.299	0.509
HANDTH	0.302	0.142	-0.004	0.406	0.331
HEADCIRC	0.323	0.165	-0.049	0.411	0.314
BICFLEXD	0.217	0.134	-0.128	0.636	0.189
BICRELXD	0.218	0.136	-0.139	0.645	0.175
FORARMFL	0.314	0.166	-0.068	0.648	0.310
FORARMRL	0.306	0.157	-0.080	0.659	0.309
WRSTCIRC	0.412	0.157	0.028	0.467	0.468
HANDCIRC	0.373	0.083	0.003	0.395	0.499
NECKCIRC	0.276	0.126	-0.161	0.623	0.283
SHLDR CIR	0.312	0.102	-0.117	0.639	0.393
CHESTCIR	0.255	0.090	-0.200	0.614	0.299
WAICIROM	0.275	0.114	-0.186	0.613	0.286
WAICIRNA	0.305	0.126	-0.184	0.620	0.318
BUTTCIRC	0.428	0.212	-0.104	0.728	0.407
UPTHCIRC	0.308	0.171	-0.129	0.762	0.286
LWRTHCIR	0.293	0.145	-0.079	0.627	0.271
ANKLCIRC	0.310	0.098	-0.023	0.529	0.369
WAISTFRN	0.589	0.442	0.153	0.340	0.345
CROTCHLN	0.426	0.207	0.028	0.382	0.370
WAISTBK	0.629	0.378	0.155	0.334	0.503
SPAN	0.549	-0.001	0.124	0.362	0.953
CHESTBR	0.307	0.139	-0.118	0.588	0.321
CHESTDP	0.227	0.089	-0.228	0.591	0.246
HIPBRSTD	0.455	0.199	-0.040	0.611	0.466
OVRHDRCH	0.649	0.124	0.162	0.321	0.909
FUNCRCH	0.488	0.021	0.083	0.324	0.829
FOOTLNG	0.501	0.118	0.105	0.323	0.701
FOOTBRD	0.326	0.077	0.022	0.384	0.459
BUTHELNG	0.522	0.031	0.060	0.404	0.822
FUNCLEG	0.576	0.076	0.342	0.344	0.846

SHELBLNG      ELBFNGTP      ELBOWCOG      ELBWSTLN      BUTKNLNG

SHELBLNG	1.000				
ELBFNGTP	0.760	1.000			
ELBOWCOG	0.737	0.923	1.000		
ELBWSTLN	0.739	0.891	0.886	1.000	
BUTKNLNG	0.775	0.745	0.729	0.748	1.000
HIPBRST	0.419	0.453	0.435	0.433	0.606
ELBELBBR	0.234	0.282	0.300	0.281	0.415
BIDELTBR	0.372	0.424	0.431	0.395	0.479
ACROMBR	0.457	0.546	0.509	0.462	0.457
HEADLN	0.227	0.326	0.296	0.229	0.298
HEADHT	0.221	0.214	0.231	0.225	0.262
MENTVERT	0.368	0.405	0.389	0.371	0.351
HEADBR	0.168	0.159	0.171	0.160	0.214
HANDLN	0.626	0.868	0.739	0.680	0.596
PALMLN	0.536	0.746	0.646	0.607	0.521
HANDBR	0.437	0.555	0.467	0.430	0.457
HANDTH	0.313	0.343	0.319	0.301	0.381
HEADCIRC	0.277	0.342	0.334	0.293	0.370
BICFLEXD	0.170	0.250	0.260	0.256	0.390
BICRELXD	0.169	0.228	0.239	0.236	0.399
FORARMFL	0.284	0.365	0.351	0.321	0.448
FORARMRL	0.281	0.362	0.357	0.319	0.454
WRSTCIRC	0.429	0.513	0.445	0.412	0.491
HANDCIRC	0.445	0.537	0.460	0.433	0.508
NECKCIRC	0.279	0.295	0.319	0.273	0.391
SHLDR CIR	0.373	0.405	0.414	0.391	0.508
CHESTCIR	0.303	0.307	0.326	0.313	0.467
WAICIR OM	0.290	0.292	0.297	0.280	0.469
WAICIR NA	0.319	0.322	0.325	0.311	0.502
BUTCIRC	0.395	0.427	0.415	0.417	0.608
UPTHCIRC	0.262	0.327	0.333	0.343	0.507
LWRTHCIR	0.236	0.336	0.317	0.305	0.410
ANKLCIRC	0.338	0.408	0.368	0.345	0.460
WAISTFRN	0.349	0.366	0.343	0.320	0.373
CROTCHLN	0.373	0.338	0.302	0.301	0.460
WAISTBK	0.483	0.507	0.479	0.457	0.488
SPAN	0.875	0.903	0.849	0.842	0.786
CHESTBR	0.325	0.326	0.335	0.320	0.463
CHESTDP	0.253	0.243	0.248	0.236	0.451
HIPBRSTD	0.451	0.467	0.426	0.424	0.605
OVRHDRCH	0.845	0.869	0.831	0.828	0.818
FUNCRC	0.746	0.817	0.791	0.755	0.721
FOOTLNG	0.600	0.743	0.662	0.621	0.618
FOOTBRD	0.396	0.509	0.442	0.406	0.427
BUTHELNG	0.771	0.786	0.762	0.773	0.870
FUNCLEG	0.796	0.807	0.788	0.795	0.853

	HIPBR SIT	ELBELB BR	BIDELT BR	ACROM BR	HEADLN
HIPBR SIT	1.000				
ELBELB BR	0.721	1.000			
BIDELT BR	0.676	0.702	1.000		
ACROM BR	0.402	0.305	0.715	1.000	
HEADLN	0.318	0.251	0.318	0.288	1.000
HEADHT	0.222	0.105	0.218	0.170	0.218
MENTVERT	0.303	0.154	0.253	0.280	0.345
HEADBR	0.338	0.342	0.316	0.169	0.032
HANDLEN	0.386	0.226	0.366	0.492	0.339
PALMLEN	0.399	0.263	0.367	0.448	0.319
HANDBR	0.412	0.311	0.408	0.425	0.291
HANDTH	0.445	0.395	0.339	0.277	0.173
HEADCIRC	0.447	0.371	0.413	0.294	0.762
BICFLEXD	0.643	0.700	0.714	0.347	0.271
BICRELXD	0.676	0.747	0.706	0.308	0.275
FORARMFL	0.619	0.628	0.659	0.394	0.316
FORARMRL	0.650	0.670	0.689	0.406	0.295
WRSTCIRC	0.583	0.556	0.553	0.447	0.272
HANDCIRC	0.488	0.403	0.462	0.456	0.316
NECKCIRC	0.636	0.724	0.702	0.427	0.359
SHLDR CIR	0.714	0.737	0.911	0.631	0.349
CHESTCIR	0.703	0.823	0.770	0.402	0.277
WAICIROM	0.786	0.852	0.652	0.308	0.230
WAICIRNA	0.803	0.849	0.667	0.330	0.241
BUTTCIRC	0.916	0.778	0.714	0.419	0.323
UPTHCIRC	0.810	0.736	0.703	0.360	0.310
LWRTHCIR	0.697	0.678	0.633	0.359	0.297
ANKLCIRC	0.600	0.510	0.527	0.409	0.284
WAISTFRN	0.522	0.445	0.381	0.249	0.215
CROTCHLN	0.454	0.374	0.429	0.370	0.214
WAISTBK	0.485	0.348	0.326	0.324	0.321
SPAN	0.460	0.242	0.459	0.618	0.290
CHESTBR	0.677	0.768	0.812	0.463	0.303
CHESTDP	0.639	0.716	0.589	0.258	0.252
HIPBRSTD	0.865	0.657	0.618	0.408	0.285
OVRHDRCH	0.436	0.220	0.438	0.562	0.316
FUNCRCH	0.462	0.328	0.393	0.467	0.257
FOOTLNG	0.409	0.240	0.354	0.487	0.282
FOOTBRD	0.445	0.337	0.403	0.391	0.338
BUTHELNG	0.488	0.334	0.396	0.440	0.285
FUNCLEG	0.438	0.240	0.353	0.450	0.272

	HEADHT	MENTVERT	HEADBR	HANDLEN	PALMLN
HEADHT	1.000				
MENTVERT	0.445	1.000			
HEADBR	0.236	0.170	1.000		
HANDLEN	0.203	0.374	0.171	1.000	
PALMLN	0.222	0.335	0.169	0.869	1.000
HANDBR	0.181	0.281	0.255	0.623	0.504
HANDTH	0.160	0.167	0.247	0.365	0.341
HEADCIRC	0.363	0.405	0.489	0.354	0.346
BICFLEXD	0.158	0.135	0.264	0.214	0.251
BICRELXD	0.151	0.124	0.280	0.187	0.236
FORARMFL	0.220	0.237	0.339	0.373	0.391
FORARMRL	0.216	0.221	0.343	0.372	0.387
WRSTCIRC	0.180	0.306	0.303	0.552	0.518
HANDCIRC	0.191	0.279	0.296	0.584	0.479
NECKCIRC	0.236	0.267	0.416	0.290	0.330
SHLDR CIR	0.228	0.268	0.317	0.336	0.364
CHESTCIR	0.118	0.175	0.356	0.242	0.291
WAICIROM	0.120	0.177	0.375	0.233	0.267
WAICIRNA	0.127	0.191	0.368	0.257	0.289
BUTCIRC	0.197	0.268	0.332	0.367	0.385
UPTHCIRC	0.209	0.249	0.273	0.235	0.268
LWRTHCIR	0.173	0.269	0.244	0.299	0.316
ANKLCIRC	0.263	0.302	0.248	0.426	0.421
WAISTFRN	0.119	0.210	0.112	0.348	0.348
CROTCHLN	0.170	0.154	0.145	0.297	0.262
WAISTBK	0.138	0.330	0.071	0.459	0.451
SPAN	0.257	0.398	0.176	0.780	0.670
CHESTBR	0.203	0.210	0.332	0.269	0.295
CHESTDP	0.127	0.131	0.313	0.221	0.260
HIPBRSTD	0.223	0.244	0.321	0.416	0.429
OVRHRDCH	0.230	0.398	0.095	0.747	0.642
FUNCRCR	0.190	0.381	0.176	0.677	0.576
FOOTLNG	0.228	0.345	0.187	0.759	0.646
FOOTBRD	0.210	0.297	0.255	0.558	0.521
BUTHELNG	0.235	0.379	0.192	0.641	0.547
FUNCLEG	0.217	0.359	0.111	0.648	0.555

	HANDBR	HANDTH	HEADCIRC	BICFLEXD	BICRELXD
HANDBR	1.000				
HANDTH	0.473	1.000			
HEADCIRC	0.336	0.240	1.000		
BICFLEXD	0.371	0.357	0.364	1.000	
BICRELXD	0.345	0.376	0.364	0.963	1.000
FORARMFL	0.543	0.494	0.417	0.813	0.792
FORARMRL	0.530	0.490	0.407	0.832	0.819
WRSTCIRC	0.665	0.545	0.381	0.561	0.559
HANDCIRC	0.897	0.553	0.389	0.460	0.447
NECKCIRC	0.402	0.420	0.484	0.674	0.695
SHLDR CIR	0.404	0.387	0.455	0.766	0.769
CHESTCIR	0.311	0.374	0.409	0.715	0.752
WAICIROM	0.274	0.398	0.368	0.627	0.698
WAICIRNA	0.292	0.408	0.379	0.620	0.690
BUTTCIRC	0.403	0.433	0.456	0.697	0.736
UPTHCIRC	0.275	0.304	0.419	0.726	0.752
LWRTHCIR	0.364	0.268	0.379	0.687	0.707
ANKLCIRC	0.476	0.360	0.340	0.515	0.525
WAISTFRN	0.296	0.315	0.244	0.360	0.388
CROTCHLN	0.343	0.312	0.281	0.339	0.360
WAISTBK	0.365	0.289	0.296	0.283	0.289
SPAN	0.527	0.378	0.329	0.213	0.198
CHESTBR	0.371	0.379	0.400	0.672	0.700
CHESTDP	0.292	0.398	0.366	0.663	0.702
HIPBRSTD	0.434	0.460	0.387	0.593	0.630
OVRHDRCH	0.479	0.275	0.332	0.204	0.184
FUNCRCH	0.458	0.354	0.297	0.223	0.217
FOOTLNG	0.543	0.349	0.314	0.219	0.209
FOOTBRD	0.625	0.400	0.376	0.331	0.338
BUTHELNG	0.430	0.339	0.355	0.261	0.269
FUNCLEG	0.429	0.296	0.302	0.208	0.206

FORARMFL      FORARMRL      WRSTCIRC      HANDCIRC      NECKCIRC

FORARMFL	1.000				
FORARMRL	0.975	1.000			
WRSTCIRC	0.682	0.710	1.000		
HANDCIRC	0.619	0.617	0.732	1.000	
NECKCIRC	0.690	0.722	0.609	0.492	1.000
SHLDR CIR	0.711	0.738	0.583	0.470	0.754
CHESTCIR	0.654	0.683	0.552	0.395	0.765
WAICIROM	0.567	0.617	0.544	0.370	0.729
WAICIRNA	0.567	0.614	0.551	0.387	0.730
BUTTCIRC	0.659	0.699	0.641	0.502	0.725
UPTHCIRC	0.637	0.678	0.510	0.372	0.675
LWRTHCIR	0.646	0.694	0.615	0.454	0.629
ANKLCIRC	0.586	0.614	0.684	0.532	0.522
WAISTFRN	0.410	0.424	0.476	0.325	0.394
CROTCHLN	0.367	0.381	0.434	0.425	0.360
WAISTBK	0.364	0.370	0.457	0.385	0.385
SPAN	0.351	0.345	0.480	0.532	0.293
CHESTBR	0.622	0.642	0.517	0.433	0.701
CHESTDP	0.619	0.650	0.521	0.388	0.719
HIPBRSTD	0.590	0.619	0.590	0.498	0.597
OVRHDRCH	0.311	0.306	0.442	0.481	0.249
FUNCRCH	0.323	0.330	0.445	0.441	0.314
FOOTLNG	0.348	0.354	0.544	0.557	0.320
FOOTBRD	0.458	0.475	0.575	0.630	0.386
BUTHELNG	0.339	0.342	0.447	0.460	0.324
FUNCLEG	0.304	0.300	0.422	0.439	0.237

SHLDR CIR      CHESTCIR      WAICIROM      WAICIRNA      BUTTCIRC

SHLDR CIR	1.000				
CHESTCIR	0.854	1.000			
WAICIROM	0.707	0.836	1.000		
WAICIRNA	0.715	0.829	0.983	1.000	
BUTTCIRC	0.765	0.784	0.851	0.864	1.000
UPTHCIRC	0.749	0.733	0.781	0.786	0.888
LWRTHCIR	0.650	0.645	0.681	0.677	0.785
ANKLCIRC	0.545	0.493	0.513	0.517	0.644
WAISTFRN	0.397	0.441	0.537	0.535	0.531
CROTCHLN	0.443	0.378	0.360	0.404	0.528
WAISTBK	0.337	0.351	0.454	0.459	0.484
SPAN	0.441	0.305	0.270	0.305	0.415
CHESTBR	0.835	0.850	0.718	0.725	0.713
CHESTDP	0.699	0.861	0.785	0.773	0.723
HIPBRSTD	0.648	0.638	0.731	0.748	0.858
OVRHDRCH	0.409	0.280	0.243	0.284	0.412
FUNCRCH	0.401	0.361	0.366	0.387	0.436
FOOTLNG	0.328	0.243	0.277	0.309	0.414
FOOTBRD	0.394	0.314	0.305	0.319	0.460
BUTHELNG	0.393	0.360	0.384	0.415	0.479
FUNCLEG	0.343	0.270	0.270	0.300	0.406

	UPTHCIRC	LWRTHCIR	ANKLCIRC	WAISTFRN	CROTCHLN
UPTHCIRC	1.000				
LWRTHCIR	0.821	1.000			
ANKLCIRC	0.587	0.709	1.000		
WAISTFRN	0.434	0.420	0.427	1.000	
CROTCHLN	0.456	0.400	0.356	0.230	1.000
WAISTBK	0.403	0.389	0.401	0.680	0.190
SPAN	0.293	0.253	0.389	0.357	0.390
CHESTBR	0.669	0.578	0.473	0.398	0.419
CHESTD	0.657	0.583	0.452	0.410	0.344
HIPBRSTD	0.694	0.618	0.563	0.463	0.453
OVRHDRCH	0.304	0.288	0.387	0.416	0.418
FUNCRCH	0.329	0.308	0.373	0.374	0.327
FOOTLNG	0.290	0.330	0.512	0.369	0.345
FOOTBRD	0.387	0.443	0.568	0.319	0.292
BUTHELNG	0.378	0.330	0.385	0.402	0.399
FUNCLEG	0.305	0.275	0.369	0.397	0.358

	WAISTBK	SPAN	CHESTBR	CHESTD	HIPBRSTD
WAISTBK	1.000				
SPAN	0.485	1.000			
CHESTBR	0.312	0.371	1.000		
CHESTD	0.350	0.231	0.651	1.000	
HIPBRSTD	0.456	0.475	0.610	0.610	1.000
OVRHDRCH	0.549	0.910	0.323	0.219	0.442
FUNCRCH	0.501	0.789	0.358	0.312	0.488
FOOTLNG	0.506	0.705	0.266	0.232	0.431
FOOTBRD	0.347	0.485	0.358	0.290	0.432
BUTHELNG	0.516	0.804	0.355	0.333	0.511
FUNCLEG	0.525	0.830	0.294	0.234	0.456

	OVRHDRCH	FUNCRCH	FOOTLNG	FOOTBRD	BUTHELNG
OVRHDRCH	1.000				
FUNCRCH	0.763	1.000			
FOOTLNG	0.704	0.621	1.000		
FOOTBRD	0.440	0.400	0.546	1.000	
BUTHELNG	0.845	0.765	0.651	0.395	1.000
FUNCLEG	0.893	0.742	0.653	0.402	0.869

FUNCLEG

FUNCLEG 1.000

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13. ABSTRACT <i>50 //</i> Under Dss contract No. 01SE.97711-4-8216 Human Elements Incorporated conducted a survey of Canadian Forces Aircrew Personnel. Seventy-three semi-nude body measurements were recorded for 519 male aircrew. The sample was comprised of 387 pilots and 132 navigators representing 19 aircraft classifications, from three aircraft categories (helicopters, jets and trainers, and multi-engines). Over 30% of the total CF aircrew population was measured. Input error checking capabilities were incorporated into the on-site computer database to minimize errors during data collection. The report includes measurement definitions, percentile tables, descriptive statistics, correlations and photographs for each of the anthropometric measures included in the survey. //			

## KEY WORDS

anthropometry  
 survey  
 aircrew  
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