# Diagrams in Rashi's Commentary: A Case Study of Eruvin 56b

**By: ELI GENAUER**⁎

Book illustrations serve multiple purposes. Some are ornamental and, in the case of the Hebrew book, such ornamentation fell under the imperative of *zeh keli ve-anvehu* (Ex. 15:2) to beautify ritual objects.[1] Other illustrations serve a more utilitarian purpose, elucidation and explanation of the text. The first printed Hebrew book to utilize illustrations to elucidate the text (and not for ornamental use) was likely Moses of Coucey's *Sefer Mitzvot Gedolot* printed in Rome prior to 1480.[2] Of course, explanatory illustrations are not an invention of printing; many medieval commentators make use of this convention. While these illustrations can prove invaluable in elucidating an otherwise opaque text, in some instances they create more confusion than they assist. In part, however, the failure of these illustrations to explain the text, can, in some instances, be traced to the vagaries of printing rather than to a careless commentator.

Eli Genauer is a collector of antique Seforim with an emphasis on early printed editions of the Talmud. He has a particular interest in the origins and development of the diagrams contained in Rashi's commentary to Talmud Bavli, and has presented some of his findings at the World Conference of Jewish Studies in Jerusalem under the sponsorship of Dr. Mayer Gruber of Ben Gurion University. He and his wife reside in Seattle, WA where he is a businessman and community volunteer.

The standard and most widely utilized commentary in interpreting Talmud Bavli is that of Rashi. The main focus of Rashi's Talmudic commentary was elucidation of the Talmud, and throughout his commentary he includes numerous explanatory illustrations. One of the most technical of tractates is Eruvin dealing with the construction and restrictions regarding carrying and travel on the Shabbat. It comes as no surprise that Rashi's commentary to this tractate includes at least 52 explanatory illustrations.[3] But, at least one of these illustrations has undergone a change—as a byproduct of printing—that has rendered this particular illustration almost unintelligible.

The Talmud, Eruvin 56b, deals with measuring the limits of travel outside of a city on Shabbat. While one may leave the city on Shabbat, one may not travel more than 2,000 *amot* (cubits) beyond city limits. Specifically, calculating 2,000 *amot* is fairly simple when the city limits form a square or at least bisect at 90 degrees. When, however, a city is not square shaped but instead the city limits present as a circle, the calculation of 2,000 *amot* is complicated.[4]

> One who squares a city makes it like a square board: he then squares the *Teḥum* making it like a square board. We do not measure 2,000 *amot* diagonally from the middle of the corner, for then we would lose the corners. Rather, we add a square of 2,000 *amot* by 2,000 *amot* in the corner on the diagonal—the city gains 400 *amot* in each direction, and the *teḥum* gains 800 *amot* in each direction, altogether 1,200 *amot* in each direction. Abaye says that this applies to a circular city that is 2,000 *amot* by 2,000 *amot*.[5]

The Talmud is concerned with measuring that 2,000-*amot* distance when the city is not square but is circular and whose circumference is 2,000 *amot*. The Talmud explains that first one must "square the city," which adds 400 *amot* to the normal limit of 2,000 *amot* in each "corner" of the circle. That is, encompass the circle with a square. Second, add another 800 *amot* from the newly squared corner's 2,000 *amot* limit and draw a

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[3]  There are 52 illustrations that appear in the standard editions of the Talmud, however, R. Yoel Sirkes, in *Haggahot ha-Baḥ*, includes many others. Because Sirkes likely did not rely upon manuscripts to make his emendations, he likely created these additional illustrations. See Yaakov Shmuel Speigel, *Amudim be-Tolodot Sefer ha-Ivri, Ha-Gahot u-Maghim*, Bar Ilan Univ. Press, Ramat-Gan: 2005, 362–67.

[4]  Today, the issue of calculating circular distances is simple due to Archimedes' formula, $\pi r^2$. See generally, Azariah De' Rossi, *The Light of the Eyes*, transl. by Joanna Weinberg, Yale Univ. Press, New Haven & London:2001, 96–98.

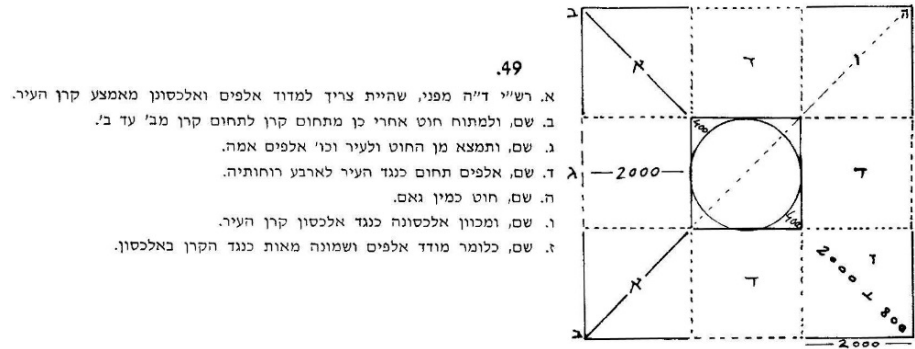[5]  All translations are my own, unless otherwise indicated.

diagonal line outwards in all directions. Third, and finally, draw a straight line across and up from these new diagonal endpoints and we will have the actual limits of travel outside of the city wall in all directions. It turns out that you are allowed to travel 2,000 *amot* from one point in the city wall, but 3,200 *amot* from another point of that wall. Confused? A diagram or a series of them would certainly be most helpful.

The idea of squaring a circle is not difficult to picture and that it adds area to the circle is also easily imagined.
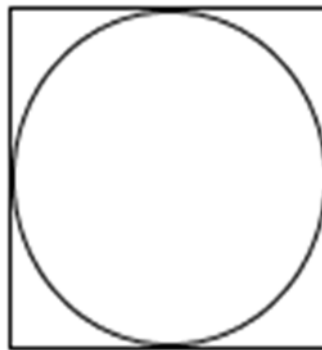


The difficulty with this passage lies in picturing what it means when it says that by measuring diagonally from the middle of the corner, we would then lose the corners. Thankfully, there is Rashi to explain this idea to us but he needs approximately 275 words in which to do it.

In this extraordinarily long explanation, in essence, Rashi explains that the issue is that merely squaring the circle is insufficient to determine the *teḥum* distance because that results in the only point from which one can walk a full 2,000 *amot* is from the corners of the square. If one were to walk from the midpoint of the curvature of the circle, they would be able to walk only 1428 *amot* outside the city from that point and not the full 2,000. Rashi explains the concept by creating 8 square boards measuring 2,000 by 2,000 *amot* surrounding the city like this: (Diagram from Daf Yomi Advancement Forum website)

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א. רש"י ד"ה מפני, שהיית צריך למדוד אלפים ואלכסונן מאמצע קרן העיר.

ב. שם, ולמתוח חוט אחרי כן מתחום קרן לתחום קרן מב' עד ב'.

ג. שם, ותמצא מן החוט ולעיר וכו' אלפים אמה.

ד. שם, אלפים תחום כנגד העיר לארבע רוחותיה.

ה. שם, חוט כמין גאם.

ו. שם, ומכוון אלכסונה כנגד אלכסון קרן העיר.

ז. שם, כלומר מודד אלפים ושמונה מאות כנגד הקרן באלכסון.

In this manner, from the midpoint of the city outwards will be a *Techum* of 2,000 *amot*, and at the corners the *Teḥum* will be 2,800 *amot*. When you add that to the 400 *amot* you gained already in the corners by squaring the city, you end up with the *Teḥum* being 3,200 *amot* at its longest.

**The Evolution and History of the Vilna Talmud's Version**

In the standard version of the Talmud Bavli, the Vilna edition, the illustration as drawn is unhelpful, and likely creates more confusion than it aids. The diagram appears as such:



What this diagrams intends to illustrate is the different steps it takes to reach the end point of Rashi's explanation of the text. In the middle of the diagram is the circular city that is 2,000 *amot* "*b'igul*" ("encompassed by a circle"). A square surrounds the city. Then it gets a bit unclear. The bottom of the outside square, reads "*tabla rivuah ha'ir,*" meaning a board or rectilinear element that squares the city. In reality, there are two boards or elements that act to square this city that are then shown. The inside square board is what occurs if you only go out 2,000 *amot* from the right hand corner of the board squaring the city. There is only one line going from right to left at that point and it says "*tabla shel* 1,428 *amot mi-keren*

*alakson shel 2,000.*" Meaning drawing a diagonal line of 2,000 *amot* from the right hand corner of the squared city outwards, will result in the square boards being only 1,428 *amot* by 1,428 *amot* and in the *teḥum* being only 1,428 *amot* outwards from any of the midpoints of the squared city.

In this diagram, however, the diagonal line going outwards from the right hand corner of the squared city then continues and ends up meeting up with a line that then extends as a square around the entire city. That is the result of what occurs when you extend the diagonal line 2,800 *amot* resulting with 8 squares of 2,000 *amot* each (which are not shown) and the *teḥum* of 2,000 *amot* from any midpoint of the squared city. To be clear, the diagram is not incorrect *per se*, and it really tries to illustrate in one picture what should probably take two or three steps, but one wonders if this is the way Rashi originally drew this diagram. Although not dispositive, the text itself provides no indication whether it has an explanatory illustration. Unlike in other instance where the text includes the word "*kazeh*" "like this" indicating an illustration, here there is no such indication, as the text does not include "*kazeh*."

**Earlier Printed Editions**

An examination of manuscripts of Rashi and one previous printed edition of the Talmud yields an entirely different set of diagrams that are cogent and helpful.

The first printed edition of the Talmud that contains a diagram similar to the Vilna Shas was Amsterdam 1714:

The diagram is the same and the words inside and outside the diagram are the same as in the Vilna edition. From after the 1714 edition until the Vilna 1884 edition, this diagram remained substantially the same with only minor differences. For example, Berlin-Frankfurt A.M. 1734:



Or, Amsterdam, 1754:



Note that in this edition, inside the inner circle, it spells out "*Ir Bet Alep* [=2,000 *amot*] *b-igul*." The word *igul* means circular. This will become important when we look at the next diagram.

Dyhrenfurth 1816. If you look inside the circle it reads, "*Ir Bet Aleph* [=2,000 *amot*] *b'ir*," or "a city of 2,000 within a city," which makes no sense. The mistake came about because the previous editions had all shortened "b-Igul" with *Bet Ayin Yud* and with an apostrophe. The editor of the Dyhrenfurth 1816 edition evidently was confused by this and assumed it to be an abbreviation meaning "*b-ir.*" Aside from this error, this edition is also less clear on the distance between the two outer borders. This might be an example in diagrams of newer is not always better.

Finally, Lemberg, 1862, is slightly changed, apparently due to more space available to the printer. This edition placed each page of the Talmud on two pages rather than the standard single page layout. This additional space allowed room for a larger diagram.



This is much cleaner and clearer than the Vilna Shas. I will soon speculate that how much space was available "on the page" was a determining factor in the creation of this diagram.

Having traced the origin and evolution of the Vilna version, and finding it originated in the Amsterdam 1714 edition, we now examine those editions that preceded Amsterdam.

The *editio princeps* of the complete printed Talmud, Bomberg 1520, contains only a blank space where the diagram should be.



This is consistent with the statements of bibliographers of the printed Talmud, that from the first Bomberg edition of c.1520 to the Berman

edition printed in Frankfurt on Oder in the 1690s, no diagrams were in-cluded in printed editions of the Talmud.[6] The lack of diagrams has been attributed to cost or technology (or a combination).[7] The solution was to permit the buyer to hand add their own illustrations. Indeed, Bomberg's second edition of 1528; Constantinople, 1584; and Amsterdam, 1644; all contain an empty space for just that purpose.

Prior to the 1697 edition of Berman, in Frankfurt Oder, no diagram appears (with one exception that will be discussed below). But, while 1697 was the first to include a diagram, it differed markedly from Vilna.



First, there are two diagrams, one in the space previously left empty in the earlier editions, and one above in the margin. The small one above, which illustrates something that is unclear to me, even has the word "Kazeh" on top of it. Where did that word come from? The main diagram itself is also extremely unhelpful in explaining the text. To complicate matters, the city is portrayed as oval and without any legend as to what the various lines illustrate. Thus, it is readily understandable why the next edition of Amsterdam 1714 tried to clean up this diagram. The Amster-dam 1714 diagram was clearly based on the one in the Frankfurt on Oder edition 1697 because it uses the same wording above and on the side of the diagram. The question then is, what was the source of that diagram? Was it handed down from Rashi through manuscripts and then used in 1697 by the Berman editors, or was its origin elsewhere? We know it could

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6   N.N. Rabinowitz, *Maamar 'al hadpasat ha-Talmud with Additions*, ed. A.M. Haber-mann, Mossad ha-Rav Kook, Jerusalem: 2006, p. 73 n.1; Marvin J. Heller, *Print-ing the Talmud: A History of the Earliest Printed Editions of the Talmud*, Brooklyn, NY: 1992, p. 145.

7   Edward Fram, "In the Margins of the Text, Changes in the Page of the Talmud," in *Printing the Talmud: From Bomberg to Scottenstein*, eds. Sharon Lieberman Mintz et al., Yeshiva Univ. Museum, New York: 2005, p. 91 n.4.

not have come from previous printed editions because (aside from the exception cited below) they did not contain any diagrams.

### A Solution, the Soncino Talmud

To answer these questions we must look at the actual first printed edition of *Eruvin,* which was printed by Gershon Soncino in *Pesaro* circa 1515.[8] This edition was the only printed edition of *Eruvin* prior to Bomberg in 1520. The equivalent page to our 56B is very different from ours and looks like this.
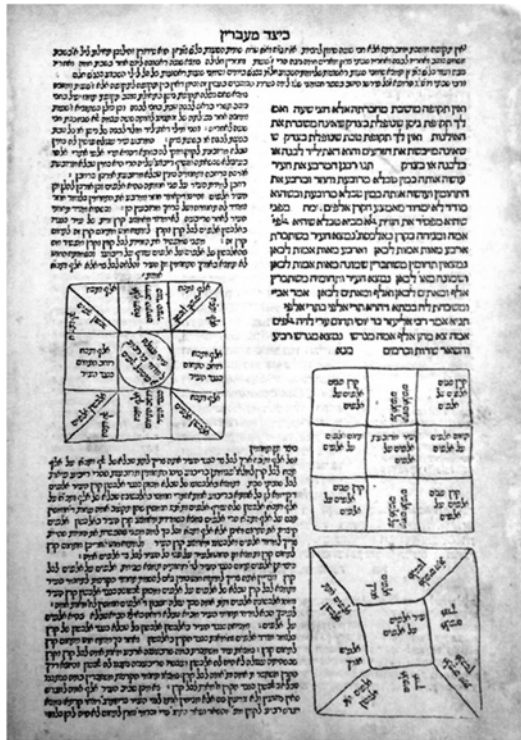


As you can see, this page contains three diagrams. They are all diagrams relevant to our 275-word Rashi. The first diagram illustrates what happens if you draw a diagonal line of 2,000 *amot* from the corner of the squared city. The result is a *teḥum* of only 1,428 *amot* from the midpoint of the squared city. The second diagram illustrates how to construct 8 boxes each of which is 2,000 *amot* square all around the city. The third diagram

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**8**    Regarding this edition see Marvin J. Heller, *The Sixteenth Century Hebrew Book*, Brill, Leiden & Boston:2004, vol. 1, pp. 82-83, and the bibliography cited therein, vol. 2, p. 956.

illustrates that the result of doing that is having the diagonal line go out 2,800 *amot* from the corner of the squared city with the result being that there is a *teḥum* of at least 2,000 *amot* from any point in the city. These perfectly illustrate the complex passage.

The question now is, what was Gershon Soncino's source for these diagrams? Were they missing or different in the Rashi manuscript that he copied from and he just made up his own diagrams? Or more likely, did he copy them from a Rashi manuscript that he had?

To begin to answer those questions, we have to look at a manuscript copy of our Rashi. The one we will now study is referred to as NY JTS RAB 718 and is being used with the permission of the JTS Library. It is manuscript number F39356 in the Israel National Library online catalogue. That entry provides that this Rashi manuscript was written in the 14th century in Italy, and it would make sense that it might have been available to Gershon Soncino in Italy a little over 100 years later.



Does that look familiar? These three diagrams are nearly exactly reproduced by Soncino, in his Pesaro edition. Not just the diagrams, but all the words in the diagrams are exactly the same. It seems clear to me that this manuscript (or a copy of it) is the source for Soncino's diagrams.

Let us now return to the Bomberg 1520 edition and see whether the editors had access to Soncino's 1511 edition or to a manuscript similar to the one shown above.
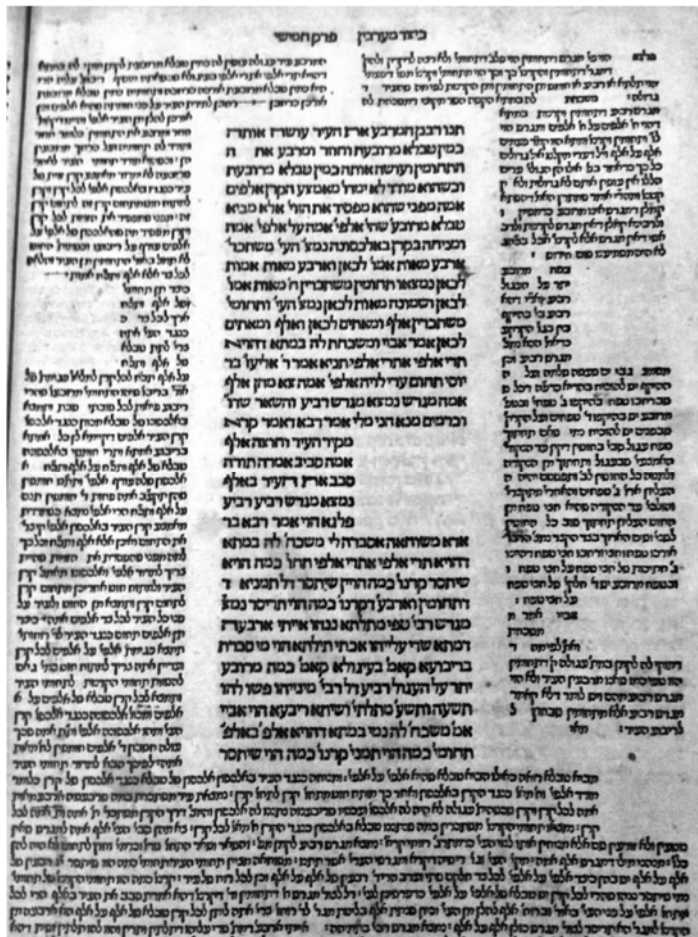
You can see that Bomberg left five blank spaces on 56B. One is squarely in the middle of our Rashi as we have it today, another seems to be in the text of the Gemara, and there are three more on the right side of the page. The top two are in the commentary of Tosafot, but the bottom one seems to be more in the text of Rashi. It is clear to me that Bomberg left room for the second Rashi diagram in the text of the Gemara, and the third one on the right side of the page on the bottom. That is the same method employed in Soncino's edition and also in the manuscript edition.[9] Bomberg knew there were three diagrams with this Rashi

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**9**  This is not to say this convention appears in all manuscripts. Indeed, in at least two well-known manuscripts, Munich, Bayerische Statsbibliotek, 95 and Vatican, Biblioteca Apostoclica, 109, no diagram appears.

and he left room for all of them. Subsequent printed editions retained these two extra spaces for diagrams, notably 1580 Basel, 1584 Constantinople, and 1644 Amsterdam. The editors of the Berman Frankfurt on Oder edition of 1697 decided to do away with two of the empty spaces that did not fit inside the Rashi and came up with this.



It is now understandable why they tried to insert an extra diagram on the side as they were reducing the spaces for diagrams from three to one. The editors of the Amsterdam 1717 edition did away with the extra diagram and were able to come up with something that fit into one space that told the story in a somewhat compact form. I suppose that it is theoretically possible that the Amsterdam editors had a manuscript edition of Rashi that had a diagram that looked like theirs, but that is a much less likely scenario, and not one that can be traced to any known manuscript. The diagram in the classic Vilna Shas did not originate with Rashi but ended up there as a result of a lack of space left in earlier printed editions. The diagram still has validity because it came from scholars who understood the Rashi, but should not be equated with text itself. What remains to be discussed are the following two questions

1. Did the original Rashi manuscript contain diagrams? In other words, did Rashi know how to draw?
2. If there were such diagrams, why are they missing from many subsequent manuscript copies of Rashi and from many printed editions?

According to Dr. Mayer Gruber, there are seven reasons that tend to demonstrate that Rashi had diagrams in his commentary on Tanakh and Talmud.[10] For the sake of brevity I will list the first three, but the others are along similar lines.

1. Rashi wrote to the sages of Auxerre that he would make them a drawing and send it to them
2. Rashi's grandson, Rashbam, wrote that Rashi made drawings of the boundaries of the land of Israel
3. The statement of Tosafot on Menaḥot 75A that refers to two drawings actually drawn by Rashi.

As far as what happened to those diagrams as time progressed, Gruber contends that the various diagrams contained in the original Rashi manuscripts disappeared in three stages.

1. The word "*ka-zeh*" was included, followed by a blank space, because the scribe was not able to draw the diagram
2. The word "*ka-zeh*" was included but there was no blank space below it
3. Finally, no "*ka-zeh*" and no diagram.

It is only when we find older manuscripts that we discover that there were diagrams in Rashi that do not appear in even the earliest printed editions. In our case, it is possible that the original Rashi included three diagrams, those diagrams were included in the first printed edition, that of Soncino in Pesaro, they were not reproduced in any printed edition for almost 200 years, and reappeared as one completely different diagram in the early 1700s.[11] ❧

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[10]  Mayer Gruber, "What Happened to Rashi's Pictures?" *Bodleian Library Record*, vol. 14:2 (April, 1992); Mayer Gruber, "Light on Rashi's Diagrams from the Asher Library of Spertus College of Judaica," in *The Solomon Goldman Lectures*, ed. Mayer Gruber, vol. 6, Spertus College of Judaica Press, Chicago:1993.

[11]  For two other examples of Rashi manuscripts that contain complicated diagrams please see 1) Munich, Bayerische Staatsbibliothek, Cod. hebr. 216 and 2) Oxford, Bodleian Library MS Opp. Add. Qu. 23.
  They are of Rashi's commentary on the passage that follows the one under discussion above. This passage deals with the area around the Levite cities.
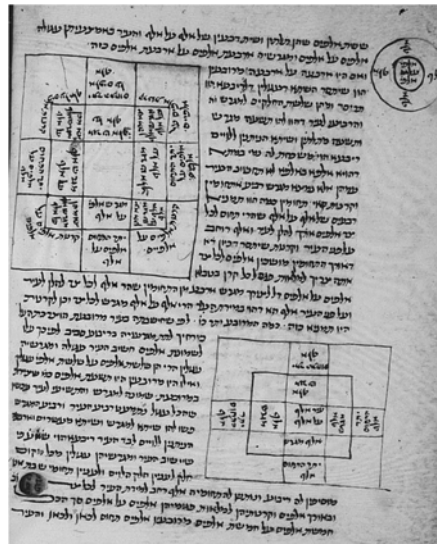
Like our diagrams, they take a lot of space and are interspersed in different places within the text. It would be very difficult for a printed page that included the text of the Talmud, Rashi's commentary, and the commentary of Tosafot to somehow incorporate all these diagrams in an efficient manner.

With regard to the diagrams in Tosafot, we can see how they also changed over the years.

Here are three diagrams in the Tosafot on *Eiruvin* 56B, "Kamah m-Rubah," which appeared in the Berman Shas of 1697. They are very well defined.

*On a personal note, forty years ago I had the privilege to learn with my maternal grandfather, Rav Avraham Rosen Z"l. He was a student in the Volozhin Ye-shiva after it was reopened under the leadership of Rav Rephoel Shapiro ZT"l, from whom my grandfather received semikha. He eventually moved to Brooklyn, which is where we studied together. We started with Gemara Berakhot and made it through Gemara Shabbat but did not have an opportunity to learn Eruvin together. Since then, I have made a few passes at Eruvin during a Daf Yomi cycle, but never at the same level I learned with my grandfather. My grandfather was not interested in where any diagram came from; all he was interested in was learning peshat in Gemara. Investigating these diagrams did, however, force me to reexamine many sections of Eruvin in depth and gave me the opportunity to learn with my sister's son-in-law. I am sure my Zaydeh would have loved that.*



Here are the same three diagrams as they appear in the Vilna Shas of 1881. As you can see, there is much less definition in them. As stated above, it may have to do with trying to fit all three into a smaller space, because the commentary of Rabbeinu Chananel had been added to the margin in the Vilna Shas.