CHAPTER IV

EXPERIMENTAL PROCEDURE

The procedure has been divided into following parts :

4.1 Fabrics used and determination of their preliminary data.

4.2 Determination of the stiffness and percentage drape coefficient and number of nodes in the fabrics.

4.3 Methods of obtaining fullness and their drape effect and analysis of prevalent styles.

4.4 Determination of relative drape ratio of garments.

4.5 Analysis of percent drape coefficient of fabrics and drape ratio of skirts.

4.6 Determination of the relationship between garment subjective assessment and textile properties of fabrics.

4.7 Determination of aesthetic appeal for different styles of skirts.

4.1 Fabrics used and determination of their preliminary data

Fabrics (five in initial work and nine in subsequent work) were used in the study. These are mentioned in Table 2.

4.1.1 Determination of fabric count:

The number of ends and picks per inch were counted in warp and weft directions using the Alfred Suter Counter. Average of five readings was taken.

4.1.2 Determination of weight per unit area of the fabric:

Five specimens of 5.0 cms x 5.0 cms were cut at different places from the fabrics. The specimen were conditioned over a

Table 2. Fabrics used.

Sr.No.	Fabric Code	Name of Fabric	Nature of Weave	Other Description
(a) Used in initial work				
1	A	Casement	Plain	medium weight, closely woven fabric
2	B	Muslin	Plain	thick medium weight
3	C	Muslin	Plain	limp medium weight
4	D	Muslin	Plain	limp medium weight
5	E	Muslin	Plain	limp light weight
(b) Used in subsequent work				
6	F	Georgette	Plain	a thin transparent or semi-transparent, loosely woven fabric. It has a harder finish is less lustrous and is more crepey.
7	G	Cambric	Plain	light weight, thin, closely woven fabric
8	H	China silk	Plain	light weight, soft plain weave
9	I	Terewool	Plain	blend of polyester and wool thick and medium weight
10	J	Terewool	Basket	blend of polyester and wool thick and heavy fabric
11	K	Crepe de Chine	Plain	A soft, thin but opaque light weight fabric with a crepe surface
12	L	China silk	Jacquard	crepe effect alongwith jacquard design, soft, light weight, limp
13	M	Terecotton	Plain	blend of polyester and cotton thick, stiff and heavy fabric
14	N	Casement	Plain	medium weight, closely woven fabric

saturated common salt solution at room temperature, in a small cabinet. Each conditioned specimen was weighed separately, on an analytical balance. An average of five readings was obtained and the weight per unit area in grams per square meter was calculated using the formula:

$$\text{weight in gms/sq.meter} = \frac{W \times 1 \times 1}{5 \times 5} \times \frac{100 \times 100}{1}$$

where 'w' is the average weight in grams of the specimen.

4.1.3 Determination of thickness of the fabric:(1)

Compressometer was used to determine the thickness of the fabric. One specimen at a time was placed on the anvil without any folds and tension. The pressure foot (1 inch in diameter) was lowered upon the specimen by rotating the knob until upper dial read 5 (equal to 0.1 lb pressure per sq.inch) and the reading was recorded from the lower dial. The pressure was then increased until the upper dial read 40 (equal to 1.0 lb pressure per sq.inch) and the lower dial reading was recorded again. The difference between the two readings gave the thickness of the fabric in inch (x 0.001). The average of five readings was taken as the fabric thickness. This was converted to centimeters and reported to the nearest 0.001 cm.

4.2 Determination of the stiffness and percentage drape coefficient and number of nodes in the fabrics

4.2.1 Determination of the stiffness (Cantilever Test):(1)

Three specimens of 2.5 cms x 15.0 cms were cut at random

STIFFNESS TESTER

WOODEN STRIP

FIBRE STRIP
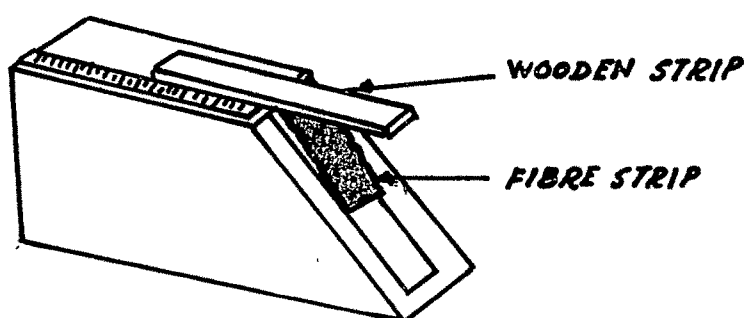
FIG. 20

from the fabrics in both warp and weft directions. The specimens were conditioned over a saturated common salt solution at room temperature, in a small cabinet. Each specimen was placed on the platform (Fig. 20) with wooden strip on top of it and the specimen was slid slowly and steadily until the leading edge project beyond the edge of the platform. With the eye in a position such that the two inclined lines coincide, the movement of the specimen was stopped, when its tip just falls to the level of these lines. The length of overhang from the scale was read. Readings were taken from each specimen from both the ends, face-to-face and back-to-back. Average of five readings was recorded for the bending length. (Geometric averages).

The flexural rigidity was determined using the formula:

$$\text{Flexural rigidity} = w_2 c^3 \times 10^3 \text{ mg/cm}$$

where w_2 = cloth weight in grams per square centimeter

c = half bending length.

4.2.2 Determination of the percent drape coefficient and number of nodes in the fabrics:
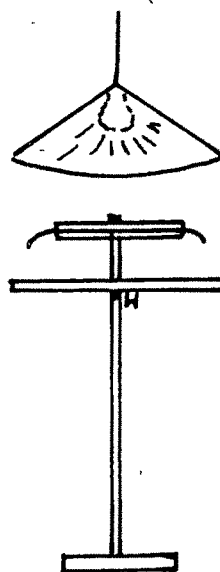
For determining the drape coefficient of fabrics, a simple drapemeter was made (Fig. 21 and 22) as described by Chu et al and use has been further discussed by Kaswell, Chu et al, and Cusick (17).

A stand (a) with a 52.0 cms long centre rod was taken and a clamp (b) was fixed 8.0 cms below the top edge of the rod. A
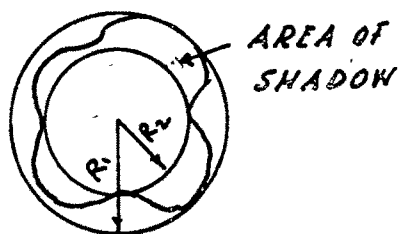
(e)
(d)
(c)

(b)
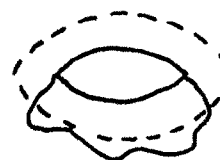
(a)
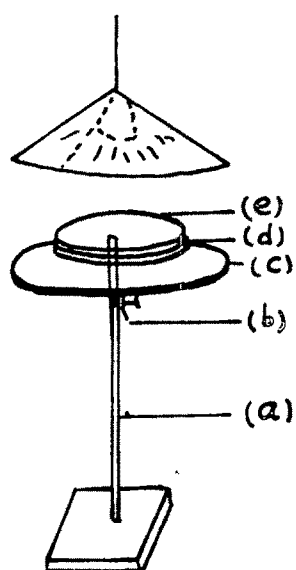
FRONT VIEW OF DRAPEMETER

FIG. 21

CROSS SECTION OF
DRAPEMETER

FIG. 22

AREA OF
SHADOW

THE PROJECTED OUTLINE
OF THE DRAPED SPECIMEN

FIG. 23

THE CIRCULAR SPECIMEN
IS DRAPED OVER THE
CIRCULAR SUPPORT.

FIG. 24

30.0 cms diameter hardboard disc (c) was placed on the clamp. Another two discs of 18.0 cms in diameter were cut from thermocol sheet (as it is light in weight, having smooth surface and easy to cut). One disc (d) was fixed on the top edge of the rod. Another was used as a lid (e) of the instrument (Fig. 21).

Circular fabric specimens 30.0 cms in diameter were cut from each fabric sample, using a hard paper template. Circular papers of the same diameter were placed on a hardboard disc and used for marking shadows of the draped specimens as noted below (Fig. 23 and 24).

Hardboard disc (c) was raised close to the thermocol discs (d). A specimen was placed in such a way that centre of the specimen coincided with centre rod. The second disc of thermocol sheet (c) was placed over the fabric so as to hold the specimen in position. The hardboard disc (c) was slowly taken down on the clamp thus allowing the specimen to drape under its own weight. With the help of narrow light, a shadow of the draped specimen was obtained on the circular paper placed on the hardboard disc (e). The cutline of the shadow was drawn on the paper and the number of nodes was noted. The percentage drape coefficient of fabric was calculated using the following formula:

$$\text{Percent drape coefficient of fabric} = \frac{A - \pi R_2^2}{\pi R_1^2 - \pi R_2^2} \times 100$$

where R_1 = 15.0 cms radius
  R_2 = 9.0 cms radius
  A = Area of the shadow in sq.cm.

4.3 Methods of obtaining fullness and their drape effect and analysis of prevalent styles

There are various methods of obtaining fullness in the costume. These methods were studied and the suitable fabrics were noted. How these methods were used in the prevalent styles were also studied and the drape effect obtaining therefrom is also analysed. Prevalent styles of draped costume as well as tailored costumes were collected from magazines, books, newspapers, weeklies, etc. The styles were analysed for the methods used for adding fullness in the costume as well as how it drapes and how it provides isolated decoration in the costume, was also noted.

4.4 Determination of relative drape ratio of garments

4.4.1 Preparation of garment drapemeter:

The relative drape ratio of garment is measured by a dressform. The dressform is prepared with the use of average measurement of girls between 15-25 yrs of age. From the measurements cross sections of different girths are drawn and cut from the thermocol sheet and full size dressform is prepared with thermocol. The skirt is selected for the study of drape ratio. Skirt is drafted and stitched from different fabrics and different angle godets of different material are made. Various arrangements of godet and skirts are arranged and draped shadows of the garment are obtained by hanging the skirt on the dressform with the use of formula, the shadow area and relative drape ratio are calculated.

Basis - As discussed on page 28 , the fabric drape is measured
by a drapemeter. The circular fabric drapes over a smaller
circular disc, so the extra fabric hanging itself under its
own weight, forming wavy area below the circular fabric. The
circular fabric, however, if draped over a smaller diameter
circle will gradually be in a conical shape, when it hangs
from the apex or a point. The apex is much more away from the
actual drapeline, it will form more and more number of nodes
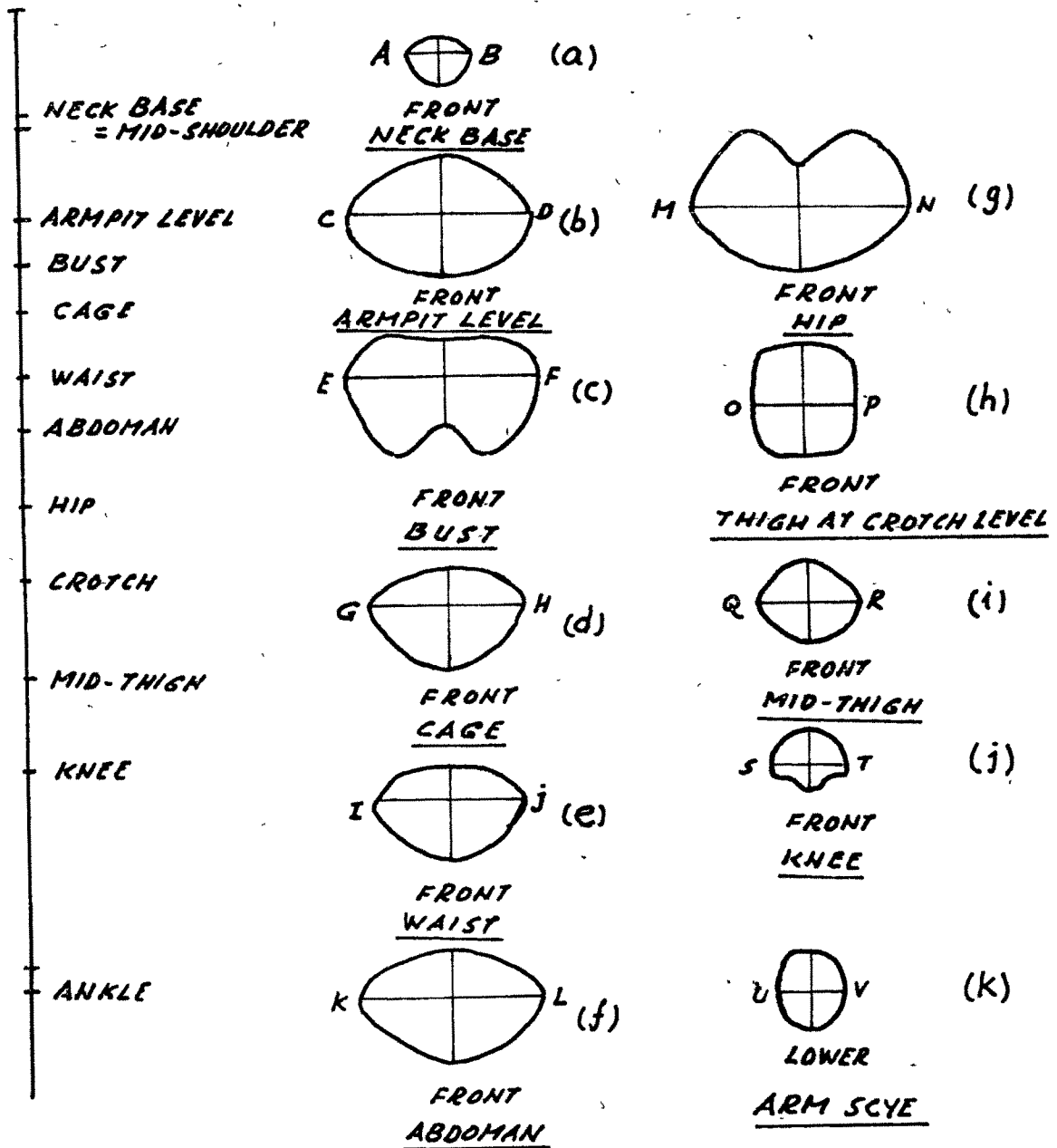as the fabric area for drape increases and shadow area decreases.

A circular garment drapes from the waistline and the hipline.
In the same way waistline is an apparent drapeline, while hipline
acts as an actual drapeline. Since a garment drapes around the
hip, the fabric of a garment can be said to behave in this way.

This method is based on the method used by Cusick (17)
who used semicircular fabrics as half skirts over model-stands.
(This study uses dressforms, instead of subjects or model-stands
and full skirts, instead of a half skirts.) The subjective
evaluation was carried out by the method (Cusick)(8) with paired
comparison and statistical evaluation of the results was done
to find out the relationship between subjective evaluation and
percent drape coefficient of fabric and bending length by rank
procedure.

Thus there have been varying methods for the study of the
drape ratio of a garment, one using a subject to wear a garment
and other to use a model stand or a dressform to stimulate a

Table 3. Materials used for preparation of dressform.

Sr. No.	Material	Description and purpose
1	Thermocol sheet (20 mm thickness)	This is a light weight plastic rigid sheet of styrene appropriate for cutting sections as required and for shaping as required with a hot iron at 150°C.
2	Aluminium pipes (10 mm in diameter)	Used as two supports for legs from waist to ankle length.
3	Aluminium rod (5 mm in diameter)	Used for upper body support from head to hip length.
4	Sawdust, sand, thermocol granules	Stuffing materials used to give the required body to the dressform padding the dressform.
5	Cotton	Padding the dressform.
6	Fevicol	Synthetic resin used as an adhesive.
7	Grey fabric and upper and lower undergarments	Covering materials used as outer layer for dressforms and to clothe the form.

A ⊕ B (a)

NECK BASE
= MID-SHOULDER

FRONT
NECK BASE

ARMPIT LEVEL   C ⊕ D (b)   H ⊕ N (g)

BUST

CAGE

FRONT   FRONT
ARMPIT LEVEL   HIP

WAIST   E ⊕ F (c)   O ⊕ P (h)

ABDOMAN

FRONT   FRONT
HIP   BUST   THIGH AT CROTCH LEVEL

CROTCH   G ⊕ H (d)   Q ⊕ R (i)

MID-THIGH   FRONT
FRONT   MID-THIGH
CAGE

KNEE   I ⊕ J (e)   S ⊕ T (j)

FRONT   FRONT
WAIST   KNEE

ANKLE   K ⊕ L (f)   U ⊕ V (k)

FRONT   LOWER
ABDOMAN   ARM SCYE

DIFFERENT GIRTH   CROSS SECTIONS OF
POSITIONS AT   DIFFERENT GIRTHS
DIFFERENT HEIGHTS

FIG. 25   FIG. 26

subject and to put the garment on it. It is difficult to get the same subject throughout the study. Two identical human figures are also difficult to get. The investigator thus preferred to use dressförms.

Identical dressforms were made with average measurements of girls (age group is 15-25 yrs, given on page 62) where skirt is common and so duplicate readings could be taken. This is the age group were the physical growth is completely over, and the anthropometric data also shows less changes. Skirt is very popular garment among the college going girls, and college going girls fall in this age group. Since various styles were studied for this age group.

Preparation of a dressform

For preparing dressform, average measurements of college girls (15-25 yrs) given below were taken from the previous anthropometric study of Kuruvilla (22). Between 15-25 yrs of age group of girls, the skirt is common in use.

In the beginning of the preparation of the dressform, different heights and different girth positions were calculated and marked on paper (Fig. 25). Cross section dimensions were calculated from total girth and these cross sections were drawn on paper as shown in the diagram (Fig. 25).

Table 4. Measurements used for preparing dressforms.

List of Measurements	Measurement (cms)
Vertical measurements:	
Total height	157.00
Below waist - Ankle to knee	34.00
Knee to mid thigh ..	14.00
Mid thigh to crotch ..	15.00
Crotch to hip	11.00
* Hip to abdomen	12.00
* Abdomen to waist ..	9.5
Above waist - Waist to cage	10.00
Cage to bust	6.5
Bust to armpit level ..	7.0
Armpit level to lower shoulder point ..	14.5
Armpit level to higher shoulder point ..	16.0
Horizontal measurements:	
Knee girth	32.0
Mid thigh girth	41.5
Round thigh at crotch level ..	55.0
* round hip (Total) ..	90.00
round hip (Front) ..	42.5
round hip (Back) ..	47.5

* Measurements used for skirt drafting.

Table 4 contd..

List of Measurements		Measurements (cms)
* round abdomen ..	..	79.0
* round Waist (Total)	..	69.0
* round waist (Front)	..	36.5
* round waist (Back)	..	32.5
round cage (Total)	..	70.0
round cage (Front)	..	38.0
round cage (Back)	..	32.0
round bust (Total)	..	81.0
round bust (Front)	..	46.0
round bust (Back)	..	35.0
round armpit level	..	78.0
across chest (Front)	..	28.5
across chest (Back)	..	35.0
Right lower shoulder point to left lower shoulder point ..	..	34.0
shoulder width..	..	13.0
round neck ..	..	37.0
neck width ..	..	6.0
round armscye ..	..	35.5
shoulder slope..	..	21°

*Measurements used for skirt drafting.

			No.of pieces
(a)	Neck base	: A - B - A	1
(b)	Armpit level	: C - D - C	1
(c)	Bust	: E - F - E	1
(d)	Cage	: G - H - G	1
(e)	Waist	: I - J - I	1
(f)	Abdomen	: K - L - K	1
(g)	Hip	: M - N - M	1
(h)	Thigh at crotch level	: O - P - O	1
(i)	Mid thigh	: Q - R - Q	2
(j)	Knee	: S - T - S	2
(k)	Round armscye	: U - V - U	2

Now the actual preparation starts. All above cross sections were cut from 20 mm thermocol sheet in a drawn shapes as given in Figure 26.

Two pieces of knee	- (S-T-S)
Two pieces of mid thigh	- (Q-R-Q)
Two pieces of thigh at crotch level	- (O-P-O)
One piece of hip girth	- (M-N-M)
One piece of abdomen girth	- (K-L-K)
One piece of waist girth	- (I-J-I)
One piece of cage girth	- (G-H-G)
One piece of bust girth	- (E-F-E)
One piece of armpit level girth	- (C-D-C)
Two pieces of round armscye	- (U-V-U)
One piece of neck base	- (A-B-A)
Two pieces for the shoulders.	

Two aluminium tubes of 10 mm in diameter of waist to ankle length were taken. Ankle to knee height was marked on the tubes and cardboard piece was fixed with clamps on the tubes. Cut pieces of knee round shapes were inserted in the tube from the top of the tube and were fixed at position with fevicol.

Tubes in a shape of a leg were stitched from grey fabric considering knee girth on one side and half hip girth on another side. These tubes were fixed on the round knee thermocol pieces with fevicol and the tubes were taken fully upward. The tubes were filled with mixed sawdust, sand and thermocol granules as needed to give body and weight and fixed with fevicol poured from the top. This way tube was filled and when it reached upto the mid thigh height, round mid thigh pieces were fixed and again same way it was filled.

After it reached to the crotch level, round thigh at crotch level pieces were fixed. This way two legs upto crotch level were ready.

A knitted upper under garment was taken and all the lengths from mid shoulders were marked on it. The girths were also marked and shape was given to the upper under garment. The ready upper under garment was stitched with grey fabric tubes from thigh at crotch level. The two fabric tubes and the upper garment were stitched with gusset between the two legs, to make it completely closed. After stitching, the garment was filled only with thermocol pieces and when it was filled upto the
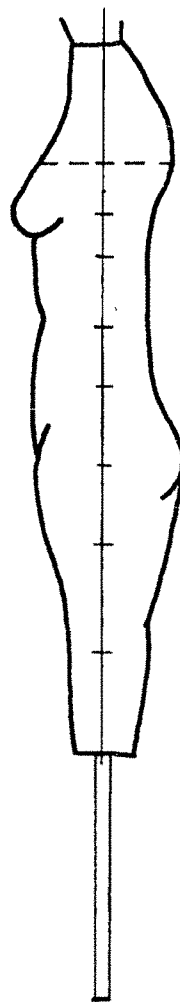
DIAGRAM OF DRESS FORM

SCALE - $^{1}/_{10}$
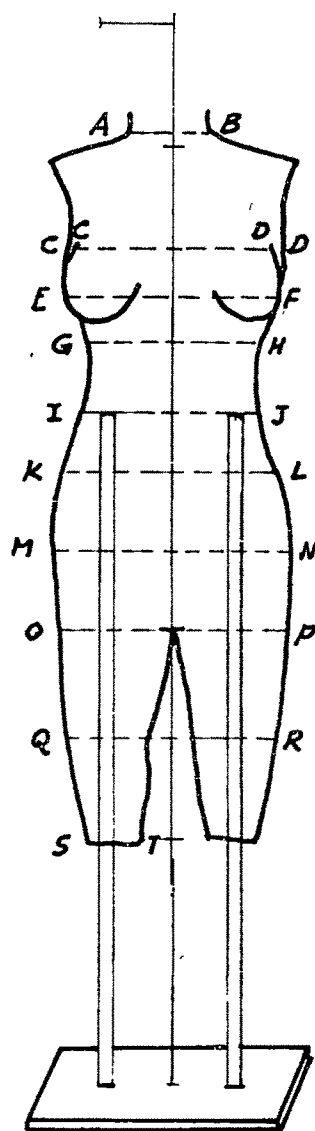
FRONT VIEW

FIG. 27

SIDE VIEW

FIG. 28

hip level height, the round hip piece of thermocol was placed.

In the centre of the round hip piece, an aluminium rod was inserted of head to hip length. Now the garment was filled up partially and abdomen level, waist level, cage level, bust level and armpit level round shape pieces were fixed in the garment at their positions. Two pieces of thermocol having slope like shoulder on each side which formed shoulder line and another. side straight which were placed vertically on the round-armpit-level-thermocol piece, keeping neck-width distance between them. The front and back side were filled with thermocol pieces and required chest widths were obtained as the front and back chest widths are different. On two sides of shoulder slopes, two round armscye shapes were fixed and extra material of the upper garment was pinned. Finally a round neckbase shape was fixed to form an inclination on the top to complete the dressform (Fig. 1⅞, 1ᵬ).

After completing the main structure of the body, the surface was smoothened with hot electric iron set at 150° to 155^{b} C°. Thermocol (styrene) melts at $100^{\circ}-120^{\circ}C$ and proper curves as per size were obtained. These were checked by measurements after hot pressing. The dressform from neck to knee was padded with padding cotton for any irregularities. It was covered with fitted muslin dress, stitched from all the sides.

A movable plywood stand of 50.0 cms x 76.0 cms x 26.0 cms was made with two round holes, near the centre having, the distance between them equal to the distance between two pipes. The pipes were inserted and this movable stand was used for marking the shadow of the garment. Another wooden stand over the floor was fixed to the face ends of the pipes to keep the pipes in position.

4.4.2 Designing and construction of different styles

A skirt is a garment which drapes straight from the hipline forming series of waviness around hemline. It is thus easy to assess the drape of the garment at hemline.

Basic skirt is called basic and it is primary to all other skirt patterns. It is a plain, straight, two-piece skirt pattern with side seams, no wider at the hem than the hip width, and darted at 4 places to fit at the waistline. This skirt is used as a guideline for getting varied skirt styles. In this study the fitting aspect of the basic skirt was kept constant for other styles.

Drafting of the basic skirt was done as per instructions given by Pivnick (22).

DRAFTING OF BASIC SKIRT

SCALE - 1/5

FIG. 29

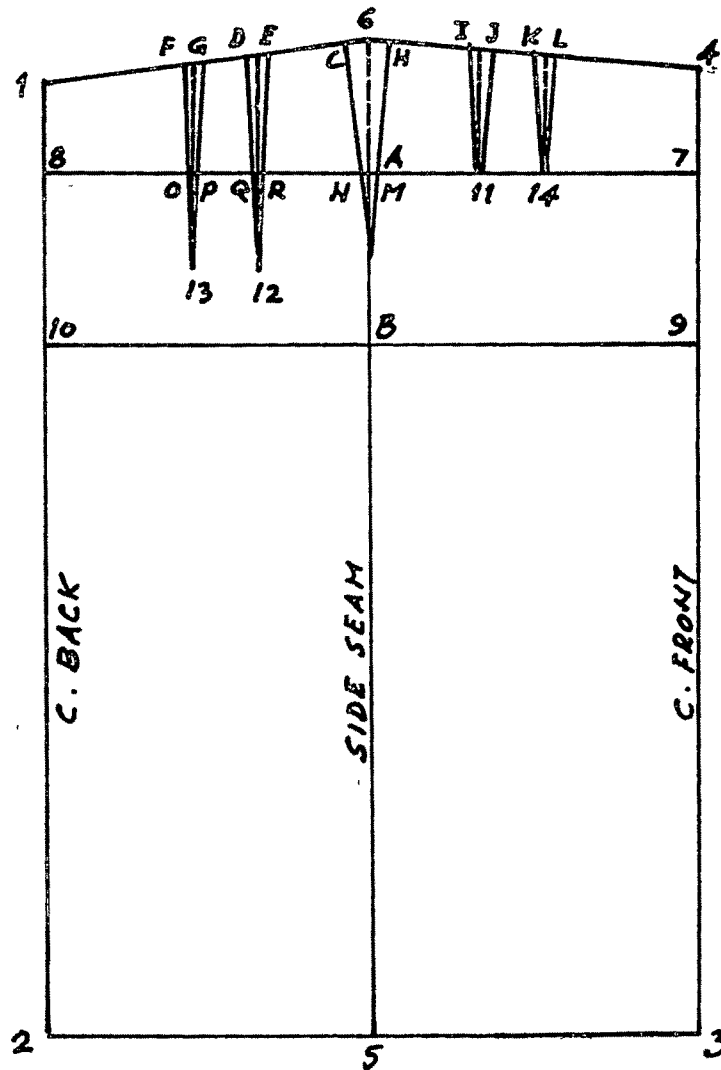Measurements required: cms

    Ready back length of the skirt   : 66.5

    Ready front length of the skirt   : 67.0

    Ready side seam length of the skirt   : 69.0

    Round hip   : 90.0

    Round abdomen   - Front   : 42.5
                     - Back   : 37.0

    Round waist   - Front   : 36.0
                     - Back   : 33.0

    Waist to hip   : 21.7

    Waist to abdomen   : 9.5

The front and back skirt was drafted together and then separated (Fig. 29).

- Draw the centre back length (1-2).

- Make the hemline (2-3) one half the complete hip measurement, and it must be at exact right angle to the centre back.

- From 3, draw the centre front length parallel to the centre back (3-4).

- The side seam length (5-6) is drawn from the centre of the hemline (5) parallel to the centre front and back.

- Join 1 and 6 and 6 and 4 for the waistline.

- Draw the level of the abdominal extension measurement (8-A-7).

- Draw the level of the hip measurement (10-B-9).

- The dotted guideline (11 and (12) will help to locate the waist darts. From the side seam, each guideline is drawn about 1/3 the measurement of 8-A and parallel to the centres.

- Divide the back waist measurement in half. Subtract this half from the length of line 1-6. Divide the difference into thirds.

    Using one-third, mark off the following darts.

    6-C from the sideseam, D-E half on each side of line 1-2. F-G about 3.5 cms away from D-E.

- Draw guideline (13) through the centre of F-G.

- Make 6-H the same measurement as 6-C. Measure the length of line H-4. Divide the front waist measurement in half. Subtract this half from the length of line H-4. Divide the difference in half. Using one half, mark off the two front darts.

    I-J, half on each side of line 11, K-L about 3.5 cms away from I-J.

- Draw guideline (14) through the centre of K-L.

- Mark off one-half the front abdominal extension measurement (7-M).

- Draw the front side seam line H-M-B. Make A-N equal to A-M.

- Draw the back side seam line C-N-B.

- To draw the back darts, subtract one half the back abdominal extension measurement from 8-N. Divide the difference in half.

- Mark off a half equally on each side of each guideline (12 and 13). O-P and Q-R are each one half the difference.

DRAFTING OF THE SKIRT WITH MODIFIED
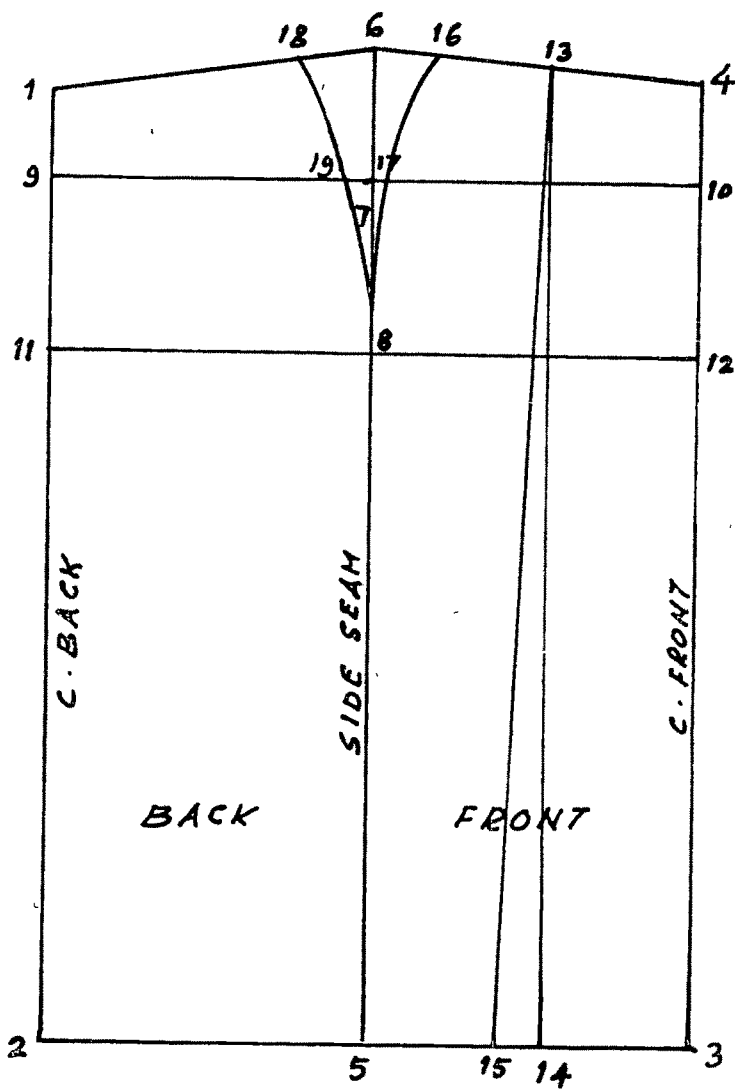## INSTRUCTIONS
SCALE - 1/5

FIG. 30

– Draw one back dart from F through O and from G through P.

Draw one back dart from D through Q and from E through R.

The above drafting was used for getting varied skirt styles with a little modifications in the instructions. The back darts were shifted and removed from the side seam line. The front darts were eliminated and the centre panel was widened at the hemline, as the seamline of the centre panel of the skirt front falls on the dart positions.

For this study, the front of fitted skirt was designed in two parts because for getting localized drape. The extra fabric was added in a form of a panel (godet) from two points that were for front dart positions. The front was thus divided into three parts, one centre piece and two side pieces.

Measurements required for drafting of the fitted skirt were same as basic skirt (Pivnick) (Page 70).

The fitted skirt with modified instructions was drafted and constructed with the following instructions: (Fig. 30)

Back and Front

1 Draw a vertical line 1-2 equal to back length.

2 Draw a perpendicular 2-3 from point 2 equal to 1/2 hip round plus 1.0 cm in length.

3 Draw a vertical line 3-4 from point 3 parallel to back length equal to front length.

4 Mark a point 5 as mid point of the line 2-3.

5 Draw a vertical line 5-6 from point 5 parallel to back length equal to side seam length.

6 Join points 1 to 6 and 6 to 4.

7 Mark points 7 and 8 from point 6 on the vertical line 5-6 at waist to abdomen level and waist to hip level respectively.

8 From point 7, draw perpendiculars towards the line 1-2 and 3-4 and mark as 9 and 10.

9 From point 8, draw perpendiculars towards the line 1-2 and 3-4 and mark as 11 and 12.

10 Mark point 13, 10.5 cms from point 4 on the line 4-6.

11 Draw a parallel line 13-14 to the line 3-4.

12 Mark point 15, 3.0 cms away from point 14 and join points 13-15 with a straight line.

13 Mark point 16, away from point 4, on the line 4-6 measuring one half front waistline.

14 Mark point 17, away from point 10, on the line 7-10 measuring one half front abdomen girth.

15 Join points 8, 17, and 16 with a curve for front side seamline.

16 Mark point 18, away from point 1 on the line 1-6 measuring one half back waistline.

17 Mark point 19 away from point 9 on the line 9-7 measuring one half back abdomen girth.

18 Join points 8, 19 and 18 with a curve for back side seam line.

19 Back piece of the skirt is 1, 2, 5, 8, 19 and 18 and 1-2 vertical line is kept on fold.

20 Front piece of the skirt is in two pieces - one centre piece and another side piece. The centre piece is 4, 3, 15, 13 and 4 and side piece 13, 14, 5, 8, 17 and 16 and are cut separately.

21 Vertical line 3-4 of the centre panel is kept on fold.

This fitted skirt was having, in all, four piece. One piece of back and three pieces of front consists of one centre panel and two side pieces. On the waistline, 1.0 cm, side seams, 2.0 cms, placket edge of centre piece, 3.0 cms, and on placket side of side pieces, 5.0 cms seam allowance was kept while cutting the skirt. Now the construction was done as per following the steps given below:

- The two side pieces of front were extended horizontally by 2.0 cms and finished with 2.0 cms wide placket.

- The back and two side pieces of front were joined from side seams.

- The waistline of the above was finished with ready 2.5 cms wide belt.

- The belt was extended by 15.0 cms on either side.

- The centre panel was finished separately with ready 2.0 cms wide placket.

- The waistline of the centre panel was finished with ready 2.5 cms wide belt.

7G

- The belt of the centre panel was extended by 5.0 cms on either side.
- On the placket, 2 sets of press buttons were stitched at a distance of 1.5 cm from the lower edge of the belt, on either side in order to close the centre front panel and the skirt.
- Another 10 sets of press buttons were stitched at a distance of 12.5 cms on either side as closer from the first set.
- In the belt, on the matching line of centre panel and side pieces, two buttonholes were made to keep the centre panel in position and to hold the weight of the panel.
- The 15.0 cms extended belt were overlapped and were hold at waistline by use of a press button.
- Two big hooks and eyes were stitched on the belt extension of the centre panel on either side.

Thus the skirt was ready for experiment of garment drape ratio, five skirts were made with five different materials which were mentioned earlier (page 51).

Initially for the experiments, for getting localized drape, the extra fabric panels were added from two points in the front. Various angles from 10° to 40° were used for panels, so also different fabrics. These angular panels were extended by 2.0 cms on both the sides for placket extension and were of 67.0 cms long. There are various methods for attachment of godets : (a) with the use of press buttons, (b) with the use of button and buttonholes and with the use of velcro. Here

press buttons are used for attaching and detaching the godets from the skirt. First set of press buttons were attached right on the starting point of the angle and other 5 sets of press buttons were stitched at a distance of 12.5 cms from the first button on both the sides. These panels were varied in the fitted skirts as needed, to have a various width at hemline with the use of press buttons the panels were made inter-changeable so the same skirt can be used for adding various fabrics and various angles of panels, to have different flare in skirts.

### 4.4.3 Determining the relative drape ratio of a draped skirts:

After construction of the skirts with different fabrics and different angle panels, these were draped. This was done on dressforms. The skirt was put on the dressform, and allowed to hang from the waist over the platform. A sheet of graph paper was placed over the platform to mark the shadow of the skirt. From the top, light falling vertically over hipline casts a shadow of the draped garment on this sheet. The shadow was then transferred on a tracing paper and was cut along the trace of the shadow outline and weighed. From the weight, area was calculated which is shadow area of a garment, and also checked from graph by counting the number of square.

For calculating the drape ratio of a garment, the formula used was:

$$\text{Drape ratio} = *\frac{\text{Shadow area of a garment}}{\text{Calculated hemline ellipse area}}$$

The above formula was obtained from the actual hip ellipse. Though the fitted skirt is worn from the waistline it actually drapes from the rounded hip and falls straight, so the fitted skirts drape ratio is a limiting value for the drape ratio.

*From the hip, ellipse dimensions (used in the preparation of dressforms), the two axes ratio was calculated (Fig. 31).
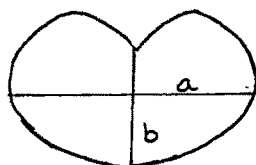
ratio 'x' = b/a

Fig. 31

Hip Ellipse Dimensions

The circumference of a garment at hem was measured and noted. For obtaining the two axes in the ellipse for the above measured circumferences an approximation

$$c = 2\pi \sqrt{\frac{a^2 + b^2}{2}}$$

was used alongwith the above ratio and new suitable 'a' and 'b' axes were calculated for different circumferences.

After calculating the 'a' and 'b' of ellipse with a particular circumference 'c' area was calculated with the use of formula:

ellipse area = π ab   'a' and 'b' = axis of the
                                            ellipse

Thus the ellipse area with a particular circumference of a garment was calculated and used in the formula. Hip area was directly calculated by counting the number of squares.

4.5 Analysis of percent drape coefficient of fabrics and drape ratio of skirts

After calculating the percent drape coefficient of fabrics and drape ratio of various skirts, the following relationships were studied with related characteristics such as :

- Stiffness versus number of nodes in the draped fabric
- Fabric percent drape coefficient versus number of nodes in the draped fabric
- Flexural rigidity of fabrics versus percent drape coefficient of fabric
- Relative drape ratio of garment versus degree of angles of panels
- Area draped under panel of garment versus degree of angles of panels.

Relationship of the above properties were shown with the help of graphs.

4.6 Determination of the relationship between garment subjective assessment and textile properties of fabrics

4.6.1 Assessment of various skirts by subjective method:

In the subjective method, the skirts were draped on the five dress forms with 10° angle panels of different fabrics,

and all possible combinations. Then three observers viewed
these skirts and answers to the following questions were
obtained. Similarly, the responses were obtained for 20°, 30°
and 40° panels:

The questions were ... which godet drapes more?

... which godet drapes least?

Answers to these questions were coded and tabulated in a
table form and ranks were given to them. The highest values
gets the 1st rank.

4.6.2 Relationship between subjective and objective assessment (Textile properties of fabrics)

The results obtained by objective assessment were ranked
and these were compared with the ranks of the objective assess-
ment. The relationship was noted. The objective assessment
results were ranked. The highest value gets the 1st rank and
lowest gets the last rank. These ranks as well as the values
of the subjective assessment and objective assessment were
compared.

4.7 Determination of aesthetic appeal for different styles of skirts

The aesthetic appeal for different skirts were studied
by the construction of skirt as per the fabrics used.

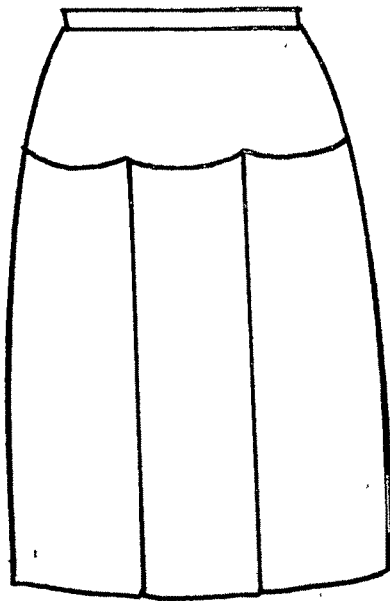## SKIRT STYLE (WITH SCALLOPED YOKE)
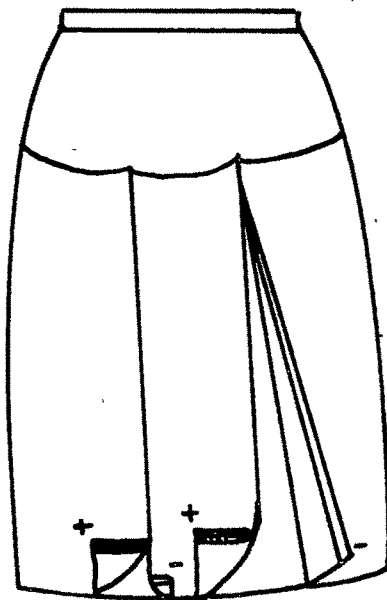

FIG. 32

PLACEMENT OF VELCRO IN A SKIRT

FIG. 33

4.7.1 Construction of the skirt:

For judging the aesthetic appeal, a skirt style (as mentioned earlier on page 73) was used, with a small modification of scalloped yoke and a princess line effect. This is shown in Figure 32. The scalloped yoke was taken upto the hipline and the lower part of the skirt hangs down upto the knee length.

The skirt has a placket in the place of princessline upto yoke. The two sides of the centre panel and side panels were folded from the stitching lines and plackets were made on either side, for fixing godets. The velcro was attached on the placket leaving 2.5 cms distance from the yoke stitch line at the wrong side of the skirt. On one side, loop of the velcro was attached and on other side hook of the velcro was attached (as shown in Fig. 33). Four skirts were thus made from four different materials.

The godets were constructed from different fabrics with different angles. Two godets were made from the same material with same angle. The godet was extended in width by 2 cms on either side for fixing velcro so that the draped angle remains same. The velcro sides which were attached to the skirt plackets, opposite to that were stitched to the godets on either side leaving 2.5 cms from the tip of the godet on right side (Fig. 34).

4.7.2 Aesthetic appeal as per fabrics used:

Different fabrics (Table 5) with various thickness were used. Thick fabrics were used for major portion of skirts while godets were constructed from both (thick and thin) materials. Different godets were constructed to obtain a different drape effects. From the theorical reviews and also from the results of the subjective assessment, thick fabrics were used for major portion of skirt and all the fabrics for the godets.

Table 5. Skirt fabrics used for aesthetic appeal.

Fabric Code
I
J
M
N

PLACEMENT OF VELCRO IN A GODET
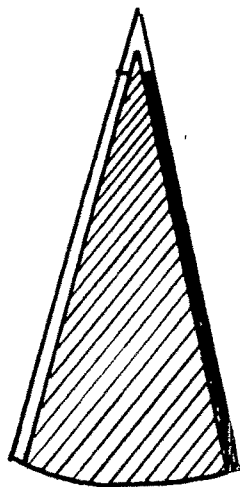

FIG. 34

PLACEMENT OF A GODET AND INTERCHAGABILITY OF PANELS
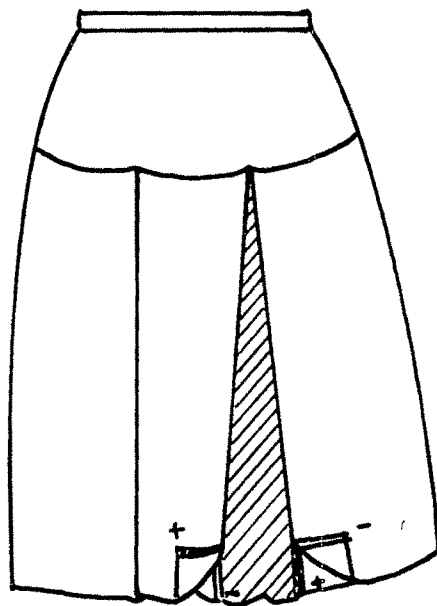
FIG. 35

Table 5a.   Godet fabrics used for aesthetic appeal.

Fabric Code		Angle of godet (°)
F	..	50
G	..	60 and 0
H	..	60 and line effect
I	..	10
J	..	20
K	..	30
L	..	50
M	..	30
N	..	40

4.7.3 Determination of aesthetic appeal for skirt style:

Four skirts and several godets were used for the judgement of aesthetic appeal. The four skirts were draped in combination with the interchangeable panels of different angles (Fig. 35) and the following questions were asked to the observers.:

- Is the style appealing? If Yes, rank according to appeal.
- Is it a fresh idea?
- Do panels add decoration? '
- Is it acceptable?

The ranks for the appeal were tabulated and total scores were calculated for each skirt and each panel fabric. The total

scores were multiplied by 1, 1/2, 1/3 and 1/4 with 1st rank
score, 2nd rank score, 3rd rank score and 4th rank score
respectively, and the total of these was considered as overall
score. The ranks 1 to 4 were on the basis of this overall
score.

Similar procedure was followed for the panel fabrics
and final ranks were calculated according to the aesthetic
appeal.