THE USE OF COMMERCIAL AND DRAFTED PATTERNS
FOR TEACHING IN HIGH SCHOOL

A PROJECT
presented to the Faculty of The Beirut College for Women
in partial fulfilment of the Requirements for the
Degree of Bachelor of Arts

by

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June, 1956
OUTLINE

I  The importance of making a dress.

II The use of commercial patterns in dress making.

III Points that should be taken into consideration in buying a commercial pattern.
   A. Basic body measurements.
   B. Pattern measurements.
   C. Pattern size.

IV What to watch in the pattern.
   A. Different measurements as compared to body measurements.
   B. Pattern symbols and markings.
   C. How to place pattern pieces on the material.
   D. How to cut.

V A comparison between four different patterns of the same size: "Simplicity", "McCall's", "Vogue", and "Jardins des Modes", in
   A. Measurements.
   B. Directions.
   C. Ease of use.

VI Pattern Alteration.
   A. Body measurements needed for alteration.

VII Pattern Drafting.
   A. Basic body measurements needed.
   B. Variations.

VIII Alteration of one small size "Simplicity" pattern and one large size "Simplicity" pattern, to suit my body measurements.
My girl friend, lady, and housemother:

Many times you have stopped to think of how many clothes you have, of how much time you have spent selecting your clothes, and of the amount of money you have spent on having them made at the dressmaker. And, so many times you feel happy about it, you feel you are getting great satisfaction from wearing a nice fitting dress that suits you and gives you the appearance and the personality that you wish to have.

But, have you ever stopped to think of how much this is costing you, such as your time in going and coming to the dressmaker, that you should be spending in preparing your school work, or in attending a good lecture, or reading some beneficial books, the time that you need to spend with your children and husband at home and in preparing their meals and other things. Have you ever tried to think of a way whereby you can save your time, energy, and money from dressmaking and still get the same satisfaction? Have you thought of learning how to make your own dress by drafting your own pattern at home using your own hands, machine, and sewing equipment, or, using instead a ready made pattern for your own size with all directions of sewing and fitting written completely and clearly on it, that, you need no more than read the directions, following them in cutting the material on the pattern and fitting it on your body.

If you haven't thought of it, think of it now and try to make one dress by yourself, and feel the double satisfaction that you get. When you see it ready and well fitted on you, and here are a few directions and points that help you in drafting your own pattern, and in selecting the ready made pattern to fit your size and taste, and to give you the type of personality that fits you.

Ready made patterns are available on the market in different sizes and styles that are becoming and suitable to different types of personalities and figures. They are easy to use, inexpensive, and require much less time than the drafted patterns. Before buying the pattern be aware of your personality type, the design and lines that fit your figure, and your own body measurements as follows:

1. **Bust measurement**: Take it over the fullest part of the bust.
2. **Waist**: Take it around your natural waistline.
3. **Hips**: Measure around the largest part of your hips; usually 7 in. (17.5 cm.) below the natural waistline.
4. **Width across the back**: Measure from armhole to armhole, on the narrowest part of the shoulders. Pull your arms forward when measuring.
5. **Width across the chest**: Measure from armhole to armhole about 4 in. (10 cm.) below the highest part of the shoulder.
6. **Waist length**: From the prominent bone on the back of the neck to the natural waist-line.
7. **Length of dress**: From the prominent bone on the back down to the desired length you want for your dress, allowing for hem.
8. Length of skirt: Measure from natural waistline instead from the prominent bone of the neck.

9. Sleeve length: Measure from top of the armhole to the wrist while your arm is bent. Underarm seam should be measured from the bottom of the armhole to the wrist.

After knowing your basic body measurements compare them with the pattern basic measurements which are usually written on the back of the pattern as follows in this example:

<table>
<thead>
<tr>
<th>Size</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bust</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>36</td>
</tr>
<tr>
<td>Waist</td>
<td>23 1/2</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>30</td>
</tr>
<tr>
<td>Hip</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In buying a blouse pattern compare your bust measurement with those of the pattern. In buying a skirt compare your waist and hip measurements with those of the pattern. In buying a dress compare your bust and hip measurements with those of the pattern.

Use of the Pattern:

After you have chosen the size and design of pattern that fits you:

1. Open the pattern envelope.
2. Mark the style or view that you want to make, on the pattern.
3. Study the direction sheet that is found in the envelope, that gives you full information about the different pieces of the pattern, how they should be placed on the material, and how to cut and make the garment step by step.
4. Choose the pattern pieces of the view you want to make, mark them and put them aside so as not to confuse them with the other pieces.
5. Pin your pattern pieces of the back, front, sleeves, and skirt, together, try them on and see if they fit you or if they need any alterations such as in length, width, narrowness, or fullness. Make the necessary alterations using the directions that are given on page as a guide.
6. Before placing the pattern on the material watch the different directions and markings of the pattern that help you in placing the pattern on the material in the correct way:

a. The notches (V shaped) along the edges indicate which edges should be placed together for basting. The No. of the notches helps one put the pieces together. For example, notch 3 in the blouse front is put on notch 3 in the blouse back.

b. Perforations which are on some patterns in holes or on others in dotted lines indicate seam allowances, darts, pleats, placement of pocket or of trimming, sections to be gathered, etc.
c. Solid lines around the pattern indicate cutting lines.
d. The solid line in the shape of an arrow usually indicate the grain line of the fabric.
e. Solid lines on centers of pieces indicate the placement of the piece on fold.

These are a few examples of the different common markings or guides of the pattern; however, they differ in meaning from one pattern to another. So, be sure to read the meaning of different markings of each pattern by itself before placing the pattern on the material. After you have studied the pattern directions completely and you are very sure of yourself, place the pattern pieces on the material following the way of placing each piece, as shown on the sheets of directions. Pin the pieces on the material.

It is advisable to pin all pattern pieces at the same time on the material, so as to be a hundred percent sure that you have enough material for every piece. After that, cut.
A comparison between the same size 13 patterns of "Simplicity", "McCall's", "Vogue", and "Jardin des Modes", size 40 in directions, price, measurements, ease of use, and as compared to my own measurements:

<table>
<thead>
<tr>
<th>Name of Pattern</th>
<th>Simplicity Price</th>
<th>McCall's Price</th>
<th>Vogue Price</th>
<th>Jardin des Modes Price</th>
<th>My Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurements:</td>
<td>250 L.P.</td>
<td>250 L.P.</td>
<td>200 L.P.</td>
<td>200 L.P.</td>
<td></td>
</tr>
<tr>
<td>Bust:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>18 in.</td>
<td>18 in.</td>
<td>18 in.</td>
<td>18 in.</td>
<td>19 in.</td>
</tr>
<tr>
<td>Back</td>
<td>17 in.</td>
<td>17 in.</td>
<td>16 1/2 in.</td>
<td>18 in.</td>
<td>16 in.</td>
</tr>
<tr>
<td>Chest width</td>
<td>14 1/2 in.</td>
<td>14 in.</td>
<td>14 1/2 in.</td>
<td>15 in.</td>
<td>14 in.</td>
</tr>
<tr>
<td>Back neck seam</td>
<td>6 in.</td>
<td>5 1/2 in.</td>
<td>7 in.</td>
<td>6 1/2 in.</td>
<td>6 in.</td>
</tr>
<tr>
<td>Upper back width</td>
<td>15 in.</td>
<td>15 in.</td>
<td>15 in.</td>
<td>16 in.</td>
<td>15 in.</td>
</tr>
<tr>
<td>Width across</td>
<td>14 in.</td>
<td>14 1/2 in.</td>
<td>14 1/2 in.</td>
<td>15 in.</td>
<td>14 1/2 in.</td>
</tr>
<tr>
<td>Shoulder blades</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House length:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center front</td>
<td>14 in.</td>
<td>14 in.</td>
<td>14 in.</td>
<td>14 in.</td>
<td>14 1/2 in.</td>
</tr>
<tr>
<td>Center back</td>
<td>16 1/2 in.</td>
<td>16 in.</td>
<td>17 in.</td>
<td>15 in.</td>
<td>16 in.</td>
</tr>
<tr>
<td>Over bust</td>
<td>16 in.</td>
<td>16 in.</td>
<td>17 in.</td>
<td>15 1/2 in.</td>
<td>16 in.</td>
</tr>
<tr>
<td>Over shoulder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over shoulder blades</td>
<td>15 1/2 in.</td>
<td>15 in.</td>
<td>16 in.</td>
<td>15 in.</td>
<td>15 in.</td>
</tr>
<tr>
<td>Armhole depth</td>
<td>9 1/2 in.</td>
<td>9 1/2 in.</td>
<td>9 1/2 in.</td>
<td>8 in.</td>
<td>9 in.</td>
</tr>
<tr>
<td>Shoulder length</td>
<td>7 1/2 in.</td>
<td>7 1/2 in.</td>
<td>8 1/2 in.</td>
<td>7 in.</td>
<td>7 in.</td>
</tr>
<tr>
<td>Underarm length</td>
<td>7 1/2 in.</td>
<td>7 in.</td>
<td>8 1/2 in.</td>
<td>8 in.</td>
<td>7 1/2 in.</td>
</tr>
<tr>
<td>Shoulder length</td>
<td>5 in.</td>
<td>5 in.</td>
<td>5 in.</td>
<td>5 in.</td>
<td>4 1/2 in.</td>
</tr>
<tr>
<td>Sleeve length:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeve to wrist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short</td>
<td>short sleeves</td>
<td>short sleeves</td>
<td>23 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elbow to wrist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short</td>
<td>short sleeves</td>
<td>short sleeves</td>
<td>6 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder cap length</td>
<td>5 in.</td>
<td>5 in.</td>
<td>5 in.</td>
<td>Sleeveless</td>
<td></td>
</tr>
<tr>
<td>Sleeve width</td>
<td>13 in.</td>
<td>13 in.</td>
<td>13 in.</td>
<td>13 in.</td>
<td></td>
</tr>
<tr>
<td>Elbow</td>
<td>No elbow</td>
<td>No. elbow</td>
<td>11 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waistline:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>13 in.</td>
<td>14 in.</td>
<td>14 1/2 in.</td>
<td>13 in.</td>
<td>13 in.</td>
</tr>
<tr>
<td>Back</td>
<td>13 in.</td>
<td>14 in.</td>
<td>12 in.</td>
<td>13 in.</td>
<td>13 in.</td>
</tr>
<tr>
<td>Hips:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>20 in.</td>
<td>20 in.</td>
<td>Full</td>
<td>18 in.</td>
<td></td>
</tr>
<tr>
<td>Back</td>
<td>24 in.</td>
<td>24 in.</td>
<td>Skirt</td>
<td>20 in.</td>
<td></td>
</tr>
<tr>
<td>Waistline to hips</td>
<td>7 in.</td>
<td>7 in.</td>
<td>7 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skirt length:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center front</td>
<td>32 in.</td>
<td>32 in.</td>
<td>32 in.</td>
<td>32 in.</td>
<td>32 in.</td>
</tr>
<tr>
<td>Center back</td>
<td>32 in.</td>
<td>32 in.</td>
<td>32 in.</td>
<td>32 in.</td>
<td>32 in.</td>
</tr>
<tr>
<td>Left side</td>
<td>32 1/2 in.</td>
<td>32 1/2 in.</td>
<td>32 1/2 in.</td>
<td>32 1/2 in.</td>
<td>32 1/2 in.</td>
</tr>
<tr>
<td>Right side</td>
<td>32 1/2 in.</td>
<td>32 1/2 in.</td>
<td>32 1/2 in.</td>
<td>32 1/2 in.</td>
<td>32 1/2 in.</td>
</tr>
</tbody>
</table>
As to directions and ease of use they compare as follows:

**Simplicity Pattern:**

1. Inside the pattern there is a sheet of paper with full directions of procedure to be followed in cutting, basting, and fitting.
2. It includes a complete cutting lay out for all pieces of the pattern considering the different widths of the piece of material.
3. Perforations of the pattern pieces and their meanings are well explained in a simple language with simple-to-understand directions, on the sheet of directions as well as on the different pattern pieces.
4. Directions for altering pattern pieces are written on the sheet of directions as well as marked on the pattern pieces themselves.
5. Easy and time saving directions of how to proceed in sewing the different pattern pieces together are found.

**McCall's Pattern:**

The pattern includes a sheet of directions for the use of the pattern.

1. A cutting lay out with complete details considering the differences in the width of the material.
2. Directions for cutting, basting, and finishing are too detailed. They are not as simple to understand as the Simplicity ones, although they are, as in the Simplicity pattern, shown and demonstrated in sketches.
3. Notches and pattern markings are not very well explained on the sheet of directions. However they all appear on the pattern pieces with their meaning.
4. Adjustments of the pattern pieces to your body measurements and ways of altering them, are shown in sketches with short explanation details.

**Vogue Pattern:**

The pattern includes a sheet of directions for the use of the pattern. This sheet includes:

1. A cutting lay out.
2. Meaning of different perforations. However, different from Simplicity and McCall's patterns, the perforations are not explained on the different pattern pieces. All markings are round perforated holes which make it confusing to the eye to see and understand.
3. Directions for cutting, basting, and finishing are all shown and demonstrated in sketches on the sheet of directions.
Directions for alteration are written on the direction sheet but are not marked on the pattern pieces themselves, as they are marked on Simplicity and McCall's patterns.

Unlike the other, pattern sheets of directions, Vogue's sheet includes an explanation and a guide for the care of the different kinds of material, that should be taken before cutting.

Jardin des Modes:

1. The pattern pieces are without seam allowances.
2. As Vogue Pattern, the perforations are round perforated dots that are confusing and take a long time for one to understand them.
3. The sheet of directions has a full detailed directions of a cutting layout, of cutting, basting, and fitting.
4. The directions are complicated and require a long time to understand. They require the person herself who is using the pattern to write the different directions on the pattern pieces.
5. It says, alter after you cut which is very wrong. Alteration must be made before cutting the different pattern pieces on the material.
6. Demonstrations for cutting, basting, and finishing are not shown in sketches on the sheet of directions.
7. In general the directions are brief and complicated.

As a conclusion for my comparison, I recommend Simplicity Pattern to be used for high school students as it is the simplest, the least time consuming and the most accurate measurements as compared to my body measurements.

As for sizes and the different measurements, "Simplicity", "McCall's", and "Vogue" patterns have nearly the same measurements. The French pattern "Jardin des Modes" has a slightly smaller measurements than the other patterns of its same size.
DRAFTING
at the
BASIC PIECES
of
PATTERN
With Different Variations.
Body measurements needed for drafting of basic patterns.

1. From neck to waist, to hip, to hem.
2. Between shoulders.
3. Around bust.
4. Waist line.
5. Hip line.
7. From shoulder to bust.

In the following drafted patterns I have followed my own measurements which are as follows:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>42 cm</td>
<td>38 cm</td>
<td>89 cm</td>
<td>66 cm</td>
<td>93 cm</td>
<td>13 cm</td>
<td>25 cm</td>
</tr>
</tbody>
</table>
Drafting Directions For Basic Pattern For blouse front

1. Draw line AB lengthwise (measurement 1).
2. Mark point C on line AB (measurement 7).
3. Draw dotted line DA extending ⊥ to AB at left of AB for 8 cm.
4. Draw dotted line DE ⊥ to DA extending downward 10 cm.
5. Draw solid curved line AE to show shape of neckline.
6. Draw line AF (measurement 6 + 3 cm.) slanting so point F is 2 cm. lower than point A.
7. Draw solid line EI // to AB with point I directly opposite point B. Mark G on line EI directly opposite point C on AB.
8. Extend line GC to equal ½ measurement 3 plus 2 cm. stopping at H.
9. Extend IB to equal ½ measurement 4 + 2 cm. stopping at J.
10. Mark point P to the right of point B 2 ½ cm. to the right, on line LJ. Mark point Q 3 cm. from point P on line LJ.
11. Mark point O 12 cm. above line LJ and exactly in the middle between points P & Q. Join L P and Q to form a dart.
12. Extend line LJ 3 cm. to the right, stopping at point M.
13. Draw dotted line JH and extend it 4 cm. to point L.
14. Draw solid line ML.
15. Mark point S 4 cm. to the right of point C on line GH.
16. Mark point R 4 cm. to the right on line AF. Mark point T 3 cm. from point R on line AF. Join angle RST to form the shoulder dart.
17. Draw curved line FL for the armhole.

Certain Important Sequences:

1. O and S must be directly opposite each other.
2. The armhole curve must be well curved.
Bodice Front
Directions For Basic Pattern For Back

1. Draw line AB lengthwise (measurement 1).
2. Draw point C on line AB (measurement 7).
3. Draw dotted line DA extending ⊥ to AB at left of AB for 6 cm.
4. Draw dotted line DE ⊥ to DA extending downward 3 cm.
5. Draw solid curved line AE to show shape of neckline.
6. Draw line AF (measurement 6) slanting, so point F is 2 cm lower than point A.
7. Draw solid line EI // to AB with point I directly opposite point B.
   Mark point G on line EI directly opposite C on line AB.
8. Extend line GC to equal ½ measurement 3 stopping at point H.
9. Extend IB to equal ½ measurement 4 stopping at point J.
10. Mark point K 5 cm. right of point B on line L.
11. Mark point M 3 cm. to right of point J on line L.
12. Mark point 0 10 cm. above line BK and exactly in the middle between points B and K.
   Join L BOK to form a dart.
13. Draw dotted line JH and extend it 4 cm. more to point L.
14. Draw solid line ML.
15. Draw curved line FL for armhole.
Bodice Back
Underarm Dart

1. Draw around part of the basic blouse pattern as follows:
   Begin drawing at first point of shoulder dart from neck, (draw towards the neck stopping at the point where underarm dart is to start, as seen on your design and marked on your basic pattern).

2. Using breast point as focal point turn basic pattern so that second point of shoulder dart lies directly on top of first point.

3. Continue drawing around basic pattern (armhole over) to point where underarm dart is to start as marked on basic pattern.

4. Remove the basic pattern, and join two points at underarm to breast point forming new dart.

5. Straighten shoulder line and extend underarm lines so that a slight hump is formed at the center of the dart end points.

6. Draw 2 cm. seam allowance and grain line.
Grain line: - to place straight on fabric and always // to the center front.
Underarm Dart

Place on Fold
Grain Line

J
M
L
Added Neck Fullness

1. Be sure center front of basic pattern is on lengthwise grain line. Draw around basic pattern (except neckline) closing the shoulder dart. The shoulder dart should be closed by rotating basic pattern towards armhole using breast point as the focal point of the rotation.

2. Close neckline and mark position of gathers. Gathering is indicated by using a dotted line.

3. Extend width of pattern at center front 2 cm. or more if your design shows more fullness in front.

4. Existence of waist line dart is determined by your design. If blouse is fitted at the waist the existing dart should be enlarged or an additional dart added. If blouse is loosely designed at waist, then all darts may be eliminated.

Gathers are marked like this ————-
**Button Holes**

1. Decide length of each button hole and distance between each button hole.
2. Mark lines of button hole ⊥ to the center front of blouse.
3. Add 1 ½ cm. of material for extra width outside the center front in order to strengthen button holes.
4. Add 2 cm. seam allowance.
Button Holes
Drop Shoulder

1. Draw around basic pattern for the back.
2. With shoulder dart of front basic pattern closed, add a portion of the front shoulder to the back shoulder pattern. Add amount portion as indicated in the design.
3. Draw around center front \( \frac{1}{2} \) of remaining front.
4. Move basic pattern away from center waist straight. When moving the basic pattern allow extra width for the bodice front shoulder to give you the desired amount of fullness as shown in your design.
5. Draw around armhole half of pattern.
6. Draw continuous shoulder line at top of remaining front.
7. Mark gathers.
8. Mark button holes.
Drop Shoulder

1. Add a seam allowance.

2. When drafting the bodice, adjust the shoulder seam to create a drop shoulder effect.

3. Measure the desired drop and adjust the pattern accordingly.
Gibson Float

1. On thin sheet of paper draw around basic pattern. Do not indicate angle at shoulder dart.
2. Mark width of shoulder dart on shoulder, ending at armhole instead of original position.
3. Fold thin paper to form pleat over armhole with point of shoulder dart (as changed in #2) meeting. Float might cover seam of armhole in front or slant somewhat towards center front. This is determined by your design. While folded cut out paper pattern.
4. Mark fold lines, then unfold thin paper pattern.
5. Place thin paper pattern on square paper. Draw around it. Mark fold lines on square paper pattern. If a slight hump exists in shoulder seam leave it there for additional material is necessary for correct pleat.
6. Draw seam allowance, and grain line on square paper pattern.
7. Remove thin paper.
Gibson Pleat
The Yoke

1. Draw around basic pattern on thin paper. Change shoulder dart to underarm dart if such a dart is shown in your design. If there is no dart in your design simply close shoulder dart.

2. Draw line for yoke as seen in your design.

3. Cut thin paper pattern apart on that line. Mark grain line on each piece.

4. Place pattern pieces on square paper so that grain lines are in correct position. Draw around thin paper pieces.

5. Remove thin paper pattern pieces, mark grain line and seam allowance around each piece.

6. If there is fullness in lower section of blouse follow directions 4 and 6 for "Drop Shoulder". Mark gathers.
Yoke

Place on fold

Top of yoke
Basic Sleeve

1. Draw line AB // to grain line, the length of your arm.
2. Mark point C 16 cm. below A on line AB.
3. Draw line DE ⊥ to line AB.
   DC = 19 cm.   CE = 19 cm.
4. Draw line FBG ⊥ to line AB.
   FB = 16 cm.   BG = 16 cm.
5. Join AE in slight curve for back.
6. Join AD in deeper curve for front.
7. Draw line EG. On line EG mark point H 22 cm. down from point E.
   Mark I 4 cm. from point H.
8. From point H go in 10 cm. and mark O directly between H and I.
   Join L H O I.
9. Extend EG 4 cm. below G to K.
   Join line HK.
   Join point DF.
10. Mark grain line.
Basic Sleeve Pattern

from point H and I.
Sleeve Width Fullness at Wrist

1. Draw around wrist basic pattern (eliminating dart) on thin paper.

2. Cut thin paper in strips /\ to grain line and spread strips on equal distance from each other at the wrist. Be sure top of sleeve remains the same length as the basic sleeve in order that the new sleeve will fit in the arm hole of the original blouse.

3. Pin the spread pattern on square paper so that grain lines are in correct position.

4. Draw around thin paper pattern. Remove thin paper pattern. Mark grain lines, gathers and seam lines on square paper pattern.
Sleeve With Fullness at Wrist
Japonaise Sleeve

1. If you have shoulder dart go on with the following directions. If underarm dart - change to underarm on basic pattern first.

2. Draw around basic blouse pattern, except armhole on square paper.

3. Extend the shoulder seam line the length of the sleeve on your diagram.

4. Draw a line ⊥ to the extended shoulder seam beginning at point where sleeve will end.

5. Draw a line // to shoulder seam, starting at a point 2 cm. below the original top of the side seam. Mark curve under arm.

6. Draw seam allowance and button holes (if shown on the design).
Japonaise Sleeve

Directions:

1. Square paper.
2. Place on your design. Tracing at point
3. Cut 2 cm. below

(trace design).
Basic Collar Pattern

1. Draw vertical line $AB$ on the squared paper which will be center back lengthwise grain line of all collars.

2. With center back of basic pattern for blouse back lying on line $AB$, draw around neckline and shoulder with dotted line.

3. Match blouse from basic pattern to back on the shoulder line with two patterns meeting at neck edge and overlapping $2\frac{1}{2}$ cm. at armpit edge. Draw around neckline of front.

4. Make collar 8 cm. wide using line drawn in direction $\# 2$ and $\# 3$ as neck edge of collar. Draw outer edge being sure four corners of collar are right angles and collar is same width all around.

5. In order to make collar variation based on the above basic collar pattern draw carbon copy of the basic collar pattern on heavy paper. Mark grain line.

6. Cut heavy paper pattern on lines parallel to center back. Cut from outer edge of collar to neck edge but not through it.
BASIC Collar Pattern

A

8
Shawl Collar

1. Draw around basic pattern for blouse front changing shoulder dart to underarm dart.
2. Mark positions of button holes as in the design.
3. Add 1 1/2 cm. of material outside center front the full length of center front.
4. Draw dotted line from outside edge of added material along center front at top button hole position to neck edge of shoulder. Extend this line 7 cm. beyond shoulder.
5. Draw a line ⊥ (perpendicular) to this extension, 8 cm. long.
6. Shape collar according to design from extension returning to point of top button hole position.
Peter Pan Collar Baby

1. Overlap strips of heavy paper basic collar pattern which have been cut at outer edge to make pattern less curved. This causes collar to roll higher on the neck.

2. Draw around this on squared paper with center back of collar directly on line AB as drawn for basic collar pattern.
Peter Pan Collar Baby
Straight Grain Collar

1. Overlap cut strips of heavy paper basic collar pattern so that neck edge is a straight line and outer edge is parallel to neck edge. This will stand high on neck.

2. Draw around this on squared paper with CB center back of collar directly on line AB as drawn for basic collar pattern.

3. Add point at end of collar as shown in design.
Straight Grain Collar

Pattern so that this is parallel to the grain of the cloth.

Focus on the collar of the dress pattern.
Mandarin Collar

1. Overlap strips of heavy paper basic collar pattern which have been cut at outer edge, so neck edge makes a curve in opposite direction. Make collar 4 cm, wide. This will stand up very straight and not roll at all.

2. Draw around this on square paper with central back of collar directly on line AB as drawn for basic collar pattern.
Basic Skirt Pattern For Front

1. Draw straight line AB (measurement 1 from waist to hem).
2. Mark point C on line AB, 17 cm. from A.
3. Draw line CD (¼ measurement 5).
4. Draw DF parallel to CB, with point F directly opposite point B.
5. Draw line EF. Extend point F 5 cm. to G.
6. Draw a line 2 ½ cm. directly above G to W.
7. Draw a gently curved line BW.
8. Draw a straight line AE (¼ measurement 4 + 2 ½ cm.).
9. Draw line EX 2 ½ cm. above E.
10. Join points A and Y with a gently curved line.
11. Join W with a gently curved line.
12. Mark point S 10 cm. from A on line AY.
    Mark point T 2 ½ cm. from S on line AY.
    Mark 0 10 cm. below ST and exactly in the middle between S and T.
    Join angle S 0 T.

P.S. For the back pattern follow the same directions as for front except that lengthen the dart to 14 cm. instead of 10 cm.
. Box Pleat and Kick Pleat

I Added material to basic Pattern
1. Draw around basic skirt pattern for front.
2. Draw 10 cm. extension line along center front.
3. Draw a line cutting the middle of the 10 cm. extension line parallel to both lines.

II Set in material
1. Draw around basic skirt pattern for front.
2. Draw 5 cm. extension line along center front. Call it line AB.
3. Mark point Y 32 cm. above B.
4. Extend point B. 2 cm. to point X.
5. Join YX.
6. Draw cross wise line AB 10 cm.
7. Draw a line CD cutting the 10 cm. line, down to the required length of the skirt.
8. Draw a line parallel to CD starting from point A down to point directly opposite point D.
9. Draw a line parallel to CD from point E down to point F directly opposite D.
10. Join EDF with a straight line.
11. Mark point Y 32 cm. from point F on line BF.
12. Extend line EF 2 cm. from point F to point X.
13. Join YX.
14. Mark point Y' 32 cm. from point E on line AB.
15. Extend line FE 2 cm. from E to point X'.
16. Join Y'X'.
Box pleat and Kick pleat

I added material to basic pattern
Box pleat and kick pleat

Set in material
Trousers Pleat

1. Draw on thin paper around the basic skirt pattern.
2. Draw a curved line from the point where the dart starts to the side seam.
3. Cut along this line. Move the upper part away from the lower part by 6 cm.
4. Trace on square paper.
Four Gore Skirt

1. Draw around basic pattern with dart closed.
2. On line AB of the basic pattern mark point C 17 cm. from A.
3. Draw CD (1/2 measurement 5).
4. Add the flare at W according to design to point Z.
5. Extend YD to Z.
Four Gore Skirt
Six Gore Skirt

1. Draw on thin paper around basic skirt pattern; mark the dart.
2. Draw a line ST parallel to center front, beginning at the dart and extending down to the bottom of center front.
3. Cut along line ST, cutting the dart.
4. Trace on square paper.
5. Add a flare as required for design, on the side seam of the piece of pattern of the center front.
6. Add a flare on both side seams of the second piece of pattern. This would be the side piece.
Six Core Skirt
Circular Skirt

1. Draw line AB. (length of skirt).
2. Draw line BC. (same length as AB).
3. Mark the radius on both lines AB and BC.
   Radius = \( \frac{\text{waist}}{2 \pi} \)  
   \( \pi = 3.14 \)
   BX is the radius on line AB
   BY is the radius on line BC.
4. Draw the radius line XY.
5. Add the distance from B to X on line XA at A to X'.
6. Add the distance from B to Y on line YC at point C to Y'.
7. Join X' Y' in a curved line.
Circular Skirt
PATTERN

ALTERATION.
Pattern Alterations

In the sketches showing how to alter the pattern:

1. Broken lines inside the pattern mark cutting lines.
2. Green areas within the pattern show where the pattern has been enlarged.
3. Broken lines outside the pattern mark the parts to be trimmed off (jog).
4. Solid lines indicate the altered pattern.

Note: All information and sketches are taken from the pamphlet "Pattern Alterations", Farmers' bulletin No. 1968 - U.S. Department of Agriculture.
Basic Pattern Measurements
Used for Pattern Alterations.

1. **Bust Measurement:**
   a. **Bust Front:** Measure between the center front and the side seam, 2 in. (5 cm.) below the armhole seam line.
   b. **Bust Back:** Same measurement as the bust front applied to bust back.

2. **Chest Width:** Measure from the armhole seam line to the center front, 6 in. (15 cm.) below the shoulder seam at neck.

3. **Back Neck Seam:** Measure in a curve way along the neck seam line.

4. **Upper Back Width:** From Center back straight across the armhole seam line.

5. **Width Across Shoulder Blades:** From center back to armhole seam line, 7 in. (15.5 cm.) below the shoulder seam at neck line.

6. **Blouse Length Center Front:** From neck seam line to waistline, along center front perforations.

7. **Blouse Length, Center Back:** From neck seam line to waistline along center back.

8. **Blouse Length Over Bust:** From middle of shoulder seam line to waistline.

9. **Blouse Length Over Shoulder Blades:** From middle of back shoulder seam line to waistline.

10. **Armhole Depth:** Measure on blouse back from shoulder seam line at neck to bottom of armhole seam line.

11. **Shoulder Height:** From top to bottom of armhole seam line at the blouse back.

12. **Underarm Length:** From armhole seam line to waistline on blouse back.

13. **Shoulder Length:** Measure on front blouse between seam perforations of the shoulder. If the front shoulder is gathered, measure on the blouse back.

14. **Sleeve Length:** From top of shoulder perforations to bottom of hem or seam line, following straight of goods perforations.

15. **Sleeve Gap Length:** From top of shoulder perforations straight down to bottom of armhole seam.
16. Sleeve Width: Between underarm seam lines of sleeve at same distance from top of armhole.

17. Elbow: From middle of elbow fullness to a point half way between matching notches on opposite seam line.

18. Waistline: Follow waist curve and seam perforations. Measure both back and front. If waist is gathered, measure the belt.

19. Hips: Measure at exactly the same distance from waistline that your own hip measurement was taken. Measure in a curved line with an even distance from the waistline.

20. Skirt Length: From waistline to hem perforations - at center front, center back, and sides.
Blouse Pattern Too Short Or Too Long

1. Indicate on your blouse pattern where the bust line is. The bust line is usually 5 cm. below the bottom of the armhole edge.

2. Draw a straight line at right angles to the line that marks the straight of the goods on the pattern, just below the bust line, Fig: 1-A.

3. Cut along this line

4. If pattern is too short, spread the cut pieces over a piece of paper to the length you need. Pin them on the paper. Fig: 1-B.

5. If pattern is too long, lap the pieces to shorten them to the length needed. Fig: 1-C.

6. Be very sure to add or lap the same amount in the blouse back, following the same procedure.
Blouse pattern too short or too long

Fig: 1-A
Bustline

Fig: 1-B

Fig: 1-C
Front Of Blouse Pattern Too Short

1. If you have a large bust in proportion to your body you might find that the pattern fits you on the bust and the underarm seam, but is too short from shoulder to waistline.

2. To alter the pattern, lengthen the entire front blouse and take the extra length that occurs at the underarm seam in an underarm dart.

3. Mark your bust line 5 cm. below the bottom of the armhole.

4. Draw a line from the center front edge to the underarm edge, just below the bust line. Fig: 2-A.

5. Draw lengthwise lines at the cutting line for matching. Fig: 2-A.

6. Cut the crosswise line.

7. Move section b away from section a to the needed length. Fig: 2-B.

8. Make the underarm dart. Fig: 2-C.
Front of blouse pattern too short

Fig: 2-A

Fig: 2-B

Fig: 2-C
Front Of Blouse Pattern Too Long

I

Pattern too long from shoulder to bust

1. Mark your bust line on your pattern, 5 cm. below the bottom of the armhole line.
2. Mark the half way distance between shoulder line and bust line.
3. Draw a horizontal line on the half way point starting from center front edge to armhole edge. Fig: 3-A.
4. Cut the line.
5. Lap section b over a until you get the right length. Fig: 3-B.
6. If the pattern has a shoulder dart use the dart perforations in section a as a guide for making a new dart.
7. Extend the front edge of section a up to the neck line and cut off the jog. Fig: 3-B.

II

Pattern too long from bust to waistline

1. Mark your bust line on your front blouse pattern 5 cm. below the bottom of the armhole line.
2. Draw a crosswise line at the bust line. Fig: 3-C.
3. Cut along this line.
4. Lap section b over a. Fig: 3-D.
5. Extend the front edge of section a down to the bottom of section b. Fig: 3-D.
6. Cut off the corner.
7. Extend the underarm line of section a down to the waistline.
Front of blouse pattern too long

Pattern too long from shoulder to bust

Pattern too long from bust to waistline
Shoulders Of Pattern Too Wide Or Too Narrow

I

To widen the shoulder:

1. Draw a point C on the shoulder seam about 7 1/2 cm. in from the armhole. Fig: 4-A.
2. Mark a point D 3 1/2 cm. above the level of the bottom of the armhole and directly opposite the first point. Fig: 4-A.
3. Join A and D with a straight line; extend the line to the armhole edge. Fig: 4-A.
4. Cut along these lines almost to the armhole edge.
5. To widen the shoulder spread the cut edges apart as shown in Fig: 4-B.

II

To narrow the shoulder:

1. Lap section a over section b, the amount needed to give you the needed length. Fig: 4-C.
2. Make a new shoulder line from the neck line to the top of the armhole.
3. Be sure to alter the back and the front exactly the same way and the same amount.
Shoulders of Pattern too wide or too narrow

Fig: 4 - A

Fig: 4 - B

Fig: 4 - C
Shoulders Of Patterns Too Sloping

1. Mark point A 2 ½ cm. down from the shoulder, on the back armhole seam. Fig: 5-A.
2. Mark point B directly below the high point of the shoulder and directly opposite A. Fig: 5-A.
3. Join points A and B. Fig: 5-A.
4. Draw a line from point B to the shoulder edge parallel to the center back. Fig: 5-A.
5. Cut on these lines almost to the shoulder edge.
6. Raise section b away from a to lengthen the armhole. Fig: 5-B.
7. Draw a new armhole line between sections a and b, cutting off the jog. Fig: 5-C.
8. Raise the front shoulder the same amount.
Shoulders of pattern too sloping
Neck Line Of Pattern Too Large

1. Pin a strip of white or colored paper flat to the neck pattern on both front and back.

2. Draw a line from the pattern edge on even distance from the neckline to make it smaller. Fig: 6-A.

3. Mark the original neck seam line on the cloth when you cut it, so as to use it as a guide in fitting and finishing the neck.
Neck line of pattern too large

Fig: 6-A
Shoulders And Chest Of Pattern Too Wide

1. Mark point A 7 1/2 cm. from top of the armhole at the shoulder seam. Fig: 7-A.

2. Mark point B 3 1/2 cm. down from the level of the bottom of the armhole, directly opposite point A. Fig: 7-A.

3. Join A and B with a straight dotted line parallel to the center front. Fig: 7-A.

4. Draw a dotted line at right angles to the first line starting from point B to point C, at the underarm side seam. Fig: 7-A.

5. Cut along these lines almost to point C.

6. Lap section b over section a until the shoulders and the chest are of the nearest or same measurements as yours. Fig: 7-B.

7. Draw a new shoulder line from the neck to top of the armhole.

8. If the dress is still too wide when you fit your dress, you can trim off a little in the front of the armhole.

9. Try the back pattern. If the back shoulder seam of the pattern is now more than 1 1/2 cm. longer than the front shoulder seam, narrow it just as you did the front, following the same procedure.
Shoulders and Chest of Pattern too Wide

Fig: 7-A

Fig: 7-B
Bust Of Pattern Too Small

1. Draw a line from the waistline parallel to center front, to a point A about 2½ in. above the level of the bottom of the armhole. Fig: 8-A.

2. From A draw a line at right angles to the first line, over to the armhole edge to point B. Fig: 8-A.

3. Cut along these lines almost to the armhole edge at point B.

4. Spread section B away from section A until the bust measures the width of your bust. Fig: 8-B.

5. Draw a new waistline cutting off the jog.

6. Take in any extra fullness at the waist in gathers, tucks, or darts, or trim off the extra material at the underarm seam below the bust level.
Bust of pattern too small

Fig: 8-A

Fig: 8-B
Bust And Chest Of Pattern Too Small.

1. Mark a point A about half way between the center front and the side seam, on the waist line. Fig: 9-A.

2. Draw a line parallel to center front beginning from point A to the shoulder, to point B.

3. Cut along this line almost to the shoulder edge at point B.

4. Spread section b away from section a, until the chest and bust are the needed width. Fig: 9-B.

5. Make a new shoulder line between the neck and armhole, filling in the hollow made by the alteration.
Bust and Chest of Pattern too Small

Fig: 9 - A
Fig: 9 - B
Blouse Pattern Too Narrow Across Back Of Neck

1. Be sure to check the back neck seam measurement of the pattern, and the upper back width.

2. Take your own neck measurement and compare it with the pattern measurement.

3. The neck seam on the pattern should not be more than 1 1/2 cm. smaller than your neck measurement.

4. If the pattern neck seam is smaller than your neck measurement add the width that you need to the center back as shown in Fig: 10-A.

5. If it is much smaller, add 1/2 the amount to the center back and the other half to the upper part of the armhole line, but not to the bottom of the armhole curve. Fig: 10-B.
Blouse pattern too narrow across back of neck
Center Back Of Blouse Pattern Too Long

1. Mark a point A 2 1/2 cm. below the bottom of the armhole. Fig. 11-A.
2. Draw a cross wise line from this point to the center back. Fig. 11-A.
3. Cut along this line.
4. Lap section B over a to shoulder center back. Fig. 11-B.
5. Extend the original center back line from section a to the waistline and trim off the jog.
6. Extend the underarm seam of section a to the waistline.
Center back of blouse pattern too long

Fig: 11 - A

Fig: 11 - B
Waistline Of Pattern Too Small

I  If the pattern needs to be just a little larger:

1. Mark your bust line on the pattern, just 5 cm. below the edge of the armhole seam.

2. Draw a line on the bust line. Fig: 12-A.

3. Cut along this line

4. Move section b down at center front until pattern is the needed width and length. Fig: 12-B.

5. Extend the center front line from section a and join it to the lower edge of section b. Fig: 12-B.

II When the pattern is much too small:

1. Draw point A about ½ way between the front and the side seam, on the waist line. Fig: 12-C.

2. Draw a line parallel to center front, beginning from point A to a point B about 2½ cm. above the level of the bottom of the armhole. Fig: 12-C.

3. From B draw a line at right angles to line AB, over to the armhole edge, to point C. Fig: 12-C.

4. Draw at the bust line a line starting from at line AB to the center front.

5. Cut along these lines. Fig: 12-C.

6. Spread section b away from a and c until the bust is wide enough. Fig: 12-D.

7. Drop section c an even distance below a to lengthen the waist. Fig: 12-D.

8. Be sure to keep the center front line straight.
Waistline of Pattern too Small

1. When pattern needs to be just a little larger
2. When the pattern is much too small
Sleeve Pattern Too Short Or Too Long

1. Indicate on your pattern the point of the elbow and call it point A. Fig: 13-A.

2. Draw a straight line at right angles to the line that marks the straight of the goods on the sleeve pattern, just above the elbow. Fig: 13-A.

3. Draw another straight line just below the elbow. Fig: 13-A.

4. If the pattern is too short, cut these two lines and spread them apart on a sheet of paper, to get the desired length. Fig: 13-B.

5. If the pattern is too long, lap each line alone, the amount needed to give you the desired length. Fig: 13-C.
Sleeve pattern too short or too long

Fig: 13 - A

Fig: 13 - B
Sleeve Pattern too short or too long (continued)

Fig: 13 - C
Pattern Too Small At Elbow

1. Draw line AB from the top of the shoulder perforations of your sleeve pattern to the bottom of the sleeve. Fig: 14-A. The line must be parallel to the straight of goods marks on the pattern.

2. Mark your elbow level on the pattern print C.

3. Draw a line from C at elbow level to the line AB, thus making a right angle with the line AB. Fig: 14-A.

4. Cut along these two lines, almost to the top and bottom edges of the sleeve pattern.

5. Spread section B and C apart over a paper and pin it, until you get the needed elbow measurement. Fig: 14-B.
Pattern Too Small Below Elbow

1. Mark your elbow level on the pattern.
2. Draw a crosswise line AB just the elbow level to the center of the sleeve. Fig: 15-A.
3. Draw another line starting from point B down to C to the lower edge of the sleeve pattern. Fig: 15-A.
4. Cut along these lines but just to the lower edge of the pattern.
5. Spread section B away from section a on a paper until you get the correct measurement. Fig: 15-B.
6. Draw in a good elbow curve.
Pattern too small below Elbow

Fig: 15 - A

Fig: 15 - B
Sleeve Pattern Too Wide

1. Mark 1 ½ in. (3 ½ cm.) at the two sides of the upper part of the sleeve pattern, just above each shoulder perforation on each side. Points A and B. Fig: 16-A.

2. Draw two lines from these two points down to the bottom of the sleeve pattern. These two lines must be parallel to the straight of goods perforations of the pattern. Fig: 16-A.

3. Cut along these lines.

4. Lap section b over section a the same amount from top to bottom. Fig: 16-B.

5. Lap section c over section a the same amount from top to bottom. Fig: 16-B.

6. The armhole seam must be 1 ¼ - 2 in. (3 ½ - 5 cm.) larger than the armhole of the blouse pattern.

If the wrist measurement is right but the sleeve pattern is too wide at above and below elbow:

1) Cut the lines to the bottom edge of the pattern.
2) Lap section b over a. Fig: 16-C.
3) Lap section c over a. Fig: 16-C.
Sleeve Pattern too Wide

Fig: 16-B

Fig: 16-C
Long Sleeve Pattern With No Elbow Fullness

To make extra fullness on elbow of your sleeve pattern you need to lengthen the back seam line of the sleeve pattern.

1. Mark your elbow level at the sleeve pattern. Point A. Fig: 17-A.
2. Draw a straight crosswise line at elbow level. Fig: 17-A.
3. Cut along this line almost to the front seam edge.
4. Without moving section a lower section b so there is a 1 in. (2.5 cm.) space between the 2 cut edges of the back seam line. Fig: 17-B.
5. Draw a new elbow line.
6. When you make your dress make this new fullness one or more unpressed pleats or make it into gathers on each side of the elbow so as to give you the desired fullness at the elbow.
Long Sleeve pattern with no elbow fullness

Fig: 17-A

Fig: 17-B
Skirt Pattern Too Short Or Too Long

1. Indicate your hip line on the skirt pattern, usually a hip line is 7 in. (17.5 cm.) down from the waistline. (Point A). Fig: 18-A.

2. Draw a straight line that makes a right angle with the line that marks the straight of the goods on the pattern, just below the hips. Fig: 18-A.

3. If the skirt pattern is too short, cut along this line, spread the two cut edges on a paper to the length you need. Pin them on the paper. Fig: 18-B.

4. If it is too long, lap along this line you drew, downward, the amount needed to give you the desired length. Fig: 18-C.

5. Be sure to do the same thing to the skirt back adding or laping the same amount.
Skirt Pattern too Short or too Long

Fig. 18 - A

Fig. 18 - B
Skirt pattern too short or too long (cont)

Fig: 18 - C
Pattern Too Small At Hips

For this, alter the skirt from the back and front following the same procedure for both:

1. Draw line AB from middle of waistline to the middle of the lower edge of the skirt pattern. Fig: 19-A.
   It should be a parallel line to the straight of goods marks on the pattern.

2. Cut along this line almost to the waistline.

3. Spread section b and a on a slip of paper, an equal amount. Pin them. Fig: 19-B.

4. Make a new straight of goods marks in the center of the slash. Fig: 19-B.
Pattern too small at hips

Fig: 19 - A

Fig: 19 - B
Skirt Pattern Too Short And Narrow At Bottom.

1. Pin a strip of paper to the bottom edge of the skirt pattern on both back and front pieces.

2. Mark the needed length evenly around the lower edge. Fig: 20-A.

3. Extend the seam lines.
Skirt Pattern too short and narrow at bottom

Fig: 20 - A
Skirt Pattern Too Straight At Sides.

1. Pin a paper to the side seam line of the skirt pattern.
2. Mark the widest part of the hip curve on your pattern, point A. Fig: 21-A.
3. Draw a line from A down to the hem line thus adding an extra width to the bottom of the skirt. Fig: 21-A.
4. Add the same amount to both back and front side seams.
Skirt Pattern too straight at sides

Fig 121 - A
Collar Pattern Too Short Or Too Long

Collars must be altered with the alteration of the neck line of the pattern.
1. If you have widened the back neck line of the dress lengthen the straight collar as such:
   a. Pin a strip of paper to the center back edge of the collar pattern. Add the amount needed. Fig: 22-A.
2. If you have enlarged your neck line across the front, enlarge your collar as such:
   a. Pin a strip of paper, the amount of width needed, to the front edge of pattern's Fig: 22-B.
3. If the collar is the kind that lies flat and you have enlarged your neckline at the back enlarge your collar as such:
   a. Draw a cutting line on the collar half way between center back and shoulder seam marks. Fig: 22-C
   b. Cut the line and spread the pieces the required width Fig: 22-D.
4. If you have widened your dress neck line at the front, widen your dress neck line at the front, widen your collar as such:
   a. Draw a cutting line on the collar, halfway between shoulder seam marks and front edge.
   b. Cut along the line and spread the pieces apart the amount needed. Fig: 22-E.

Notice: To make the collar shorter, lap the two pieces along the cutting line instead of spreading them.
Collar Pattern too Short or too Long

Fig: 22 - A

Fig: 22 - B

Fig: 22 - C

Fig: 22 - D

Fig: 22 - E