The Gemara asks: From where are these matters, that the Shabbat limit must be measured with a rope fifty cubits long, derived? Rav Yehuda said that Rav said: They are derived from that which the verse states: “The length of the courtyard shall be one hundred cubits, and the breadth fifty by fifty” (Exodus 27:18). The Torah states: Measure with a rope of fifty cubits, i.e., the length and breadth of the courtyard must be measured “by fifty,” with a rope fifty cubits long.

The Gemara asks: This repetitive usage of the word fifty is necessary to teach us something else, namely, that the area of a courtyard is equivalent to a square the size of the Tabernacle’s courtyard. To this end, the Torah states: Take a square of fifty cubits by fifty cubits, and surround it with the remaining fifty cubits in order to form a square, each side of which is just over seventy cubits long.

The Gemara answers: If so, let the verse state: Fifty, fifty, which would have sufficed to teach us the size and shape of a courtyard. What is the significance of the phrase: Fifty by fifty? Conclude from this that the verse comes to teach two things, both the matter of the square courtyard and that the length of the rope used to measure the Shabbat limit should be fifty cubits long.

We learned in the mishna: One may measure a Shabbat limit only with a rope fifty cubits long, not less and not more. It was taught in the Tosefta: No less, because a shorter rope improperly increases the Shabbat limit, as the rope is likely to be stretched. And no more, because a longer rope reduces the limit, as the rope is likely to sag due to its weight.

Rabbi Asi said: One may measure only with a rope of afsakima.10 The Gemara asks: What is afsakima? Rabbi Abba said: It is the nargila plant. This name was also not widely known, and therefore the Gemara asks: What is nargila? Rabbi Ya’akov said: A palm tree that has only one fibrous vine wrapped around it. Some say a different version of the previous discussion, according to which the Gemara asked: What is afsakima? Rabbi Abba said: It is the nargila plant. Rabbi Ya’akov disagreed and said: It is a palm tree with one fibrous vine.

It was taught in a baraita that Rabbi Yehoshua ben Hananya said: You have nothing better for measuring than iron chains, as they do not stretch. But what shall we do, as the Torah states: “I lifted up my eyes again and looked, and behold a man with a measuring rope in his hand” (Zechariah 2:5), from which it is derived that measurements must be made with a rope.

The Gemara asks: Isn’t it also written: “And in the man’s hand a measuring reed of six cubits long, of one cubit and a handbreadth each” (Ezekiel 40:5), which indicates that reeds may also be used for measuring? The Gemara answers: That is used for measuring gates, which are too narrow to be measured with lengthy ropes.

Rav Yosef taught that there are three kinds of rope, each required by halakha for a different purpose: A rope of magag, a kind of bulrush reed; a rope of netzer, made from fibrous palm vines; and a rope of flax.
Rope of magag – מְגָג. The red heifer is bound with a rope fashioned out of bulrush reeds (מְגָג) (Rambam Sefer Tahara, Hilkhot Para Adumah 3:2).

Rope of reeds – מְגָג. After the clothes of a sota are torn, her garments are bound with a rope so that they will not fall off entirely. The preferred rope for this purpose is one fashioned of reeds, a mitzi rope (Rambam Sefer Nashim, Hilkhot Sota 3:1).

Rope of flax – מסקע. The measurements for an eirav are made with a rope of flax (Shulhan Arukh, Orah Hayyim 399:1).

Measurement and spanning – קַבָּלָה הַבַּלִיעוֹ. In the case of one who is measuring the distance to determine the Shabbat limit and reaches a canyon up to two thousand cubits deep whose walls slope over a distance of more than four cubits, if the canyon is less than fifty cubits wide, he spans it; if not, he pierces it. If the canyon is more than two thousand cubits deep, one measures the area of the entire slope itself, in accordance with the opinion of the Rosh. If the area over which walls of the canyon slope is less than four cubits and the valley is narrower than fifty cubits, he spans it; if that is not possible, he measures only the width of the floor of the canyon. This ruling is in accordance with the view of the Rosh, who rules in accordance with the Gemara’s second version of the mishna (Shulhan Arukh, Orah Hayyim 399:5).

**BACKGROUND**

Looks for the spot aligned with his measurement – קַבָּלָה הַבַּלִיעוֹ. When measuring the distance from a city, if the surveyor arrives at an obstacle that cannot be circumvented, such as a mountain, he begins his measurements from a different place, along the dotted line in the diagram, until he passes the obstacle, at which point he resumes his measurement along the original line.

Measuring distance with an obstacle in the way

The canyon was curved – קַבָּלָה הַבַּלִיעוֹ. Generally, if one encounters a canyon while measuring the distance of the Shabbat limit, he may bypass it and measure the distance at a parallel location. When the canyon is curved, as depicted in the image, it cannot be bypassed efficiently. Therefore, other methods must be implemented in order to measure the limit correctly.

Curved canyon within the Shabbat limit of a city

**HALAKHA**

They are used for the following purposes: A rope of magag is utilized for the burning of the red heifer, as we learned in a mishna: ‘They would bind the heifer with a rope of magag and place it on its woodpile, where it would be burned after it was slaughtered. A rope of netzer was required for a sota, a woman suspected of adultery, as we learned in a mishna: Before the sota is compelled to drink the bitter waters, her clothes are torn. And after that a priest brings a mitzi rope,’ i.e., a rope made of reeds [netzarim], and binds it above her breasts, so that her garments will not fall. A rope of flax is used for measuring.

It was stated in the mishna: If he was measuring the limit and he reached a canyon or a fence, he spans the area as if it were completely flat and then resumes his measurement. The Gemara comments: From the fact that it taught that he resumes his measurement, it may be derived by inference that if he cannot span it because it is too wide, he goes to a place where it is narrower so that he can span it. And he spans it, and he then looks for the spot at the same distance that is aligned with his original measurement, and he resumes his measurement from there.

The Gemara comments that we have indeed learned this, as the Sages taught the following baraita: In the case of one who was measuring the Shabbat limit and the measurement reached a canyon, if he can span the canyon with a rope of fifty cubits, i.e., if the canyon is less than fifty cubits wide, he spans it. And if not, i.e., if the valley is more than fifty cubits wide, he goes to a place where it is narrower so that he can span it, and he spans it, and he then looks for the spot at the same distance that aligns with his original measurement, and he resumes his measurement from there.

The baraita continues: If the canyon was curved so that it surrounds the city on more than one side, and it cannot be spanned on the side where he wishes to measure the limit, he pierces and ascends, pierces and descends, thereby measuring the canyon’s width bit by bit. If he reached a wall, we do not say that he should pierce the wall so that it can be precisely measured; rather, he estimates its width and then leaves and continues on.

The Gemara asks: Didn’t we learn in the mishna: If he reached a canyon or fence, he spans it and then resumes his measurement? Why is a precise measurement required there, whereas in the case of a wall, an estimate is sufficient? The Gemara explains: There, in the mishna, we are dealing with a place whose use is convenient, i.e., where the slope is relatively gentle so that the area can be crossed. Therefore, the area must actually be measured. However, here, in the baraita, the wall’s use is not convenient. Since one cannot walk through the wall, an estimate of its width is sufficient.

Rav Yehuda said that Shmuel said: They taught the method of piercing only where a plumb line does not drop straight down, i.e., where the canyon has a slope.

**NOTES**

Mitzri rope – מִזְצִי. In the Jerusalem Talmud it is stated that a mitzi rope, made of reeds, was used for the sota in order to hint that this woman acted in the manner of an Egyptian [Mitzri], as the Egyptians were known for their licentious behavior.

He looks for the spot that is aligned with his measurement and he resumes – קַבָּלָה הַבַּלִיעוֹ. The early commentators ask: Why does one return to his original measurement? Let him measure from the place where he circumvented the valley or mountain. The RavAvad explains that there were one to do this, the measurement would be inadequate, as it is necessary to perform at least two measurements on each side of the city, one at each end, to ensure that the limit will be measured accurately.

He spans it and resumes his measurement – מַלְבוֹלָה חוֹזֵר מַרְבּוֹלִיעוֹ. There are several variant readings and explanations of this passage. The Rif’s version contains the following question: Wasn’t it taught in a baraita that one must perform a proper measurement? According to this version, a wall that can be used is measured in the common manner, while a steep wall cannot be measured (see Rashba).

They taught only – והרי. Some commentaries explain that this caveat is referring back to the mishna’s statement with regard to spanning, namely, that a canyon can be spanned only if a plumb line does not drop straight below it (see Rashba and Rif’s).
However, if a plumb line drops straight down, i.e., if the canyon wall is very steep, he measures the width of the canyon properly at the bottom of the canyon, without taking its walls into account.

The Gemara asks: And what is the depth of a canyon that may be spanned if it is not more than fifty cubits wide? Rav Yosef said: Up to two thousand cubits; but if it is deeper than that, the slope must be measured as well.

Abaye raised an objection from the following baraita: If a canyon is up to one hundred cubits deep and up to fifty cubits wide, one may span it; and if not, one may not span it. How could Rav Yosef say that the canyon may be spanned if its depth is less than two thousand cubits? The Gemara answers: He stated his opinion in accordance with the opinion of Aĥerim; as it was taught in a baraita: Aĥerim say: Even if the canyon is two thousand cubits deep and fifty cubits wide, one may span it.

The Gemara cites an alternate version of the previous discussion. Some say that Rav Yosef said: Even if the canyon is more than two thousand cubits deep, it may be spanned. The Gemara asks: In accordance with whose opinion did Rav Yosef say this? It is not in accordance with the opinion of the first tanna, and it is not in accordance with the opinion of the Aĥerim.

The Gemara answers: There, where the tanna’im disagree about the depth of a canyon that may be spanned, they refer to a case where a plumb line does not drop straight down and therefore there is reason to measure the slope. Here, however, Rav Yosef says that the canyon may be spanned even if it is more than two thousand cubits deep, he is referring to a case where a plumb line drops straight down.6

The Gemara asks: And where a plumb line does not drop straight down, how much must it extend from the top of the canyon in order for the wall of the canyon to be considered a slope rather than a vertical wall? Avimi said: Four cubits. If the bed of the canyon lies four cubits beyond the top edge of the wall, the wall is sloped and must be included in the measurement. And similarly, Rami bar Ezekiel taught, based upon a baraita, that the maximum run is four cubits.

We learned in the mishna: If he reached a hill, he does not measure its height, but rather he spans the hill as if it were not there and then resumes his measurement. Rava said: They taught this halakha only with regard to a hill that has an incline of ten handbreadths within a run of four cubits. However, with regard to a gentler hill, e.g., one that has an incline of ten handbreadths within five cubits, one must measure the hill properly, i.e., he must include the slope itself in his measurement.

The Gemara notes that Rav Huna, son of Rav Natân, teaches a lenient formulation of this halakha: Rava said that they only taught this halakha with regard to a hill that has an incline of ten handbreadths within a run of five cubits. However, with regard to a steeper hill that has an incline of ten handbreadths within four cubits, one need not take any precise measurements; instead, he estimates the length of the hill, and then leaves and continues measuring from the other side.

We learned in the mishna that one may measure a canyon or hill located within the Shabbat limit, provided that one does not go out beyond the limit. The Gemara asks: What is the reason for this restriction? Rav Kahana said: It is a decree, lest people say: The measurement of the Shabbat limit comes to here. Since people know that he set out to measure the Shabbat limit, if they see him measuring in a certain spot they will assume that the area is included in the Shabbat limit.


dropping a plumb line into a valley

According to the opinion that the depth of a valley can be only two thousand cubits, this measure corresponds to the Shabbat limit. The Rambam explains that according to the opinion that it can be more than two thousand cubits, the limit is four thousand cubits, corresponding to the view of Rav Huna with regard to a semicircular shaped city (Rashba; Maggid Me’ir). According to the opinion that the depth of a valley can be only one hundred cubits, the measure corresponds to the courtyard of the Tabernacle (Rashba).

A plumb line up to four cubits: Some explain this as follows: If the slope of the canyon is so steep at the top that a plumb line drops straight down for a length of four cubits, it is no longer considered a place that can be traversed by foot because this steep section makes it hard to reach the gentler slopes below it (Rashba; see Tosafot).

A hill that has an incline of ten handbreadths within five cubits: An incline with this ratio, on which one walks without exertion, is based upon the incline of the ramp of the altar, which was thirty cubits long and nine cubits high (Rabbeinu Hananel; Me’ir).

Some plumb lines drop straight down – אבוי של גיא

This illustration depicts a canyon whose left side is so steep that a plumb line drops straight down. On the right side, a plumb line does not drop straight down. The distance between the plumb line that reaches the bottom of the valley and the bottom of the valley on the other side is greater than four cubits.
We learned in the mishna: If, due to the width of the canyon or hill, one cannot span it, he may pierce it. The Sages taught a baraita which explains this procedure: How does one figuratively pierce a hill? Two people hold the two ends of a measuring rope. The one who is lower down on the hill holds the rope at the level of his heart while the one who is higher holds it at the level of his feet, and they proceed to measure in this fashion. Abaye said: Based on tradition, we hold that one may pierce only with a rope of four cubits.⁵⁸

Rav Nahman said that Rabba bar Avuh said: Based on tradition, we hold that one may not pierce when measuring distances for the rites of the beheaded heifer.⁵⁹ This rite is practiced when a murder victim is found, and it is not known who killed him. Judges measure the distance from the location of the corpse to the nearest town, in order to determine which town must perform the rite (Deuteronomy 21). Similarly, one may not pierce when measuring distances with regard to cities of refuge, in order to determine the boundaries within which an accidental murderer is protected from the blood redeemer (Numbers 35). Because these measurements are from the Torah, indirect methods of measurement are insufficient. The area must be measured as though it were flat.

MISHNA One may measure the Shabbat limit only with an expert surveyor.² If it is discovered that the surveyor extended the limit in one place and reduced it in another place, the line marking the Shabbat limit is not straight, one accepts the measurement of the place where he extended the limit and straightens the limit accordingly. Similarly, if the surveyor extended the limit for one and reduced it for another, one accepts the extended measurement.

And furthermore, even a gentle slave and even a gentle maidservant, whose testimonies are generally considered unreliable, are trustworthy to say: The Shabbat limit extended until here,¹ as the Sages did not state the matter, the laws of Shabbat limits, to be stringent, but rather to be lenient. The prohibition to walk more than two thousand cubits is rabbinic in origin and is therefore interpreted leniently.

HALAKHA Piercing – פירוק פירוק. Piercing is performed by means of a series of short measurements of four cubits each, which together equal the width or length of a particular area.

The methods of measuring – רבות הקנים. The Rambam distinguishes between the laws that are applicable to a canyon, a mountain, and a wall. Two principles apply to a canyon: if a plumb line does not drop straight down, and the canyon is up to two thousand cubits deep, one spans it; or, if the spanning will not work, he pierces it. If a plumb line does drop straight down, and the canyon is up to four thousand cubits deep, one spans or pierces it. If it is deeper than this, one must include the wall of the canyon in the measurement.

With regard to a mountain, if the slope rises ten handbreadths within four cubits, one spans it; or, if the spanning will not work, he pierces it. If it rises ten handbreadths within four cubits, he estimates the distance. With regard to a wall, if its use is convenient, he measures it. If not, he estimates it. If a plumb line drops straight down, he measures only the level section.

The Rashba maintains that the halakha is the same with regard to a canyon, a fence, a wall, and a mountain, and the following four principles apply: If the slope rises ten handbreadths within five cubits, he spans or pierces it. If the slope rises ten handbreadths within four cubits, he estimates the distance. With regard to a mountain, if the slope rises ten handbreadths within five cubits, he spans or pierces it. If it rises ten handbreadths within four cubits, he estimates it. If a plumb line drops straight down, he measures only the level section and disregards the inclined and upright parts.

According to the Rosh, one law applies to a mountain and a wall, whereas a canyon is treated differently. Three principles apply in the case of a mountain and a wall: If it rises ten handbreadths within five cubits, he spans or pierces it; if it rises ten handbreadths within four cubits, he estimates; and if the plumb line drops straight down, he only measures only the level part.

With regard to a canyon, four principles apply: If he can span it, he does so. If the plumb line drops straight down, he spans it even if it is more than two thousand cubits deep; if the plumb line does not drop straight down, he spans the canyon only if it is less than two thousand cubits deep. If he cannot span it and a plumb line drops straight down, he measures only the level section. If it does not drop straight down and it is less than two thousand cubits deep, he measures with the piercing method; if it is more than two thousand cubits deep, he must include the canyon wall in his measurement (Gebron Yisakov).

Expert [nummeh] – מומחה. The ge’onim, cited by Rabbeinu Hananel and the Rif, explain the term nummeh as related to the verse: “And the border shall go down and shall strike [nummeh] upon the slope of the Sea of Galilee” (Numbers 34:10). Therefore, they explain the mishna as follows: A level area near the city must selected for its measurement, so that it will not be necessary to adjust the measurements (see Tosafot).

Extended the limit in one place and reduced it in another place – אֵין מְדָרִין לֹא בְּעָגְלָר עֲרוֹר. We learned in the mishna: If, due to the width of the canyon or hill, one cannot span it, he may pierce it. The Sages taught a baraita which explains this procedure: How does one figuratively pierce a hill? Two people hold the two ends of a measuring rope. The one who is lower down on the hill holds the rope at the level of his heart while the one who is higher holds it at the level of his feet, and they proceed to measure in this fashion. Abaye said: Based on tradition, we hold that one may pierce only with a rope of four cubits.⁶⁰

The methods of measuring – רבים הקנים. The Rambam distinguishes between the laws that are applicable to a canyon, a mountain, and a wall. Two principles apply to a canyon: if a plumb line does not drop straight down, and the canyon is up to two thousand cubits deep, one spans it; or, if the spanning will not work, he pierces it. If a plumb line does drop straight down, and the canyon is up to four thousand cubits deep, one spans or pierces it. If it is deeper than this, one must include the wall of the canyon in the measurement.

With regard to a mountain, if the slope rises ten handbreadths within four cubits, one spans it; or, if the spanning will not work, he pierces it. If it rises ten handbreadths within five cubits, he spans or pierces it. If it rises ten handbreadths within four cubits, he estimates it. If a plumb line drops straight down, he measures only the level section.

The Rashba maintains that the halakha is the same with regard to a canyon, a fence, a wall, and a mountain, and the following four principles apply: If the slope rises ten handbreadths within five cubits, he spans or pierces it. If the slope rises ten handbreadths within four cubits, he estimates the distance. With regard to a wall, if its use is convenient, he measures it. If not, he estimates it. If a plumb line drops straight down, he measures only the level section and disregards the inclined and upright parts.

According to the Rosh, one law applies to a mountain and a wall, whereas a canyon is treated differently. Three principles apply in the case of a mountain and a wall: If it rises ten handbreadths within five cubits, he spans or pierces it; if it rises ten handbreadths within four cubits, he estimates; and if the plumb line drops straight down, he only measures only the level part.