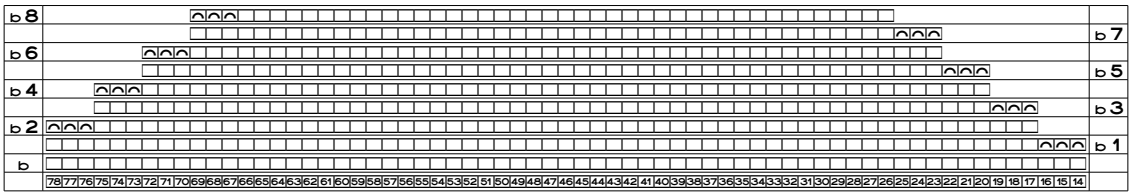
Appendix 529

DO CHARTS LIE?

If you counted the symbols in any of the charts in chapter 430, you probably wondered why some of them weren't quite accurate. Let's take a closer look.

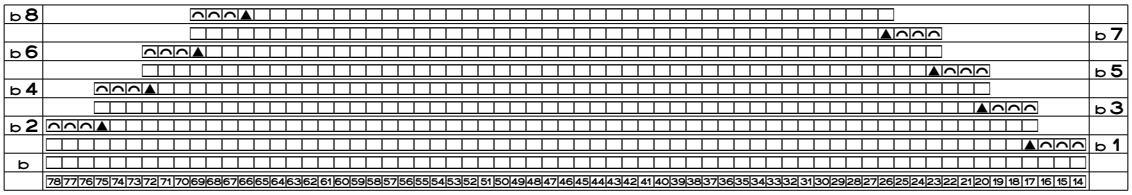
The Shoulder Shaping

The instructions for the back of the size small vest in chapter 410 have us binding off three stitches at the beginning of the eight shoulder rows. In chapter 430, the bind-offs were represented with this chart:



We know that at the end of each row, we will have three fewer stitches than we started with. But consider that after we finish binding off three, we already have one stitch on our working needle. If we then try to work **all** of knit symbols shown on each row, we have a problem. Because we actually worked **four** stitches to bind off just three, there is one more knit symbol in each chart row than we have in actual stitches on our source needle.

The chart in no way makes clear this subtle but important point. Perhaps we should use a different symbol for the fourth stitch of each row, something that alerts us to the fact that that stitch has already been worked. Doing so would make the chart exactly match what happens in yarn.



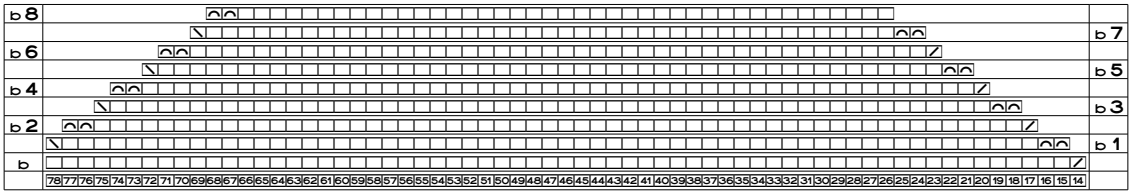
The triangle tells us that we don't count that stitch as one of the stitches we have to work to **finish** the row. Instead, the additional stitches we work once we complete the bind-offs is now accurately shown by the number of knit symbols.

> When we bind off some of the stitches of a row, we need to remember that the stitch immediately following the last bound-off stitch has **already** been worked. If we want the rest of the chart row to be absolutely accurate, we need to use a special symbol to represent that extra stitch. If we're not so

picky about what the chart actually shows, we have to mentally subtract one to match the number of stitches that will remain on the source needle.

An Alternate Shoulder Shaping

The smoothed shoulder shaping chart shown in chapter 432 added a decrease at the end of each row before a row that started with bind-offs, then bound off one less stitch on that next row.



Let's count the number of knit symbols in each row, figuring out the instructions exactly according to the symbols shown in the chart.

For private-side row B, the chart tells us to purl sixty-four stitches (stitches seventy-eight through fifteen inclusive), then we do a P2tog for a directional purl decrease. Since we need two stitches to do a P2tog, we're already in trouble, because purling sixty-four and doing a single decrease means we ought to have started row B with sixty-six stitches. We had only sixty-five. By the chart, we finish row B with sixty-five stitches, the sixty-four we purl and the single stitch that results from the P2tog.

On row B1, we bind off two, knit sixty-one (symbols seventeen through seventy-seven inclusive), then SSK. But to work row B1 this way, we need three stitches to bind off two, the sixty-one in the middle, and two more at the end for the decrease. That means we ought to have started row B1 with sixty-six stitches, but we just saw we start it with only sixty-five because row B apparently ended with sixty-five.

We can continue in this fashion, but we'll see that the number of knit symbols simply isn't right.

Counting Stitches Used

Let's work the problem the other way. Binding off two means we use three stitches from the source needle and give one stitch to the working needle. When we do a single decrease, we use two stitches from the source needle and give one stitch to the working needle.

For the smoothed shoulder shaping, we can summarize stitches used and stitches made. The table looks tricky, but each column represents the stitches used and made as we work across each row.

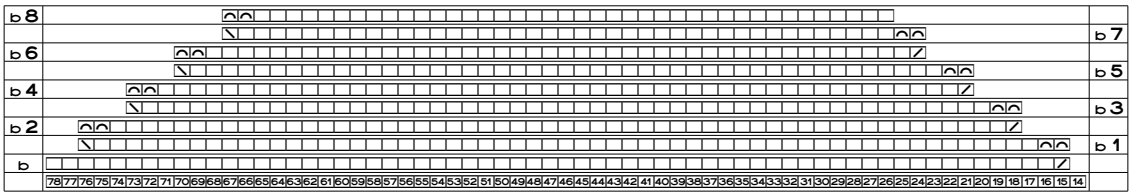
	A	B	C	D=A–B–C	E	F	G=D+E+F
	Start Row With	BO Uses	Dec Uses	Central Knit Symbols	BO Gives	Dec Gives	End Row With
B	65	0	2	63	0	1	64
B1	64	3	2	59	1	1	61
B2	61	3	2	56	1	1	58
B3	58	3	2	53	1	1	55
B4	55	3	2	50	1	1	52
B5	52	3	2	47	1	1	49
B6	49	3	2	44	1	1	46
B7	46	3	2	41	1	1	43
B8	43	3	0	40	1	0	41

Let's write out these instructions in the typical form, using the values in column D as the number of knit or purl stitches in the middle of each row.

Smoothed Shoulder Shaping for Size Small Vest Back

On final WS row before starting shoulder BOs, P63, P2tog. (64 sts)
Row B1 (RS): BO 2, K59, SSK. (61 sts)
Row B2: BO 2, P56, P2tog. (58 sts)
Row B3: BO 2, K53, SSK. (55 sts)
Row B4: BO 2, P50, P2tog. (52 sts)
Row B5: BO 2, K47, SSK. (49 sts)
Row B6: BO 2, P44, P2tog. (46 sts)
Row B7: BO 2, K41, SSK. (43 sts)
Row B8: BO 2, P40. (41 sts).

Now let's chart these instructions. Technically speaking, and in yarn of course, the first stitch bound off on each row will be the stitch that we're left with after doing the decrease at the end of the previous row. That's why the symbols are in slightly different positions than in the first version of the chart.



If we count the number of knit symbols on each row, we get the exact number in col-

umn D of the table for all nine rows. However, row B8 shows only forty stitches remaining (stitches sixty-five through twenty-six inclusive), and we know we are supposed to have forty-one. (We start the shoulder shaping with sixty-five stitches and bind off twelve on each shoulder, which leaves forty-one.)

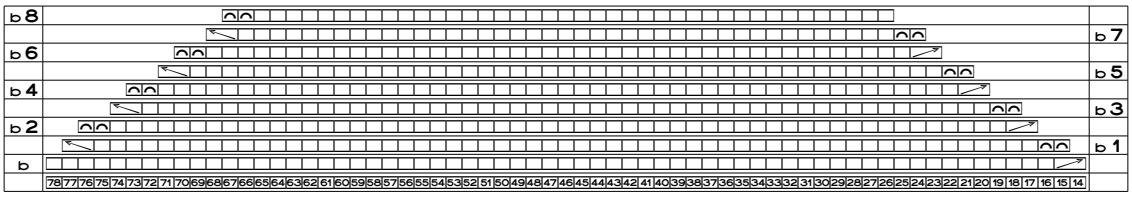
If we look at the empty stitch positions on each row, we see that row B has no symbol at location fourteen, which corresponds exactly with the loss of one stitch in the decrease. Row B1, though, isn't quite right, as we know that we end the row with sixty-one stitches on our working needle (we decreased two and bound off two of our original sixty-five), but the chart shows that only three stitches, not four, are missing: at locations fourteen, seventy-seven, and seventy-eight.

Does row B2 have the correct number of missing stitches? We end with fifty-eight stitches on our needle (three decreased and four bound off out of the original sixty-five). So we should have seven empty stitch locations, but the chart has only six missing stitches: two at the left edge and four at the right edge.

What if we just count the total number of stitches on each row, based on where the symbols start and end? Row B has symbols in seventy-four stitch locations, so that's right. Row B1 goes from stitch location fifteen to location seventy-six. Inclusively, that's a total of sixty-two stitches. But the instructions say (and we already know) that we have only sixty-one stitches at the end of row B1. This result isn't totally unexpected, as we already saw there weren't enough blank spots on rows B1 and B2.

Use Different Decrease Symbols?

Perhaps we should use decrease symbols that are two stitches wide.

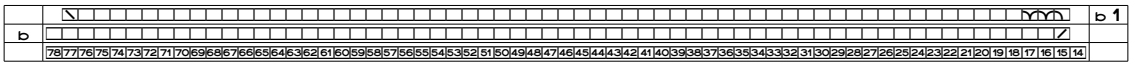


This doesn't help either, as row B8 is still a stitch short, and the stitches that have been eliminated at the end of each row are less clear than they were before.

Use the Knitting Font's Special Bind-Off Symbols?

There are symbols in the knitting font designed to be used for binding off, simply because we have that whole "you have to work one more stitch than you bind off" situation. Let's try using those symbols instead of the ones we've been using.

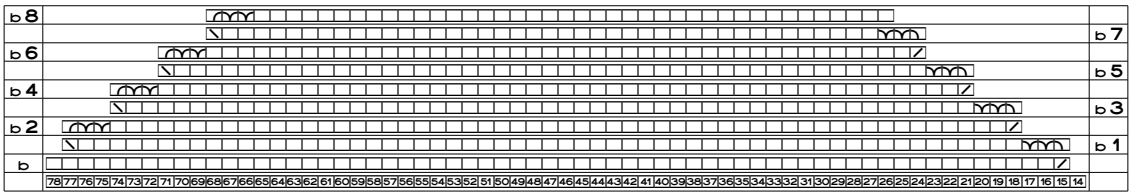
Row B still shows as one stitch shorter because of the decrease done at the end, so let's see what happens on row B1.



The symbols combine to show with the two complete arches (from the middle of location fifteen to the middle of location seventeen) that two stitches have been decreased. The partial arch on the left half of the symbol at location seventeen reminds us that we worked three stitches, even though we only bound off two. We still have the fifty-nine stitches that we knit in the middle (eighteen through seventy-six inclusive), and we do an SSK at the end as before.

We still don't have the correct amount of empty space, because we've removed four stitches but there are only two empty stitch locations on row B1. However, if we instead count the number of locations that indicate the presence of an actual stitch, we have stitches running from seventeen through seventy-seven inclusive, which is sixty-one. That matches the table and the written-out instructions.

Let's swap in the bind-off symbols in the whole chart.



The two and a half arches at the beginning of each row now show that we've bound off two stitches and have a third stitch already worked. We have the correct number of knit symbols in the center of each row. And the decrease at the end of each row is aligned to be the first stitch bound off at the beginning of the next row.

If we count the last arch symbol, the knit symbols, and the decrease symbol on each row, we will see that we have the proper number of stitches as indicated by the table and the corresponding written-out instructions. Even on row B8, since we count the arch symbol at location sixty-six as the stitch that remained when we bound off the first two, we have stitches from locations sixty-six to twenty-six inclusive, which is—drum roll, please—forty-one. Yippee!

Why Does the Chart Lie?

Part of the problem is that we're forcing all the symbols into a grid. The grid then makes it easy for us to count how many stitch locations have symbols. But the symbols stay rigidly in place, especially compared to how real stitches move around and lean over when we bind off, decrease, and increase.

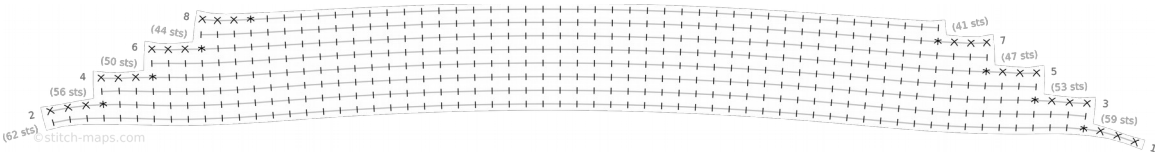
Think about how a decrease worked at the end of a row makes the end of the row lean

instead of remaining straight up and down. But in the grid-based charts used in this book, we either have a rectangular symbol or we have a blank space. All the symbols have horizontal and vertical edges, which make square corners.[1] In that sense, the charts don't exactly match the work. Because of this limitation, some knitters might like JC Briar's stitch maps better in some situations or even in all situations.[2]

Let's see what the stitch maps of the original and smoothed shoulder shaping look like. If you've not worked with stitch maps, here's a quick summary of what they show.

- A vertical line indicates a public-side knit stitch, so on private-side rows, we of course must purl.
- An X shows a stitch that's been bound off.
- The pale horizontal line running through the symbols shows all the stitches on a particular row.
- The number of stitches remaining after completing each row is shown in parentheses at its end.
- Each row is numbered, but instead of using B through B8, the rows are labeled zero through eight, so row zero is our foundation row B, and we can mentally put a B before the rest of the row numbers.

The first stitch map shows the original shaping, binding off three stitches at the beginning of all eight shoulder rows. Note that the edges curve a bit, because the stitch map is trying to show how the fabric will actually respond to the various knitting operations. It also finishes row eight (our row B8) with forty-one stitches, which is exactly right.



What's cool about a stitch map is that when we bind off, there's a special symbol used automagically for that extra stitch we always have to work. We can see that the three bound-off stitches are all shown with an X. But that extra stitch, the fourth one we have to work to bind off the third stitch, is shown with an asterisk. That exactly represents what's going on.[3]

The stitch map of the smoothed shoulder shaping curls quite a bit more because it now responds to the decreases at the end of rows zero through seven (our rows B through B7), which can pull the fabric in one or even several directions.

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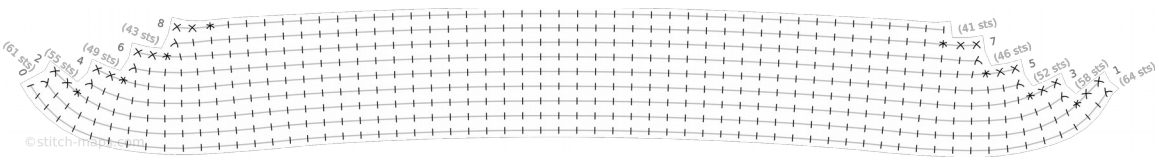
[1] The only symbols that have a diagonal edge are the ones for both variations of Jolie Elder's 3-into-2 decrease, discussed in issue two in appendix 528.

[2] www.stitch-maps.com

[3] Yes, I borrowed this idea to change the knit symbol to the triangle symbol in the earlier chart.



We see two Xs and an asterisk at the beginning of rows one through eight (our rows B1 through B8), with the asterisk representing the extra stitch we must work to bind off the second stitch. Note that at the end of row eight (our row B8), we have the correct result of forty-one stitches remaining.

This stitch map also uses what look like Xs with one of the upper arms broken off. Those two symbols represent the decreases, with the intact long arm showing which way the decrease leans.

We Have Choices

To some knitters, stitch maps make more sense because they try to replicate the stitches' reactions to surrounding increases, decreases, bind-offs, and cast-ons. This feature is especially notable when we're trying to design (or even just chart) a lace pattern. The stitches will lean left and right when stitches are added or taken away around them, and a lace stitch map looks remarkably like what we get in yarn.

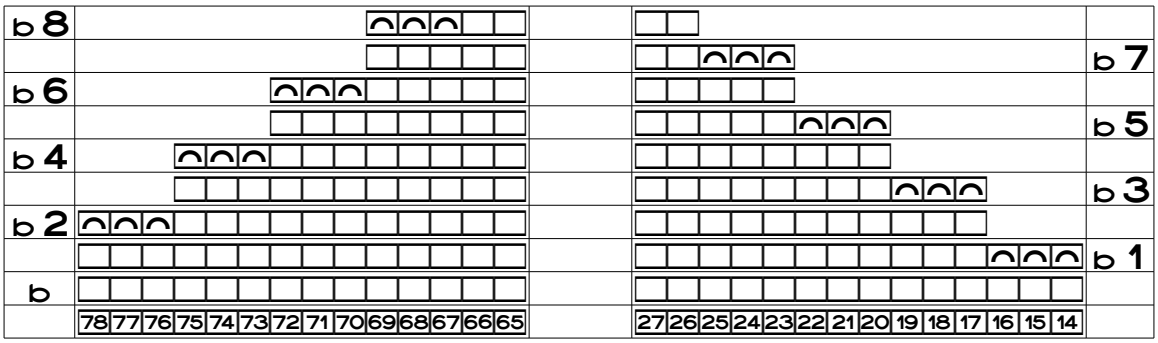
Other knitters don't fuss over these issues, so they're happy with grid-based charts.

And regardless of our normal preference, we might well want to use both stitch maps and grid-based charts in the same project, depending on the needs of the various bits and pieces.

Concentrate on the Chart's Intent

Some situations just don't work quite right when we try to show all the stitches exactly. We saw one tweak we can use to fix one kind of inaccuracy: represent with a different symbol the extra stitch used in binding off. But in lots of charts, the central stitches in one sense don't matter at all.

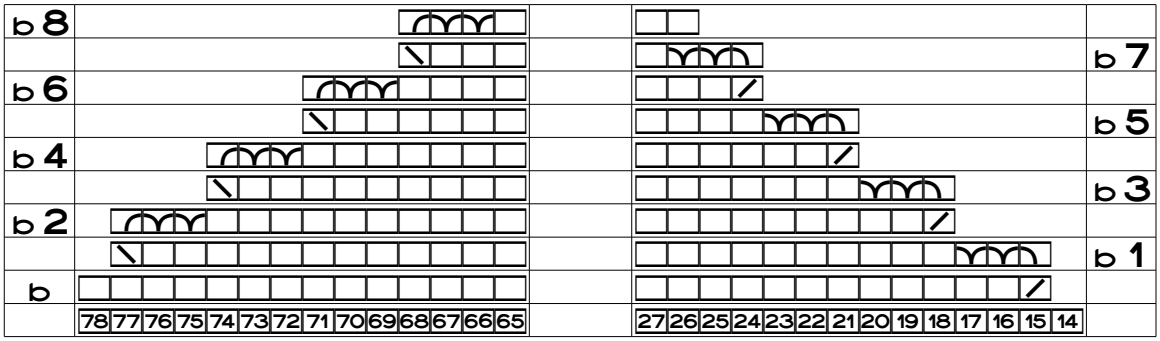
Suppose the original shoulder chart had been presented this way:



Does ignoring the entire center of the chart make it easier to understand what we're trying to do? Many of us would think so.

The most important thing that the original shoulder shaping chart is **really** trying to show, and what the truncated chart is showing, is that we bind off three stitches at the beginning of eight rows, then work evenly all the way to the end of each row. The full chart shows that, even if it glosses over the matter of the fourth stitch needed to bind off the third stitch. The simplified chart makes us concentrate on the beginning and end of each row.

For the smoothed shoulder shaping chart, the only symbols that really matter are again those at both ends of the rows.



As we're working the shoulders, the chart simply tells us to

* work to the last 2 sts, dec, turn, BO 2, and repeat from *, omitting dec on row 8

For both versions of the vest shoulder chart, and plenty of other project charts, the only thing all the central knit symbols are really doing is spreading the important symbols apart.

