

A COMPARATIVE STUDY OF BODY MEASUREMENTS OF A SELECTED
GROUP OF COLLEGE WOMEN, WITH CERTAIN
COMMERCIAL PATTERNS

by

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INTRODUCTION

The first interest in body measurements arose among the early painters and sculptors. Their efforts were directed almost entirely toward the development of imagined systems of proportions called canons. Many of these were recorded in literature. In most of them some part of the body, such as the foot, head, hand, or vertical column, is taken as a unit, and an attempt made to force a relation between this and the rest of the body. One of the earliest canons published is a Sanscrit treatise entitled, "Silpi Sastri" which has been traced to the remote civilization of India. The author divided the human figure into 480 parts, the head being one-seventh of the whole form. Alberti used one-sixth of the entire height for his modulus, whereas in some of his work Albrecht Durer took the entire height as a basis.

Other early writers developed elaborate geometric schemes by which they undertook to deduce all proportions of the body from one measurement. Many of these ideas were bound up with notions concerning the occult relation of certain numbers in connection with body measurements.

In more recent years, investigators in different sciences have measured the body for various purposes. Anthropometrists have done reliable and noteworthy work in this line but have reported little data of value in clothing

construction. The points on the body measured by Anthropometrists are different from those which the clothing designer must use. They have been primarily interested in such relationships as those between stature and the upper and lower appendages. Harris (12, p.270) found that in tall individuals, sitting height forms a relatively smaller, and leg length a relatively larger proportion of total stature than in short ones. This relationship holds for both adults and children of various ages.

The purpose of this study has been to ascertain distribution of body mass for a group of college women of similar age, bust measure, weight and height, and determine the difference in norm found with the measurements of certain commercial patterns of supposedly correct size. Such a study was prompted by the feeling of a need for a standardization of sizes in dress patterns which will enable the woman in the home, and the dress industry to more nearly fit certain sizes from commercial patterns.

Through many years of experience in the home and in the classroom, it has been observed that various commercial patterns, of supposedly the same size, vary considerably in different measurements and these necessitate a different alteration for each make of pattern used. One make of pattern calls a 39 inch bust a perfect 36. The size stamped on the envelope would seem to be only approximate. The differences

in measurements are thought to be especially marked in the larger sizes. (5, p. 151).

It is intended that the data collected in this study shall serve to indicate further the need and possibility of standardizing sizes of commercial patterns. No pattern size could possibly be worked out to fit all individuals of supposedly that size because of the tremendous variation in body measurements, but after sufficient measurements have been taken, it will be possible for a pattern to be worked out that will more nearly fit the median of the group rather than either of the extremes, and thus present a lesser problem in alteration. The data collected from a wide study of this nature might also contribute much toward bringing about a uniformity of sizes among various makes of commercial patterns.

Any means of partial elimination of alterations in the clothing industry would reduce the cost of clothing.

Manufacturers and retailers as well as consumers share the great economic loss entailed annually through the vast amount of alteration made necessary through misfits. Retail merchants have to maintain expensive alteration departments in order to sell their ready-made clothes. Even with the most skillful fitters, they have some losses in trade and in goods on account of unsuccessful attempts to fit customers. Manufacturers stand losses when ill-fitting

garments are returned by retailers. The direct money loss in homemade clothing through fitting difficulties due to pattern irregularities is less obvious but even more widespread. (4, p. 1).

In the clothing industry, as a natural outgrowth of the movement toward elimination of waste through simplified practice, a number of standards in sizes have been adopted, in men's pajamas, men's and boys' shirts and blouses and all knit underwear with the exception of rayon. At present, proposed commercial standards for women's circular flat knit rayon underwear, and men's flat knit rayon underwear are being considered for adoption by the Bureau of Standards.

REVIEW OF LITERATURE

Military records of measurements have been a source of influence on garment sizes. Some authorities state that the height and chest measurements taken during the Civil War were probably the first to serve as a basis for the manufacture of uniforms and civilian clothing. (18, p. 45). Many of these measurements were accurate, yet others were very hurriedly and inaccurately made. In most cases only height, weight, and chest measurements were recorded. After the World War, Ireland, Love and Davenport made a study of 100,000 men taking measurements necessary for uniforms. This was done according to scientific methods and is the

only published report of a study of this kind made with clothing construction in view. Insurance companies and physical directors of colleges and universities have also shown much interest in body measurements, but again their data are of no value in clothing and pattern manufacture.

Miles (1928) reports from a study of men students at Stanford that the correlation between height and sitting height is the highest value shown. However, hip and weight correlate most strongly for one of the two groups, and also a little more strongly than group two in height and weight. (16, p. 385).

Analysis by modern genetical methods leads to the conclusion that there are generally two or more genetic factors involved in build. There are, however, biotypes in which only one factor is involved. Markedly is this true of the biotype of medium build. The factors for fleshy build dominate slightly over those for slender build. (7, p. 230).

The publications on measurements used in the clothing trade are limited to discussions of proportions and systems of drafting devised by various workers. The proportions recommended seem to be based entirely on traditional ideas and not on actual measurements of individuals.

The pioneers in the field studied the ancients and found that the Greeks and Romans had no idea of fit at all except for armor and foot wear. Their clothing consisted

mostly of rectangular blankets and sheets which could be wrapped around one man as well as another. The ancients produced the famous Apollo Belvedere statue, which everyone seemed to agree was a perfect male figure. The clothiers decided to make clothes to fit Apollo. If these did not fit customers, it would be the customers' fault.

The Apollo statue was six feet, two inches tall, had a 42 inch chest and size $16\frac{1}{2}$ inch collar, all of which they faithfully followed in their clothes. They realized that few men are over six feet tall, so they made up their suits in sizes all the way down, chest, collar, trousers, and all in proportion, smaller-sized Apollos, which was an almost sure way of fitting nobody.

Manufacturers of women's clothing had a later start and took their first measurements from the Venus de Milo - a 34 $\frac{3}{4}$ inch bust with a 28 $\frac{1}{2}$ inch waist. This resulted in as many misfits as did the first men's clothes.

Within the past few years, a number of studies have been made in colleges and universities with the interest of pattern standardization in view.

Dunn and Cranor (1925) found there was a wide variation in different makes of patterns of supposedly the same size, and that measurements printed on the pattern envelope frequently do not correspond to actual measurements. (8, p. 130) Clayton and Phelps (1926) also found marked irregularities

in actual size of patterns, and in amounts of material called for on envelopes. (5, p. 329). Little (1928) in a similar study, found that there was a wide variation in size of patterns of supposedly the same size and of various makes, the variation being greater in the case of girls' and misses' patterns than in the case of women's patterns; also that patterns do not agree uniformly with either median or maximum physical measurements as to rate of increase with size, tending to follow to a somewhat limited extent only the general direction of the physical measurements. (15, p. 89).

On February 7, 1929, a joint conference of representative manufacturers, merchants, educators, and users, adopted a commercial standard for dress patterns. Certain classifications and body measurements were recommended by the conference and promulgated by the Department of Commerce as standard for dress patterns. This recommendation went into effect January 1, 1930, subject to regular annual revision by the standing committee.

The recommendation was not made from average anthropometric measurements from various sources, but rather was a practical compromise between such measurements, the experience of dress pattern manufacturers, and their commercial practice. (21, p. 1,2).

Such a move is a step forward, even if the only accom-

plishment would be that of securing cooperation between pattern companies to the extent of accepting the same standard measurements in designing their patterns. It is evident from comparison of different makes of patterns that even that has not yet been accomplished. Until the average of a sufficiently large group is obtained, the problem of alteration will not be reduced to the minimum.

METHOD OF PROCEDURE

In making this study of body measurements, 50 women from the college classes within the range of five feet, two inches to five feet, six inches in height; 32 to 35 inches bust; and 110 to 130 pounds in weight were measured. The form on which the measurements were recorded as each measurement was taken follows:

| | | Specific Measurements | | |
|----------------------|--------------------|-----------------------|-------------------------|----------------|
| | | Waist | | |
| | | Front | | Back |
| General Measurements | | Relative Distances | | |
| Subject | :Shoulder to floor | :Neck | : Shoulder to chest | : Neck |
| Age | :Neck | :Shoulder | : Chest to armseye line | : Shoulder |
| Height | :Bust | :Chest | : Armseye line to bust | : Chest |
| Weight | :Waist | :Armseye line | : Bust to waist | : Armseye line |
| Bust | :Hips | :Bust | | : Bust |
| | :Stem | :Waist line | | : Waist line |
| | :Sleeve length | :Underarm | | : Underarm |
| | | :Armseye(entire) | | : Length |
| | | :Length | | |
| | | | | |

| Sleeve | | | Skirt | | |
|-------------|----------|---|-------------------------|-----------------|---------------------------------|
| Upperarm | Lowerarm | Rel. distance between points | Front | Back | Rel. distance between points |
| Length | Length | | Waist | Waist | Waist to hips |
| Girth | Girth | | Hips | Hips | Hips to floor |
| Cap length | Wrist | Intersection of shoulder and armseye to gr. up. girth | Floor Length | Floor Length | |
| Cap width | | Elbow to greatest lower- arm girth | Side floor length | | |
| Elbow girth | | | | | |

While the measurements were being taken, the subject stood in stocking feet, clad in trunks or their equivalent.

The subject stood with feet together, weight on balls of the feet, arms straight by side except when flexed for arm measurements, and head erect.

Gummed strips of paper one-eighth inch wide and two inches long, were used in indicating points on the body. Strips were crossed and made to adhere at intersections of the neck and shoulder line, shoulder and armseye, armseye and chest line, and armseye and underarm seam. Tapelines were used in marking neck, armseye line, bust, waist, and hips. These were held in position by means of paper clips.

The same tapelines, of a strong, sized, double material, which permitted no stretching, were used throughout the study. A Continental scale was used in weighing the subjects. All measurements and weights were taken and recorded by the same person. Every subject was given a number and all measurements were recorded under this number. The standards of location were the natural points of intersection of the body. All measurements were taken close.

General Measurements

Height. On a smooth wall surface, by means of a tape-line, a scale was prepared for measuring the height of subjects. The subject stood erect with heels touching the wall

surface. From the scale reading, the height was recorded.

Weight. The subject was weighed clad in the ordinary amount of clothing, without a wrap.

Length. This measurement was taken at the back from the highest point of the shoulder, where the neck line and shoulder line intersect, to the floor.

Neck. A tapeline was placed around the neck allowing it to pass above the seventh cervical, above the collar bones and dropped to the middle of the pit in the front of the neck. The tape was held close to the neck, yet not tight.

Bust. A tapeline was placed over the tips of the bust, (largest part) under the arms, and over the tips of the shoulder blades, slightly raised in the back. This measurement was taken standing behind the subject.

Waist. This measurement was taken around the smallest part of the trunk, which lies between the lower rib and the top of the pelvic bone.

Hips. A tapeline was placed around the largest part of the hips.

Stem. For this measurement, the subject was seated erect on a low table. A tapeline was attached to a meter stick and held parallel to and near the back of the subject, and the distance from the table to the top of the head recorded.

Specific Measurements

Waist - Front.

(a) Neck. This measurement was taken from the intersection of the neck and shoulder line on one side, over the middle of the pit in front of the neck, to the intersection of the neck and shoulder of the opposite side. These points of intersection were indicated by means of narrow gummed strips of paper made to adhere to the body.

(b) Shoulder. With the head erect and face forward, the length of a pencil was placed on the crest of the bone behind the ear, holding the pencil so that it was parallel to the back contour line of the neck and touched the neck line. The shoulder line starts at that point and extends to one-half inch back of the middle of the shoulder on the armseye line.

(c) Chest. On the armseye, from a point four inches from the shoulder seam, a measurement was taken to this same point on the armseye of the opposite side. This point approximately bisects the armseye and gives a correct chest measurement.

(d) Armseye line. A tapeline was placed around the body at a point one and one-half inches directly below the highest point of the normal armpit. A measurement from this point under one arm to the same point under the opposite arm

gives the front armseye line.

(e) Waist. The tapeline was placed around the smallest part of the trunk, which lies between the lower rib and the top of the pelvic bone. This tape was held fast and permitted to remain in this position until all further measurements were recorded. The measurement from the underarm seam of one side to that of the other was recorded as the front waist line.

(f) Underarm. With a weight attached at about two-thirds the length of a tapeline, the opposite end of the tape was held in the center of the armpit at a point one and one-half inches below the top of the armpit. A measurement from this point to the waistline was recorded as the underarm of the waist.

(g) Bust. With the tapeline in position at the bust as previously described, a measurement from the underarm seam of one side to that of the other was recorded as the front bust.

(h) Length. This measurement was taken from that point on the shoulder at the intersection of the neck and shoulder (highest point of shoulder) to the middle of the tapeline at the waist line.

(i) Armseye. The armseye was located by placing the thumb and first finger on either side of the ball of the arm as it swings in the socket. A line dropped from

these points is parallel to the center front and center back respectively down to where the line starts to curve, when the arm leaves the body, to a point under the arm. This is a close measurement. Before using, one and one-half inches must be added.

Waist - Back. All of the measurements for the back waist were taken in the same manner as those of the front.

Relative Distance between Points.

(a) Shoulder and Chest. This measurement was taken from the point of intersection of the neck and shoulder (highest point of shoulder) to the chest line.

(b) Chest and Armseye Line. A measurement was taken of the distance from the chest to the armseye line.

(c) Armseye and Bust. A measurement was taken from the armseye line to the bust line.

(d) Bust and Waist. A measurement was taken of the distance from the bust line to the waist line.

The total measurement of the distances between these points equals the length of the waist front.

Sleeve.

(a) Total Length (outside). This measurement was taken from the point of intersection of the shoulder and armseye line, over the elbow (lower arm at right angle to upper) to a point between the joint of the wrist and that

of the hand.

(b) Upperarm - Length. With the lower arm bent at right angle to the upper, a distance from the point of intersection of the shoulder and armseye to the tip of the elbow was measured.

(c) Upperarm - Girth. A circumference of the arm at its largest part was measured.

(d) Length of Cap. A tapeline was placed around the arm, parallel to the floor, so that it touched the top of the armseye line. This line had previously been located on the body and marked by means of narrow gummed strips of paper. Next, a tapeline was placed at the intersection of the shoulder and armseye lines and allowed to fall perpendicular to the upper edge of the tape that had been placed around the arm. This measurement gave the length of the cap. One-half inch is added to this measurement for comfort in fit.

(e) Width of Cap. This measurement was taken across the arm parallel to the floor, from the point of intersection of the armseye and front chest to the point of intersection of the armseye and back chest, these intersections having been indicated by strips of gummed paper. One inch is added to this measurement for ease of movement.

(f) Elbow Girth. With the arm flexed, a circumference of the elbow was taken.

(g) Lower Arm - Length. With the lower arm at right angle to the upper, a measurement was taken from the tip of the elbow to a point between the joint of the wrist and that of the hand.

(h) Lower Arm - Girth. With the lower arm at right angle to the upper, a tape was placed around the arm at the greatest girth.

(i) Wrist. At a point between the joint of the hand and that of the wrist, the girth of the wrist was measured.

The suggested allowances for freedom of movement in cap length and width were not made in measurements recorded.

Relative Distance between Points.

(a) Intersection of shoulder and armseye line to greatest girth. This measurement was obtained by placing a tapeline at the point of intersection of the shoulder and armseye lines and extending to the top of tape around the greatest girth.

(b) Elbow to greatest lower girth. With the lower arm at right angle to the upper, a tapeline was extended from the tip of elbow to the edge of the tape around the greatest girth.

Skirt - Front.

(a) Waistline. This measurement is the same as that of the waist front.

(b) Hips. This measurement was taken from the side seam of one side to the side seam of the other, the largest part of the hips having been previously indicated by a tape-line held in place by a paper clip.

(c) Length. A distance at center front from the waist line to the floor was taken.

(d) Side length. A distance on the side seam from the center of the tape at the waistline to the floor was taken.

Skirt - Back.

(a) Waistline. This measurement is the same as that of the waist back.

(b) Hips. A distance from the side seam of one side to the side seam of the other was taken, the hipline having been previously located and the correct position marked by a tapeline.

(c) Length. A measurement from the middle of the tapeline around the waist, at the center back, to the floor was recorded.

Relative Distance between Points.

(a) Waist to Hips. A measurement at the center front from the middle of the tapeline at the waist to the middle of the tapeline at the hips was taken.

(b) Hips to Floor. This measurement was taken at the center front from the middle of the tapeline at the

hips to the floor.

Method of Checking Commercial Patterns

The patterns to be checked were opened and examined and all pieces not to be used in checking were discarded. The envelopes and direction sheets were studied for seam allowances and location of points on the patterns, whenever these were indicated. A gauge the width of seam allowances was prepared and used in indicating this width at every inch on the edge of the pattern. These points were then connected by a pencil line. Where let out seams were allowed on the pattern, the seam line was drawn along this line of perforations. The chest, armseye, bust, waist and hip lines were drawn on the pattern and measurements of these and the distances between these points recorded. The neck, shoulder, armseye and underarm measurements were also taken. The measurement of the neck, armseye and any other curved lines was taken with the tapeline standing. The lines drawn on the sleeve were cap length, cap width, elbow, greatest upper and lower girth, and length of upper and lower arm. The size of these, and of the armseye and wrist as taken were recorded.

The patterns used in this study are foundation or lining patterns.

INTERPRETATION

A comparison of the measurements of the four commercial patterns with the norm of the body measurements for the two groups of women, size 32 and 34 bust respectively, seems to indicate that a group of any number, 1000 or more, of similar size, would show body measurements in almost the same proportion, since even in such a small sample, the measurements vary slightly from the norm. A comparison of the pattern measurements with the median body measurements for the two sizes measured is reproduced in Table II and represented graphically in Figures I and II, and also in Plates I, II, III, IV, V, VI. From these curves, it appears that the patterns studied vary from the mean body measurements. The greatest variation in size 32 is found in the waist. Pattern I exceeds the median body measurement by 6.25 inches, the minimum by 9.25 inches and the maximum by 4.25 inches. The least variation is in the length of the shoulder, which in no case deviated more than three-quarters inch from the corresponding median body measurements. In the case of this measurement for the group, none varied more than one-half inch from the median. It is safe to say then that in a group similar to this, and of any size, the shoulder would show no greater variation from the median. Also since in the group studied, the deviation from

Table I. Body Measurements of Fifty College Women of Bust 32 to 35; Height Five Feet, Two Inches to Five Feet, Six Inches; and Weight 110 to 130 Pounds.

| | | | | | | | | | | Waist | | | | | | | | | | Sleeve | | | | | | | | | | Skirt | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|-----|--------|--------|-------|-------|-------|-------|-------|------|---------------------|-------|------|-------|-------|---------------------|-------|--------|-------|------|----------|-------|------|-------|-------|----------|-------|--------|--------|------|----------------------------------|-------|--------|-------|-------|--------------------|-------|-------|-------|-------|--------------|--------|-------|-------|--------|----------------|--------|--|--|--|------------|--|--|--|--|
| | | | | | | | | | | Front | | | | | Relative Distances | | | | | Back | | | | | Upperarm | | | | | Lowerarm | | | | | Rel. Distances | | | | | Front | | | | | Side | | | | | Back | | | | |
| | | | | | | | | | | Arms-Shoulder & eye | | | | | Shoulder & arms-eye | | | | | Arms-eye | | | | | Girth | | | | | Top of shoulder to gr. up. lower | | | | | Elbow to gr. lower | | | | | Waist to Hip | | | | | Floor to Floor | | | | | Hip length | | | | |
| Subject | Age | Height | Weight | floor | Bust | Hip | waist | Neck | ear | Shoulder | Stem | Neck | Chest | line | Bust | Waist | Length | Chest | eye | Bust | waist | Neck | Chest | line | Bust | Waist | Length | length | ye | Length | Girth | length | width | elbow | Length | Girth | Wrist | girth | girth | Hip | length | hip | floor | length | Hip | length | | | | | | | | |
| 1 | 19 | 5-4.50 | 116.50 | 57.00 | 32.00 | 37.50 | 25.25 | 13.50 | 7.00 | 4.25 | 33.50 | 8.00 | 11.75 | 15.00 | 17.00 | 13.00 | 17.25 | 4.75 | 2.00 | 4.75 | 5.75 | 5.50 | 11.50 | 15.50 | 15.00 | 12.25 | 16.50 | 25.00 | 5.00 | 14.75 | 9.75 | 5.50 | 6.50 | 11.00 | 10.25 | 9.00 | 6.25 | 4.50 | 2.75 | 17.50 | 41.25 | 8.75 | 32.50 | 42.25 | 20.00 | 41.50 | | | | | | | | |
| 2 | 20 | 5-5.00 | 115.00 | 57.50 | 32.00 | 35.50 | 25.25 | 14.25 | 8.75 | 4.50 | 33.25 | 8.25 | 12.25 | 14.50 | 15.00 | 12.75 | 16.50 | 5.00 | 2.25 | 2.25 | 7.00 | 6.00 | 14.25 | 18.50 | 17.00 | 12.50 | 16.50 | 24.75 | 4.00 | 14.00 | 9.50 | 5.75 | 6.25 | 10.50 | 10.75 | 8.75 | 6.00 | 5.00 | 2.75 | 17.00 | 40.75 | 9.25 | 31.50 | 41.75 | 18.50 | 41.25 | | | | | | | | |
| 3 | 24 | 5-6.00 | 126.00 | 57.50 | 32.00 | 39.25 | 24.50 | 14.00 | 8.25 | 4.25 | 35.50 | 8.00 | 11.75 | 13.25 | 15.25 | 12.50 | 17.75 | 5.00 | 1.75 | 3.25 | 7.75 | 6.00 | 12.75 | 16.75 | 16.75 | 12.00 | 17.25 | 24.25 | 4.75 | 14.00 | 10.50 | 6.00 | 7.50 | 11.00 | 10.25 | 9.75 | 6.00 | 4.75 | 2.50 | 18.25 | 41.50 | 10.25 | 31.25 | 41.50 | 21.00 | 41.25 | | | | | | | | |
| 4 | 18 | 5-6.00 | 127.25 | 59.00 | 32.00 | 37.50 | 26.00 | 14.25 | 8.25 | 5.00 | 34.00 | 8.75 | 13.25 | 16.75 | 16.50 | 13.50 | 18.25 | 5.00 | 3.00 | 3.00 | 6.25 | 5.50 | 12.75 | 15.50 | 15.50 | 12.50 | 18.25 | 25.00 | 4.50 | 14.25 | 10.75 | 6.00 | 6.50 | 11.00 | 10.75 | 10.00 | 6.50 | 5.50 | 3.00 | 17.00 | 41.00 | 10.00 | 31.25 | 41.75 | 29.50 | 41.00 | | | | | | | | |
| 5 | 20 | 5-5.00 | 115.00 | 56.50 | 32.00 | 37.00 | 26.00 | 14.00 | 7.25 | 4.50 | 34.75 | 8.50 | 13.00 | 16.50 | 17.25 | 13.50 | 17.00 | 5.25 | 2.75 | 3.50 | 5.50 | 5.50 | 12.50 | 15.00 | 14.75 | 12.50 | 17.25 | 24.50 | 4.25 | 14.50 | 10.00 | 6.00 | 6.25 | 10.25 | 10.00 | 9.25 | 5.75 | 4.50 | 3.25 | 17.00 | 40.25 | 8.35 | 31.50 | 41.00 | 20.00 | 40.75 | | | | | | | | |
| 6 | 21 | 5-3.00 | 116.50 | 54.25 | 32.00 | 37.00 | 25.75 | 13.00 | 6.75 | 4.25 | 33.50 | 8.00 | 11.75 | 15.00 | 16.00 | 13.25 | 16.00 | 5.50 | 2.00 | 3.50 | 5.00 | 5.25 | 12.25 | 15.00 | 16.00 | 12.50 | 15.00 | 23.50 | 5.00 | 13.75 | 10.25 | 6.00 | 6.75 | 10.00 | 9.75 | 9.00 | 6.00 | 4.75 | 2.00 | 18.00 | 40.25 | 8.75 | 31.50 | 40.75 | 19.00 | 40.25 | | | | | | | | |
| 7 | 17 | 5-3.75 | 115.50 | 54.75 | 32.00 | 36.25 | 25.75 | 13.75 | 6.00 | 4.75 | 35.00 | 8.25 | 12.50 | 15.25 | 15.75 | 13.00 | 16.75 | 5.25 | 1.25 | 2.75 | 7.50 | 5.50 | 12.75 | 15.50 | 16.50 | 12.75 | 16.50 | 22.25 | 3.50 | 13.00 | 10.00 | 5.25 | 6.75 | 11.00 | 9.25 | 9.25 | 6.25 | 4.00 | 2.25 | 16.50 | 38.50 | 9.25 | 29.25 | 38.75 | 19.75 | 38.50 | | | | | | | | |
| 8 | 20 | 5-4.00 | 110.50 | 55.50 | 32.00 | 38.00 | 24.50 | 13.50 | 6.75 | 4.50 | 32.75 | 8.00 | 11.50 | 15.00 | 16.50 | 12.00 | 15.25 | 5.00 | 1.75 | 3.25 | 5.25 | 5.50 | 12.00 | 15.00 | 15.50 | 12.50 | 15.25 | 24.50 | 4.50 | 14.00 | 10.50 | 5.50 | 6.75 | 10.50 | 10.50 | 9.00 | 6.00 | 4.75 | 2.25 | 18.00 | 41.25 | 8.75 | 32.50 | 41.50 | 20.00 | 41.00 | | | | | | | | |
| 9 | 24 | 5-4.25 | 125.00 | 55.75 | 32.00 | 37.50 | 26.00 | 13.75 | 6.75 | 4.25 | 33.50 | 8.00 | 11.50 | 15.00 | 16.00 | 13.75 | 16.00 | 5.00 | 2.00 | 3.50 | 5.50 | 5.75 | 12.00 | 15.00 | 16.00 | 12.25 | 15.75 | 25.00 | 4.50 | 15.00 | 10.50 | 6.25 | 6.50 | 11.00 | 10.00 | 9.50 | 6.00 | 5.00 | 2.50 | 18.00 | 41.00 | 9.00 | 32.00 | 41.75 | 19.50 | 42.00 | | | | | | | | |
| 10 | 19 | 5-6.00 | 126.00 | 58.00 | 32.25 | 38.00 | 26.25 | 13.50 | 7.50 | 4.75 | 33.50 | 8.00 | 12.00 | 15.50 | 16.25 | 13.50 | 16.50 | 5.25 | 2.25 | 1.75 | 7.25 | 5.50 | 13.25 | 18.00 | 16.00 | 12.75 | 15.75 | 25.75 | 4.50 | 15.00 | 11.00 | 6.00 | 7.25 | 11.00 | 10.75 | 9.50 | 6.00 | 4.00 | 2.00 | 18.00 | 41.00 | 8.00 | 33.00 | 42.00 | 20.00 | 41.50 | | | | | | | | |
| 11 | 19 | 5-5.75 | 115.00 | 58.00 | 32.50 | 36.25 | 25.00 | 13.50 | 6.00 | 4.75 | 34.75 | 8.00 | 12.50 | 15.50 | 16.50 | 13.50 | 17.25 | 5.00 | 1.75 | 4.25 | 6.75 | 5.50 | 12.25 | 16.50 | 15.50 | 11.50 | 17.00 | 24.50 | 4.75 | 14.50 | 10.00 | 6.25 | 6.50 | 10.50 | 10.00 | 9.00 | 6.00 | 5.00 | 3.00 | 16.75 | 40.50 | 8.50 | 32.00 | 41.25 | 19.50 | 41.00 | | | | | | | | |
| 12 | 18 | 5-3.25 | 122.00 | 55.00 | 32.50 | 39.50 | 26.50 | 13.50 | 6.00 | 4.50 | 33.00 | 8.25 | 12.75 | 15.50 | 17.00 | 14.00 | 15.75 | 5.00 | 2.50 | 2.75 | 5.50 | 5.25 | 12.50 | 16.50 | 15.50 | 12.50 | 15.00 | 23.50 | 5.00 | 13.50 | 11.25 | 6.00 | 7.50 | 10.25 | 10.00 | 9.25 | 6.00 | 5.25 | 2.75 | 18.00 | 41.25 | 9.50 | 31.75 | 42.25 | 21.50 | 41.50 | | | | | | | | |
| 13 | 18 | 5-2.50 | 114.75 | 54.25 | 32.50 | 37.00 | 25.00 | 12.75 | 7.50 | 4.50 | 33.50 | 7.75 | 11.75 | 15.25 | 16.25 | 12.50 | 16.00 | 5.50 | 2.00 | 3.00 | 5.50 | 5.00 | 12.75 | 16.75 | 16.25 | 12.50 | 15.50 | 23.25 | 5.00 | 13.50 | 10.50 | 6.25 | 6.75 | 10.50 | 9.75 | 9.25 | 6.25 | 4.75 | 2.50 | 17.50 | 39.00 | 9.50 | 29.50 | 39.75 | 19.50 | 39.25 | | | | | | | | |
| 14 | 21 | 5-3.50 | 121.50 | 55.00 | 32.75 | 40.00 | 26.25 | 13.50 | 6.00 | 4.50 | 33.25 | 8.00 | 12.00 | 14.50 | 15.25 | 13.50 | 16.00 | 5.00 | 2.75 | 2.75 | 5.50 | 5.50 | 13.00 | 17.00 | 17.50 | 12.75 | 13.75 | 23.50 | 5.50 | 14.00 | 10.75 | 6.25 | 7.00 | 10.75 | 9.50 | 9.00 | 6.00 | 5.00 | 3.50 | 19.75 | 40.00 | 10.00 | 30.00 | 40.50 | 20.25 | 40.25 | | | | | | | | |
| 15 | 19 | 5-3.00 | 119.00 | 55.50 | 32.75 | 38.50 | 26.50 | 13.75 | 8.00 | 4.25 | 33.00 | 8.25 | 13.00 | 16.75 | 17.00 | 13.25 | 17.25 | 4.75 | 2.25 | 3.75 | 6.50 | 5.50 | 12.25 | 15.75 | 15.75 | 13.25 | 16.25 | 23.75 | 6.25 | 14.00 | 11.00 | 6.00 | 6.75 | 11.25 | 9.75 | 10.00 | 6.25 | 5.50 | 2.75 | 18.00 | 39.50 | 9.50 | 30.00 | 39.75 | 20.50 | 40.25 | | | | | | | | |
| 16 | 21 | 5-5.25 | 117.00 | 56.25 | 33.00 | 37.00 | 26.00 | 14.00 | 6.00 | 4.25 | 33.50 | 8.25 | 12.25 | 15.50 | 17.50 | 13.50 | 16.75 | 5.50 | 2.25 | 3.50 | 5.50 | 5.75 | 11.50 | 16.50 | 15.50 | 12.50 | 16.75 | 24.00 | 4.25 | 14.00 | 10.25 | 6.00 | 6.75 | 11.25 | 10.00 | 9.00 | 5.75 | 4.25 | 3.00 | 17.50 | 40.50 | 8.75 | 31.75 | 40.50 | 19.50 | 40.00 | | | | | | | | |
| 17 | 23 | 5-4.50 | 110.00 | 59.25 | 33.00 | 36.00 | 26.00 | 13.75 | 6.25 | 4.75 | 34.50 | 8.25 | 12.00 | 15.75 | 16.75 | 13.50 | 17.75 | 5.00 | 2.00 | 4.25 | 6.50 | 5.50 | 13.50 | 15.75 | 17.25 | 12.50 | 16.75 | 25.00 | 4.00 | 14.75 | 9.75 | 5.50 | 6.50 | 11.50 | 10.25 | 9.25 | 6.00 | 5.25 | 2.75 | 17.50 | 40.50 | 9.25 | 31.25 | 40.50 | 18.50 | 40.00 | | | | | | | | |
| 18 | 22 | 5-2.25 | 119.00 | 55.50 | 33.00 | 38.50 | 25.75 | 14.00 | 7.25 | 4.75 | 33.25 | 8.25 | 12.00 | 15.75 | 16.75 | 13.25 | 16.50 | 5.00 | 2.50 | 4.50 | 4.50 | 5.75 | 13.25 | 15.50 | 14.25 | 12.50 | 16.00 | 23.25 | 5.50 | 14.00 | 11.25 | 6.00 | 7.00 | 11.25 | 9.25 | 9.75 | 6.00 | 4.25 | 2.00 | 18.00 | 38.50 | 8.50 | 30.00 | 38.50 | 20.50 | 38.25 | | | | | | | | |
| 19 | 20 | 5-5.00 | 115.00 | 56.25 | 33.00 | 38.50 | 26.00 | 13.50 | 6.50 | 4.75 | 33.50 | 8.00 | 12.75 | 16.25 | 15.50 | 13.50 | 15.75 | 5.25 | 2.25 | 3.50 | 4.75 | 5.50 | 13.00 | 17.50 | 17.50 | 12.50 | 15.25 | 23.50 | 5.50 | 14.00 | 11.00 | 5.75 | 6.75 | 10.50 | 9.50 | 9.25 | 5.75 | 4.75 | 2.50 | 17.50 | 41.50 | 9.50 | 32.00 | 42.00 | 21.00 | 41.75 | | | | | | | | |
| 20 | 22 | 5-4.00 | 115.50 | 55.50 | 33.00 | 37.75 | 23.50 | 13.00 | 7.00 | 4.50 | 34.00 | 7.75 | 11.75 | 15.00 | 16.50 | 11.50 | 15.75 | 5.00 | 2.00 | 3.75 | 5.00 | 5.25 | 11.75 | 14.50 | 16.50 | 12.00 | 15.75 | 23.50 | 4.75 | 13.75 | 10.00 | 5.50 | 7.00 | 10.75 | 9.75 | 9.50 | 6.00 | 3.75 | 2.25 | 17.75 | 41.00 | 10.00 | 31.00 | 41.50 | 20.00 | 40.50 | | | | | | | | |
| 21 | 18 | 5-3.75 | 110.00 | 56.25 | 33.25 | 35.50 | 25.00 | 13.00 | 7.75 | 4.00 | 34.25 | 7.25 | 11.25 | 14.75 | 16.50 | 13.00 | 15.75 | 4.75 | 2.25 | 3.50 | 5.25 | 5.75 | 12.75 | 18.00 | 16.75 | 12.00 | 15.50 | 24.00 | 4.50 | 14.00 | 10.00 | 6.00 | 7.00 | 10.25 | 10.00 | 9.00 | 5.50 | 5.00 | 3.00 | 16.00 | 41.00 | 9.00 | 32.00 | 41.25 | 19.50 | 41.50 | | | | | | | | |
| 22 | 20 | 5-4.00 | 122.00 | 56.00 | 33.25 | 39.50 | 27.75 | 13.75 | 7.00 | 4.75 | 32.00 | 8.25 | 12.50 | 15.00 | 16.00 | 14.50 | 16.00 | 5.25 | 2.00 | 2.25 | 6.50 | 5.50 | 13.00 | 16.50 | 17.25 | 13.25 | 15.00 | 24.50 | 4.50 | 14.00 | 11.00 | 5.25 | 7.00 | 10.50 | 10.50 | 9.75 | 6.00 | 3.50 | 2.50 | 18.00 | 41.00 | 9.00 | 32.00 | 42.00 | 21.50 | 41.50 | | | | | | | | |
| 23 | 19 | 5-3.75 | 123.00 | 59.50 | 33.25 | 38.00 | 24.50 | 14.00 | 8.75 | 4.50 | 33.50 | 8.50 | 13.00 | 16.25 | 17.00 | 12.00 | 17.25 | 5.25 | 2.00 | 3.50 | 6.50 | 5.50 | 12.25 | 16.00 | 16.25 | 12.50 | 17.25 | 25.00 | 5.25 | 14.50 | 10.25 | 6.00 | 6.50 | 11.00 | 9.50 | 10.00 | 6.25 | 5.25 | 2.75 | 18.00 | 40.25 | 9.25 | 31.00 | 40.50 | 20.00 | 39.50 | | | | | | | | |
| 24 | 19 | 5-2.50 | 111.00 | 54.75 | 33.25 | 37.00 | 23.00 | 13.50 | 7.50 | 4.50 | 33.50 | 8.50 | 12.75 | 16.00 | 18.00 | 11.75 | 16.25 | 5.25 | 1.75 | 3.50 | 5.75 | 5.00 | 11.75 | 14.50 | 15.25 | 11.25 | 16.25 | 23.25 | 5.25 | 13.25 | 11.00 | 5.75 | 6.75 | 11.00 | 10.00 | 9.50 | 6.25 | 4.25 | 3.00 | 17.25 | 39.00 | 9.50 | 29.50 | 40.00 | 19.75 | 39.25 | | | | | | | | |
| 25 | 24 | 5-5.75 | 118.00 | 56.75 | 33.50 | 38.50 | 25.75 | 13.50 | 8.50 | 5.00 | 34.50 | 8.00 | 12.25 | 15.00 | 16.50 | 12.75 | 17.00 | 5.25 | 2.50 | 2.75 | 6.75 | 5.50 | 13.75 | 17.50 | 17.00 | 13.00 | 17.50 | 24.25 | 4.50 | 14.25 | 9.75 | 6.25 | 7.00 | 10.75 | 10.00 | 9.75 | 5.75 | 5.75 | 2.50 | 17.50 | 41.50 | 10.00 | 31.50 | 41.25 | 21.00 | 41.00 | | | | | | | | |
| 26 | 19 | 5-4.25 | 124.00 | 56.00 | 33.50 | 40.00 | 25.75 | 13.50 | 7.25 | 4.75 | 32.50 | 8.25 | 11.75 | 15.00 | 17.75 | 13.25 | 16.50 | 5.25 | 2.25 | 2.75 | 6.25 | 5.25 | 12.75 | 16.00 | 15.75 | 12.50 | 16.50 | 24.75 | 4.75 | 14.25 | 11.00 | 5.75 | 7.25 | 11.25 | 10.50 | 9.50 | 6.00 | 4.75 | 2.25 | 18.50 | 40.50 | 8.75 | 31.75 | 41.00 | 21.50 | 40.75 | | | | | | | | |
| 27 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table II. Median, Mean, Minimum and Maximum Body Measurements for Fifty College Women and the Corresponding Measures of the Four Makes of Commercial Patterns.

| Bust 32 | | | Waist | | | | | | | | | | | | | | | Sleeve | | | | | | | | | | | | | | | Skirt | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|---------------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|---------------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|---------------------|---------------------|---------------------------------|-----------------------------|---------------------------|----------|--------------------|---------------------|---------------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------|--|--|--|--|------|--|--|--|--|------|--|--|--|--|
| | | | Front | | | | | | | | | | | | | | | Back | | | | | | | | | | | | | | | Upperarm | | | | | Lowerarm | | | | | Relative Distances | | | | | Front | | | | | Side | | | | | Back | | | | |
| Height | Weight | Shoulder to floor | Bust | Hips | Girth of waist | Neck | Underarm | Shoulder to Stem | Neck | Chest | Armseye line | Bust | Waist | Length | Shoulder to chest | Chest to armseye | Armseye to bust | Bust to waist | Neck | Chest | Armseye line | Bust | Waist | Length | Total length | Armseye | Length | Girth | Cap length | Cap width | Girth of elbow | Length | Girth | Wrist | Top of sh. to gr. up. of sleeve | Armseye to gr. lower sleeve | Elbow to gr. lower sleeve | Hips | Floor length | Waist to hips | Hips to floor | Floor length | Hips | Floor length | | | | | | | | | | | | | | | | | | |
| Median | :64.25 | :120.0 | :56.25 | :33.0 | :38.0 | :26.0 | :13.75 | :7.5 | :4.5 | :33.5 | :8.25 | :12.25 | :15.25 | :16.75 | :13.25 | :16.50 | :5.25 | :2.0 | :3.25 | :6.5 | :5.5 | :12.75 | :16.25 | :16.25 | :12.50 | :16.25 | :24.25 | :15.0 | :14.0 | :10.5 | :5.75 | :6.75 | :11.0 | :10.0 | :9.5 | :6.0 | :4.75 | : | :2.5 | :17.75 | :40.75 | :9.25 | :31.5 | :41.25 | :20.0 | :41.0 | : | | | | | | | | | | | | | | | |
| Minimum | :62.25 | :110.0 | :54.25 | :32.0 | :35.5 | :23.0 | :12.75 | :6.0 | :4.0 | :32.0 | :7.25 | :11.25 | :13.25 | :15.25 | :11.75 | :15.25 | :4.75 | :1.25 | :1.75 | :4.5 | :5.0 | :11.75 | :15.00 | :14.25 | :11.25 | :15.00 | :22.25 | :13.5 | :13.0 | :9.5 | :5.25 | :6.25 | :10.0 | :9.25 | :9.0 | :5.75 | :4.00 | : | :2.0 | :16.00 | :38.50 | :8.00 | :29.25 | :38.50 | :18.50 | :38.25 | : | | | | | | | | | | | | | | | |
| Maximum | :66.00 | :127.25 | :59.50 | :33.75 | :40.0 | :28.0 | :14.00 | :9.0 | :5.0 | :35.0 | :8.75 | :13.25 | :17.00 | :18.00 | :14.75 | :17.75 | :5.50 | :2.75 | :4.50 | :7.25 | :6.0 | :13.75 | :18.00 | :17.50 | :13.00 | :18.25 | :25.00 | :15.5 | :15.0 | :11.25 | :6.25 | :7.50 | :11.5 | :11.00 | :10.0 | :6.50 | :5.50 | : | :3.0 | :19.75 | :41.50 | :10.50 | :33.00 | :42.25 | :21.50 | :42.00 | : | | | | | | | | | | | | | | | |
| Mean | :64.29 ⁺ | :119.03 ⁺ | :56.03 ⁺ | :32.55 ⁺ | :37.84 ⁺ | :25.71 ⁺ | :13.13 ⁺ | :7.6 ⁺ | :4.58 ⁺ | :33.62 ⁺ | :8.19 ⁺ | :12.25 ⁺ | :15.43 ⁺ | :16.62 ⁺ | :13.20 ⁺ | :16.57 ⁺ | :5.15 ⁺ | :2.12 ⁺ | :3.23 ⁺ | :6.06 ⁺ | :5.45 ⁺ | :12.67 ⁺ | :16.25 ⁺ | :16.14 ⁺ | :12.51 ⁺ | :16.18 ⁺ | :24.16 ⁺ | :15.43 ⁺ | :14.12 ⁺ | :10.49 ⁺ | :5.83 ⁺ | :6.81 ⁺ | :10.92 ⁺ | :10.00 ⁺ | :9.5 ⁺ | :6.04 ⁺ | :4.68 ⁺ | : | :2.62 ⁺ | :17.67 ⁺ | :40.46 ⁺ | :9.21 ⁺ | :31.25 ⁺ | :41.00 ⁺ | :20.16 ⁺ | :40.56 ⁺ | :11.12 ⁺ | | | | | | | | | | | | | | | |
| Pattern I | : | : | : | :34.0 | :38.75 | :32.25 | :13.25 | :7.88 | :5.25 | : | :9.00 | :14.50 | :19.50 | :19.00 | :16.75 | :17.50 | :5.88 | :2.88 | :1.75 | :7.0 | :4.25 | :12.75 | :15.50 | :15.00 | :15.50 | :16.63 | :22.25 | :15.12 | :13.75 | :12.75 | :5.25 | :8.75 | :10.50 | :8.50 | :9.75 | :8.00 | : | :17.0 | : | :19.50 | : | :7.00 | : | :19.25 | : | | | | | | | | | | | | | | | | | |
| Pattern II | : | : | : | :32.25 | :37.75 | :27.50 | :12.50 | :7.75 | :4.0 | : | :7.25 | :13.00 | :18.50 | :18.25 | :15.75 | :16.75 | :5.63 | :2.63 | :2.37 | :6.12 | :5.25 | :12.25 | :17.75 | :14.00 | :11.75 | :15.75 | :23.50 | :14.88 | :13.00 | :12.00 | :4.62 | :8.37 | :10.12 | :10.50 | :9.00 | :7.25 | : | :16.0 | : | :20.25 | : | :7.00 | : | :17.50 | : | | | | | | | | | | | | | | | | | |
| Pattern III | : | : | : | :33.25 | :38.00 | :31.50 | :16.50 | :8.37 | :4.25 | : | :11.0 | :13.50 | :18.25 | :18.25 | :17.25 | :18.12 | :6.00 | :3.12 | :3.25 | :5.75 | :5.50 | :12.75 | :16.50 | :15.00 | :14.25 | :15.75 | :22.50 | :14.63 | :13.00 | :12.75 | :5.00 | :9.75 | :11.00 | :9.50 | :10.00 | :7.00 | : | :16.75 | : | :20.25 | : | :7.50 | : | :17.75 | : | | | | | | | | | | | | | | | | | |
| Pattern IV | : | : | : | :33.75 | :39.50 | :29.25 | :14.50 | :8.12 | :4.37 | : | :9.0 | :14.00 | :19.00 | :18.75 | :16.25 | :16.50 | :5.12 | :2.25 | :2.37 | :6.63 | :5.50 | :13.25 | :17.50 | :15.00 | :13.00 | :15.63 | :22.50 | :14.75 | :13.12 | :12.00 | :4.75 | :8.75 | :10.63 | :9.37 | :9.75 | :7.00 | : | :16.00 | : | :20.25 | : | :7.00 | : | :18.25 | : | | | | | | | | | | | | | | | | | |
| Bust 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Median | :63.5 | :125.25 | :55.25 | :34.50 | :38.00 | :27.00 | :13.75 | :7.50 | :4.75 | :33.25 | :8.25 | :12.50 | :16.00 | :17.75 | :13.75 | :17.00 | :5.50 | :2.25 | :3.50 | :5.75 | :5.50 | :12.75 | :16.50 | :17.00 | :13.00 | :16.25 | :23.75 | :15.25 | :14.00 | :11.00 | :6.00 | :7.00 | :11.00 | :10.00 | :9.75 | :6.00 | :5.00 | : | :2.75 | :18.00 | :39.75 | :8.75 | :30.75 | :40.25 | :20.50 | :39.75 | : | | | | | | | | | | | | | | | |
| Minimum | :62.0 | :112.00 | :53.75 | :34.00 | :37.00 | :25.75 | :13.00 | :6.00 | :4.0 | :32.00 | :7.75 | :12.00 | :15.00 | :17.00 | :12.75 | :15.50 | :4.75 | :1.50 | :2.50 | :4.50 | :5.00 | :11.75 | :15.50 | :16.00 | :15.50 | :15.25 | :22.00 | :14.50 | :12.50 | :10.25 | :5.25 | :6.75 | :10.50 | :9.25 | :9.25 | :6.00 | :4.00 | : | :2.25 | :16.75 | :38.50 | :7.75 | :30.00 | :39.25 | :18.75 | :39.00 | : | | | | | | | | | | | | | | | |
| Maximum | :65.75 | :130.00 | :56.00 | :35.00 | :41.25 | :28.75 | :14.25 | :9.25 | :5.25 | :34.50 | :8.50 | :13.25 | :17.00 | :19.00 | :14.50 | :18.00 | :6.00 | :3.00 | :5.00 | :7.50 | :6.00 | :13.75 | :18.25 | :18.00 | :14.50 | :17.50 | :25.00 | :16.25 | :15.00 | :11.75 | :6.50 | :7.25 | :11.50 | :10.50 | :9.75 | :6.50 | :6.25 | : | :3.25 | :18.75 | :42.75 | :10.00 | :32.00 | :42.25 | :22.50 | :41.75 | : | | | | | | | | | | | | | | | |
| Mean | :63.45 ⁺ | :127.33 ⁺ | :55.31 ⁺ | :34.58 ⁺ | :38.36 ⁺ | :27.21 ⁺ | :13.72 ⁺ | :7.55 ⁺ | :4.61 ⁺ | :33.16 ⁺ | :8.32 ⁺ | :12.55 ⁺ | :16.13 ⁺ | :17.64 ⁺ | :13.73 ⁺ | :16.86 ⁺ | :5.54 ⁺ | :2.18 ⁺ | :3.41 ⁺ | :5.89 ⁺ | :5.41 ⁺ | :12.88 ⁺ | :16.86 ⁺ | :16.89 ⁺ | :13.13 ⁺ | :16.26 ⁺ | :23.89 ⁺ | :15.35 ⁺ | :13.94 ⁺ | :10.97 ⁺ | :6.01 ⁺ | :6.94 ⁺ | :11.14 ⁺ | :9.95 ⁺ | :9.69 ⁺ | :6.1 ⁺ | :4.89 ⁺ | : | :2.67 ⁺ | :17.86 ⁺ | :39.75 ⁺ | :8.85 ⁺ | :30.83 ⁺ | :40.39 ⁺ | :20.50 ⁺ | :39.91 ⁺ | :12.12 ⁺ | | | | | | | | | | | | | | | |
| Pattern I | : | : | : | :37.00 | :39.25 | :33.75 | :13.00 | :8.37 | :5.25 | : | :8.50 | :15.00 | :20.50 | :20.00 | :18.50 | :18.25 | :6.25 | :3.58 | :1.75 | :6.63 | :4.50 | :13.50 | :17.00 | :17.00 | :16.25 | :17.00 | :22.50 | :15.88 | :14.00 | :13.12 | :5.25 | :8.25 | :10.88 | :8.50 | :10.00 | :8.37 | : | :17.50 | : | :19.50 | : | :7.00 | : | :20.25 | : | | | | | | | | | | | | | | | | | |
| Pattern II | : | : | : | :36.50 | :39.00 | :28.00 | :13.25 | :7.88 | :5.37 | : | :7.75 | :13.50 | :19.00 | :19.50 | :15.75 | :17.5 | :4.37 | :2.25 | :3.00 | :6.50 | :5.50 | :13.25 | :17.00 | :14.75 | :12.25 | :16.25 | :23.75 | :15.25 | :13.50 | :12.25 | :4.88 | :8.50 | :10.50 | :10.25 | :9.75 | :7.50 | : | :16.62 | : | :20.50 | : | :7.00 | : | :18.50 | : | | | | | | | | | | | | | | | | | |
| Pattern III | : | : | : | :35.25 | :40.50 | :33.25 | :18.00 | :8.75 | :4.25 | : | :12.0 | :14.00 | :19.25 | :19.50 | :18.25 | :18.37 | :5.75 | :3.12 | :3.50 | :6.00 | :6.00 | :13.00 | :17.50 | :15.75 | :15.00 | :16.37 | :23.50 | :15.37 | :14.00 | :13.25 | :5.25 | :9.62 | :11.50 | :9.50 | :10.25 | :7.12 | : | :17.50 | : | :21.50 | : | :8.00 | : | :19.00 | : | | | | | | | | | | | | | | | | | |
| Pattern IV | : | : | : | :35.00 | :40.50 | :31.75 | :14.50 | :8.25 | :4.37 | : | :9.00 | :14.75 | :20.00 | :19.50 | :18.00 | :17.00 | :5.50 | :2.88 | :3.00 | :5.63 | :5.50 | :14.00 | :17.00 | :15.50 | :13.75 | :16.12 | :23.50 | :15.75 | :13.75 | :12.63 | :5.12 | :8.75 | :11.00 | :9.75 | :10.00 | :7.25 | : | :17.00 | : | :21.25 | : | :7.75 | : | :19.25 | : | | | | | | | | | | | | | | | | | |

The probable errors for this table were figured from the formula:

$$\text{Probable error} = \frac{.6745}{\sqrt{N}} \sqrt{\frac{\sum (x - \bar{x})^2}{(N - 1)}}$$

given in Rietz Mathematical Statistics."

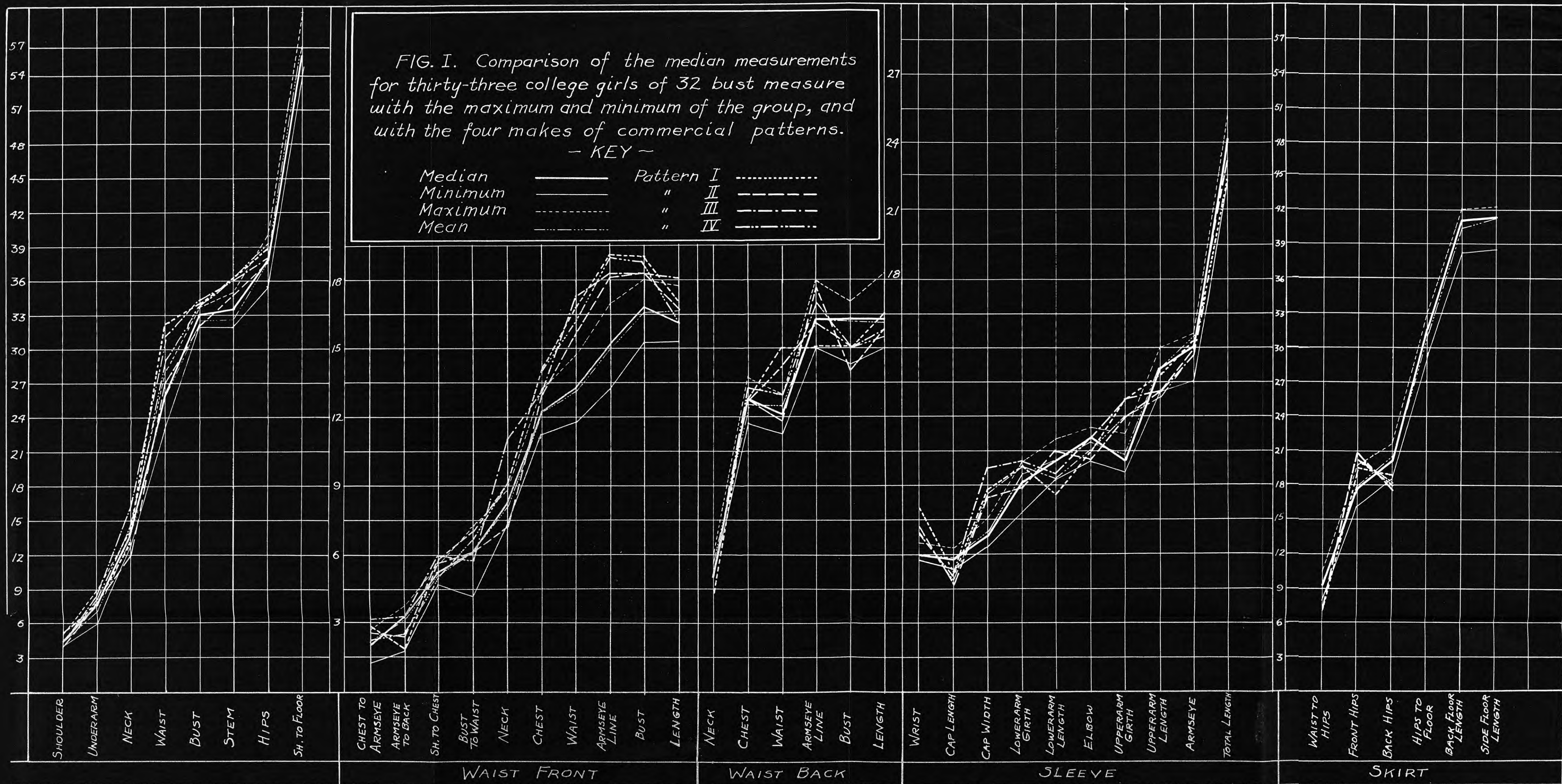
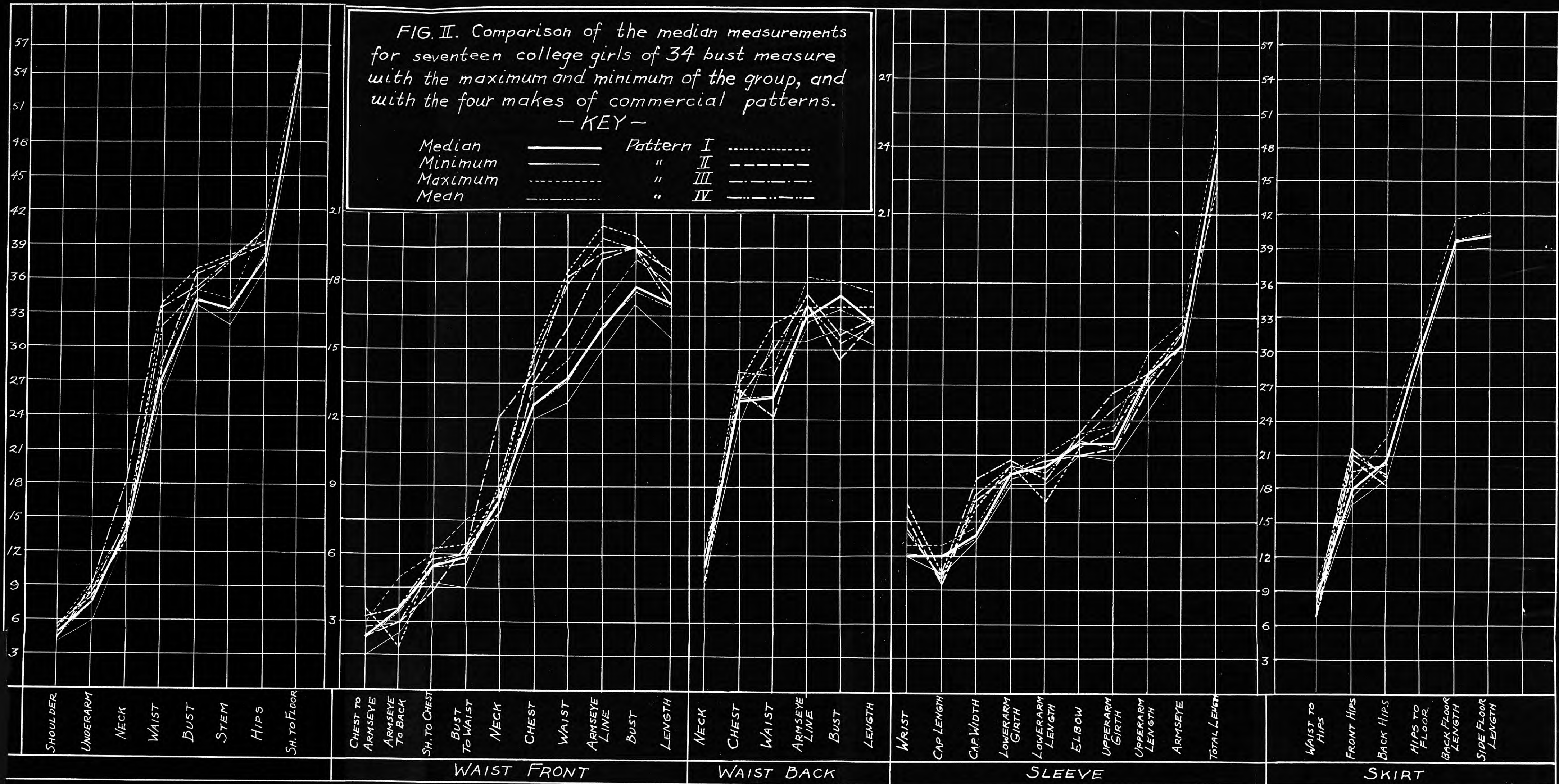


FIG. II. Comparison of the median measurements for seventeen college girls of 34 bust measure with the maximum and minimum of the group, and with the four makes of commercial patterns.

— KEY —

| | | | |
|---------|---------|-----------|---------|
| Median | ———— | Pattern I | |
| Minimum | ———— | " II | ----- |
| Maximum | ----- | " III | -.-.-.- |
| Mean | -.-.-.- | " IV | |



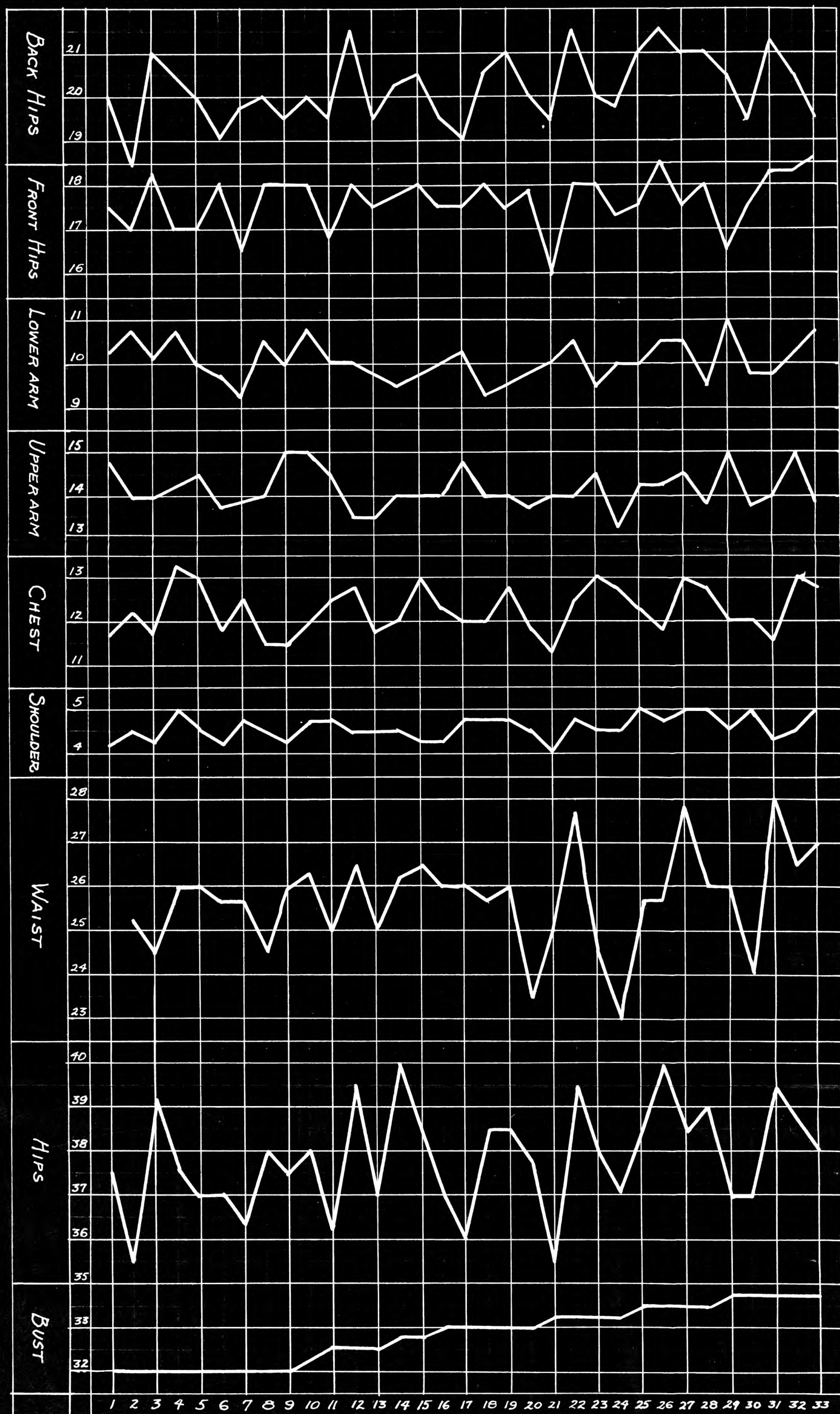
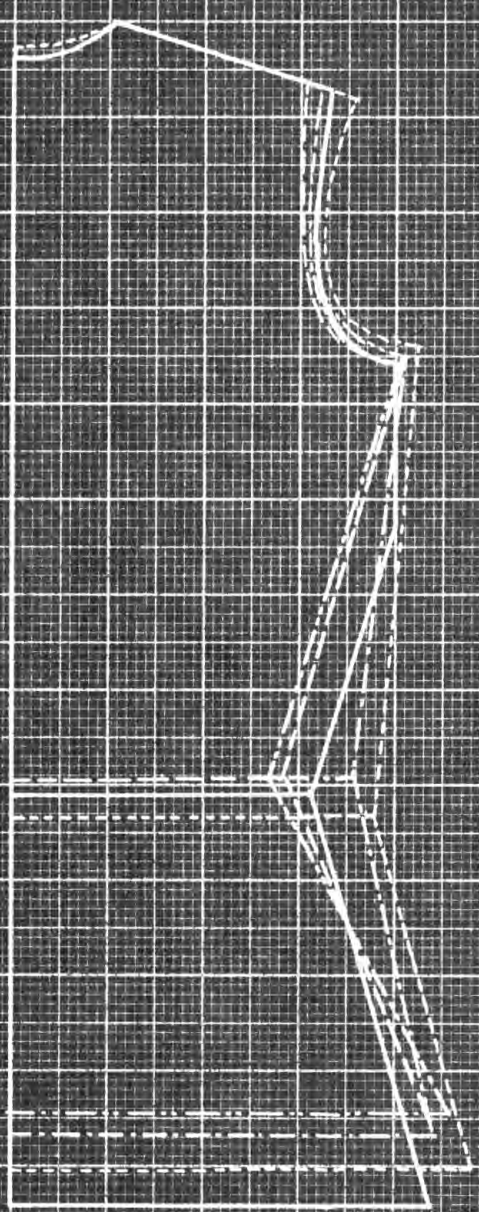


FIG. III Comparison of variations of bust measurements of thirty-three college girls with variations of other body measurements of the same girls.

| HIP-BACK | | HIP-FRONT | | LOWER ARM | | UPPER ARM | | NECK | | SHOULDER | | CHEST | | WAIST | | HIPS | | BUST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|----|-----------|----|-----------|----|-----------|----|------|----|----------|----|-------|----|-------|---|------|---|------|---|----|---|----|---|----|--|----|--|----|--|---|--|---|--|---|--|---|--|---|--|---|--|---|--|---|--|---|--|
| 22 | 21 | 20 | 19 | 18 | 17 | 11 | 10 | 9 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | 21 | | 20 | | 19 | | 18 | | 17 | | 11 | | 10 | | 9 | | 15 | | 14 | | 13 | | 12 | | 11 | | 10 | | 9 | | 8 | | 7 | | 6 | | 5 | | 4 | | 3 | | 2 | | 1 | |



Median
Pattern I
" II
" III
" IV

Chart I. Waist Back Size 32 Bust

Comparison of the median measurements for thirty three College girls of 32 bust measure with the corresponding measurements of the four makes of commercial patterns.

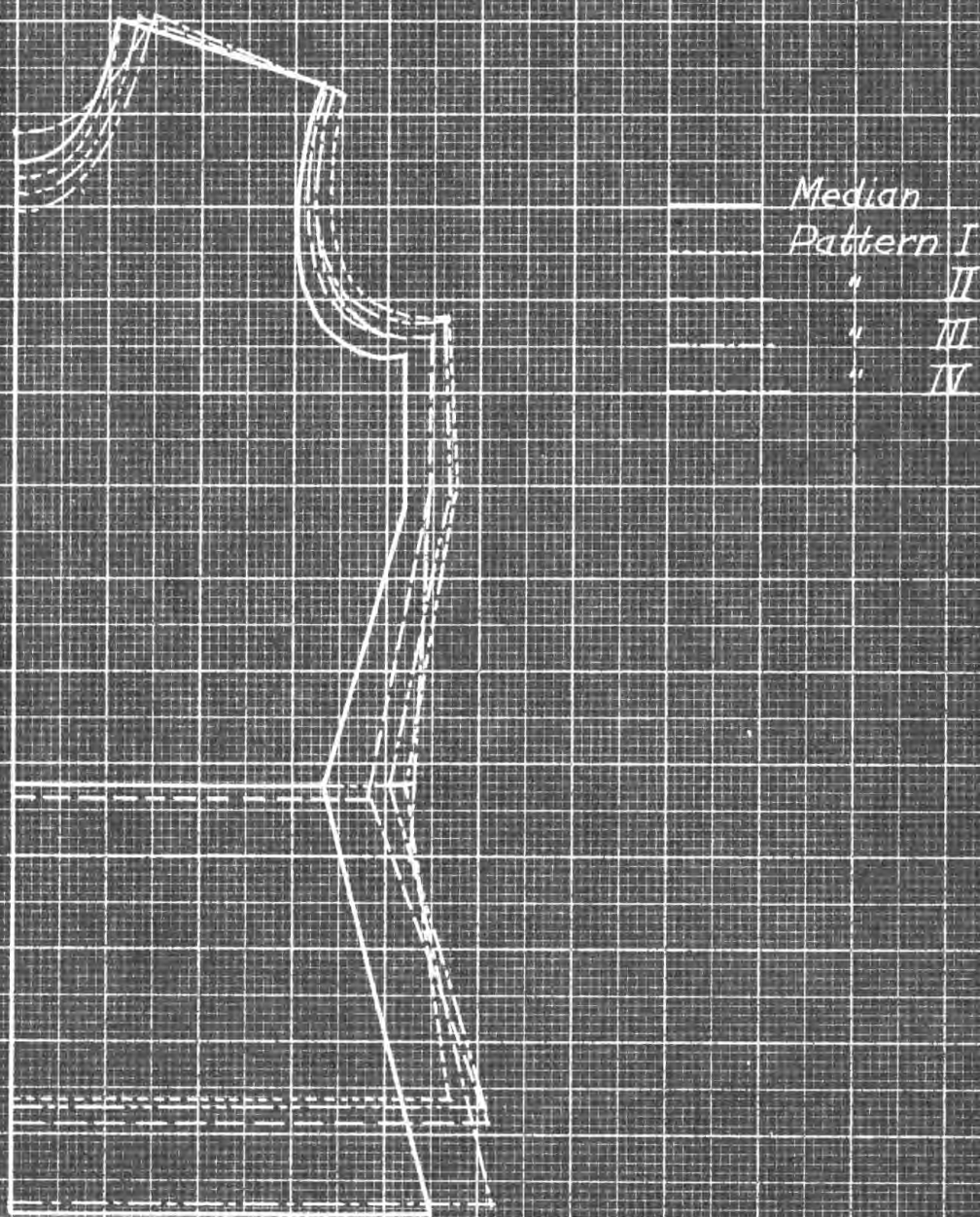
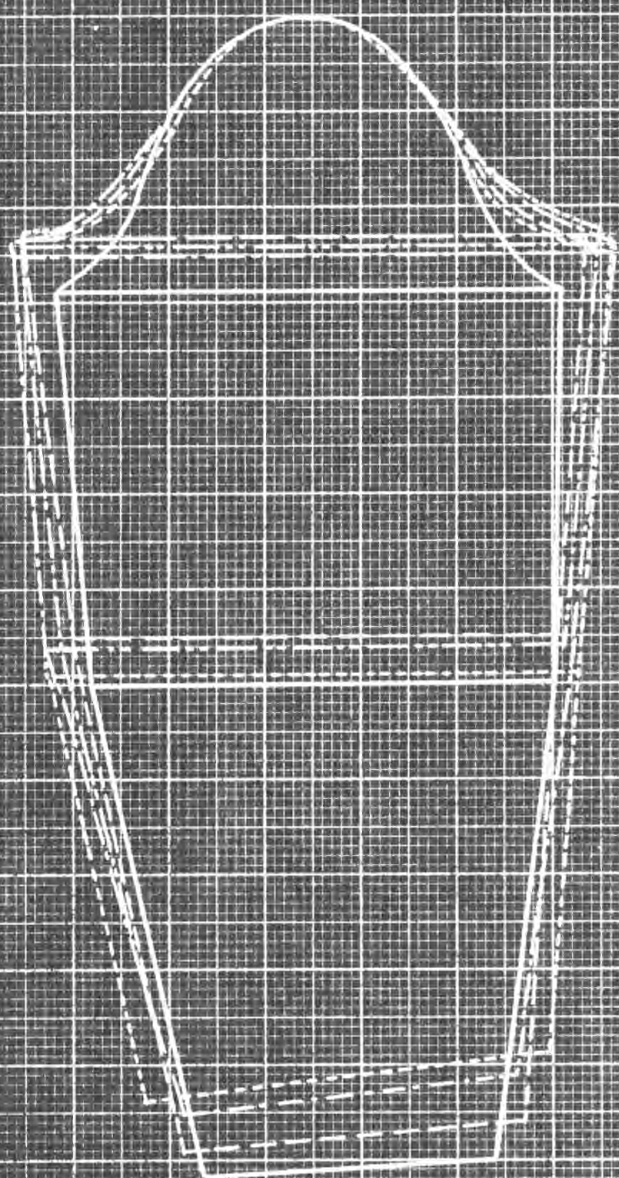


Chart II Waist Front Size 32 Bust

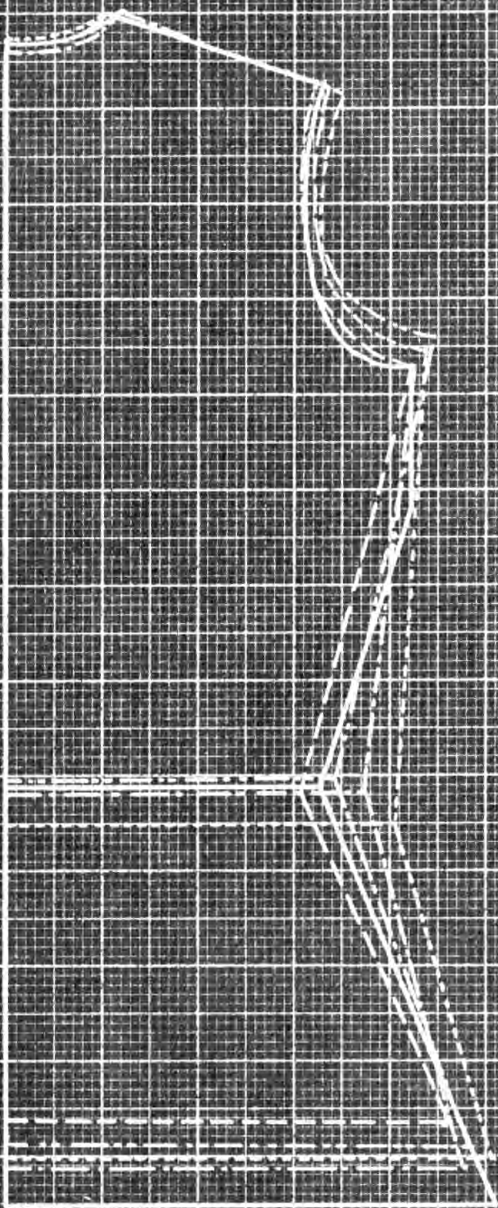
Comparison of the median measurements for thirty-three college girls of 32 bust measure with the corresponding measurements of the four makes of commercial patterns.



Median
Pattern I
II
III
IV

Chart III Sleeve Size 32 Bust

Comparison of the median measurements for thirty-three college girls of 32 bust measure with the corresponding measurements of the four makes of commercial patterns.



Median

Pattern I

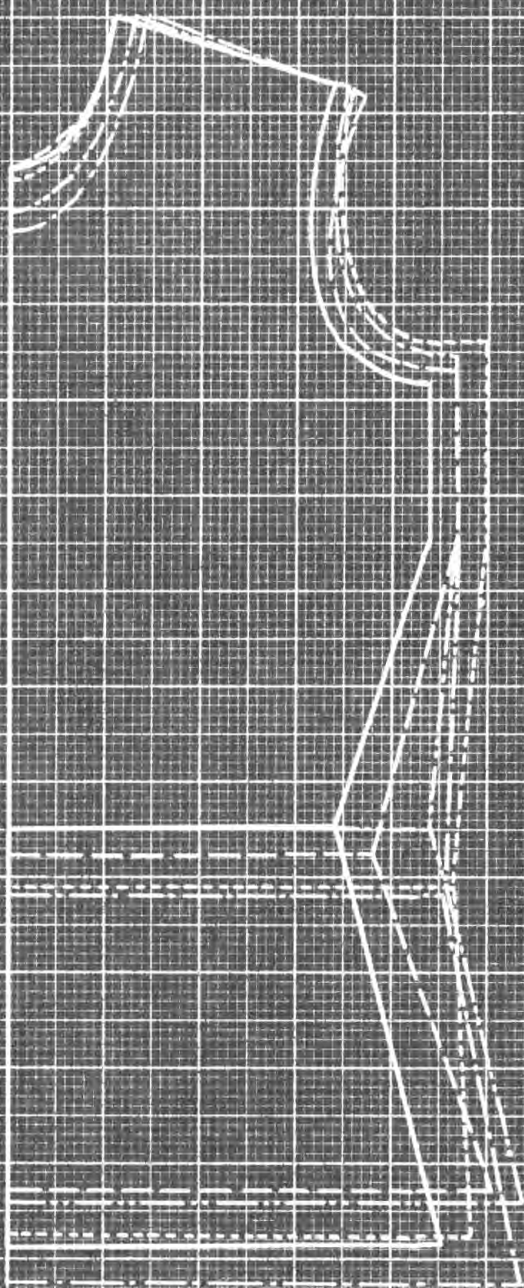
" II

" III

" IV

Chart IV Waist Back Size 34 Bust

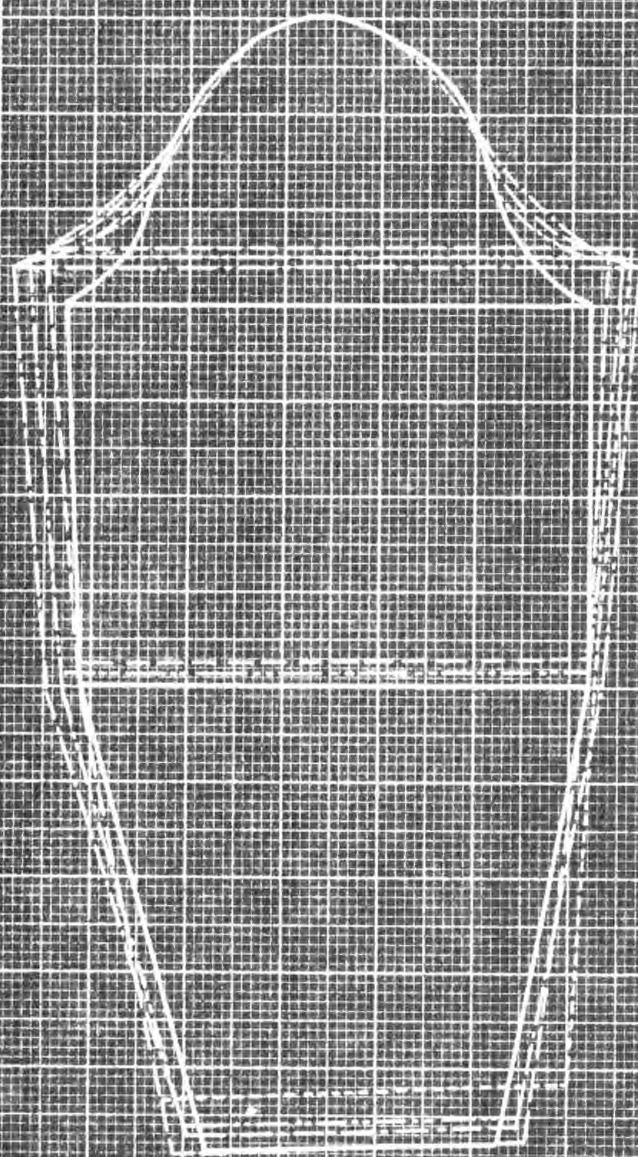
Comparison of the median measurements for seventeen college girls of 34 bust measure with the corresponding measurements of the four makes of commercial patterns.



Median
Pattern I
" II
" III
" IV

Chart V Waist Front Size 34 Bust

Comparison of the median measurements for seventeen college girls of 34 bust measure with the corresponding measurements of the four makes of commercial patterns.



Median
Pattern I
" II
" III
" IV

Chart VI. Sleeve Size 34 Bust

Comparison of the median measurements for seventeen college girls of 34 bust measure with the corresponding measurements of the four makes of commercial patterns.

the median was most marked in the waist and hips, varying five and four inches respectively in size 32, and three and four and one-half inches respectively in size 34, it seems evident that for a larger group, this measurement would remain constant. The neck, also, in Pattern III exceeds the median measurement by three and one-fourth inches and the underarm by one and one-eighth inches. The shoulder measure of three of the patterns is less than the corresponding median body measurement. In such case, the shoulder would require alteration for a majority of the group. The shoulder measurement of Pattern II is one-half inch less, and of Pattern IV, which is the largest of the patterns, is one-eighth inch less than the median body measurement. The front chest measure of the largest pattern exceeds the median body measurement by two and one-fourth inches, while the front and back waist pattern lengths show little variation from the median.

Except in the case of Pattern I, the median armseye body measurement exceeds the pattern measurements. The body measurement is a close measurement which would require one and one-half inches allowance for freedom of movement. This means that for the women of this group, the patterns studied would require an alteration in most cases.

Another outstanding feature is that the amount of increase of the armseye of the sleeve over the armseye of the

waist is not the same in the different patterns of the same type.

The total outer length of the sleeve patterns is as much as two inches less than the median body measurement. The length of the sleeve cap is one that is generally not sufficient. In this case, one pattern is one and one-eighth inches less than the median body measurement while the maximum pattern is also one-half inch less than median. The median body measurement is a close measurement which would necessitate one-half inch allowance over this measurement for a perfect fit, which means that one pattern is as much as one and five-eighths inches too short.

The patterns studied, being foundation or lining patterns, do not deviate from the median body measurements as much as would the average dress pattern.

Size 34 patterns show similar variations from the median body measurements, with slight differences in some cases. The greatest variation is in the size of the waist. Pattern I exceeds the corresponding median body measurement by six and three-fourths inches. The front and back chest of patterns exceed the median somewhat more than in the study of size 32 bust.

Judging from the above observations of the variation of patterns, not only from the median body measurement, but from each other, it is evident that although Commercial

Standard C S 13-30 was supposed to have been effective January 1, 1930, it has not yet been used by pattern makers.

Investigation from the group measured, together with the patterns considered, would seem to justify a plan for standardization, involving the measurement of 1000 people of the same weight, height and bust measure, and patterns designed from the mean or average of every body measurement of the group, using these as the size norm. The amount to be added for freedom of movement should be agreed upon by pattern makers and this amount adhered to in all patterns. This would not involve the amount which a particular style calls for, as for example, a shirred or flared skirt, but in case of a fitted skirt, the same amount would be added at the hip line. Such a pattern would not involve a great alteration even for the extremes in the group.

CONCLUSIONS

Body measurements of 50 women of five feet, two inches, to five feet, six inches in height, 110 to 130 pounds in weight; and 32 to 35 inches bust indicate:

1. Least variation is in the size of shoulder, in no case deviating more than one-half inch from the median.

2. Deviation from the median is most marked in waist and hips.

3. The median, minimum and maximum of back and front chest measurements are in direct proportion.

Pattern study indicates that:

1. Patterns of supposedly the same size but of different makes vary in actual measurements; for example, in waist measurement, there is a variation of four and three-fourths inches.

2. Measurements indicated on the envelope do not correspond to actual pattern measurements. The size on the outside of the pattern envelope should indicate a body measurement but the pattern itself should have certain measurements increased by a standard amount, say two inches, to allow for freedom of movement. However, in the commercial patterns studied, this was not the case; for example, from one and three-fourths to four and three-fourths inches was added to the waist measurement.

3. Certain measurements, such as shoulder and chest, which should remain the same in all patterns even though other measurements are affected by the style of the garment, are not the same in commercial patterns.

4. Commercial Standard CS 13-30, to have been effective January 1, 1930, was not used in these patterns.

5. Patterns would more nearly fit the group for which they were intended if either the median or mean body measurements were used.

6. Standards for dress patterns should be adopted from the median or norm of the measurements for a sufficiently large sample, these measurements to be taken scientifically rather than from a compromise of practical experience.

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