Laws of Sanctification of the New Month, Chapter 19 (Auto Translated)

English

Auto Translated

Shiur Overview

Summary of Chapter 19 — Laws of Sanctification of the New Moon (Rambam)

Introduction to the Chapter — Why the Rambam Writes This Chapter

Words of the Rambam: "Because the Sages said that among the matters with which they would examine the witnesses, they would ask them: 'In which direction was the moon inclined?'"

Simple Meaning: The Rambam begins the last chapter of the Laws of Sanctification of the New Moon. Until now he has explained everything one needs to know about **when** one can see the moon (re'iyat halevana). Now he will deal with a new topic: **"le'heichan haya hayare'ach noteh"** — in which **direction** the horns (karnayim) of the moon point.

Insights and Explanations:

1) The combination of the three questions to the witnesses: In Chapter 3 (earlier in the Laws of Sanctification of the New Moon) it states that the Sages instituted that one should examine the witnesses, in order to ensure that they actually saw the moon. There are three main questions:

- **"If it was north of the sun or south of it"** — This is essentially the **rochav hayare'ach** (latitude of the moon), which was already learned in previous chapters.

- **"If it was wide or narrow"** — This depends on the **orech** (how far the moon is from the sun), which determines how wide/narrow the crescent is. This was also already learned (Chapter 18).

- **"In which direction were the tips of its horns inclined"** — In which direction the tips of the moon point. **This is the new topic** of Chapter 19, which has not yet been addressed.

2) Why the Rambam is "not precise" in this calculation: The Rambam says explicitly: **"And I am not precise in it, because it is not useful for visibility at all"** — he is not precise in this calculation because it doesn't help for the main question of **re'iyat halevana** (whether one can see it or not). This stands in contrast to the previous chapters where he calculated everything precisely with many details. The first two questions (north/south, wide/narrow) are **directly dependent on whether one can see the moon** — if a witness says something that is impossible according to the calculation, we know he didn't see it. But **netiyat hakarnot** (inclination of the horns) is not decisive regarding whether one saw it or not — once one has seen it, one has already seen it, and the direction of the horns is a secondary detail.

3) What is the purpose of the question if it's not decisive? Two approaches:

- **a)** The beit din uses it as **assistance** — an extra indication when they already have reason to suspect the witnesses. It can help **catch liars**, even if it's not precise.

- **b)** The beit din wants to see if **both witnesses say the same thing** — if one says the horns pointed in one direction and the other says the opposite, that's a sign of falsehood.

4) What this tells us about the Rambam's intention in all these laws: The Rambam's main goal in these laws was that a **sage should be able to predict when the moon will be visible** — "a sage is superior to a prophet" — so that one shouldn't need to rely on eyes alone, but should be able to calculate in advance, even a thousand years earlier. **Netiyat hakarnot**, however, is not part of this main goal, but rather an addition for the beit din's examination of witnesses.

5) The Rambam's approach to precision: When the Rambam says "not precise," he means that the rules he will state are **approximate** — it may be that certain things are not astronomically precise, or even "far from precise." The commentators have struggled with certain points where the Rambam's calculation doesn't match. But the Rambam held that **generally the rules are correct**, and that is sufficient for the purpose.

Laws 1-2 — Inclination of the Zodiac (Obliquity of the Ecliptic)

Words of the Rambam: "The beginning of this calculation is to know the inclination of the zodiac first... the circle that passes through the middle of the zodiac in which the sun travels... does not pass through the middle of the world from east to west, but rather it is inclined above the equator... toward north and south, half inclines to the north and half to the south." "For every degree of the degrees of the zodiac is inclined to the north or to the south, and its inclination has a measure. And the width of the inclination will not be more than twenty-three and a half degrees approximately."

Simple Meaning: The galgal hamazalot (ecliptic) — the path where the sun travels — is not aligned with the kav hameshuva (equator), but is inclined. Half is to the north and half to the south. Each degree of the galgal hamazalot has a specific inclination, and the maximum is 23.5 degrees.

Insights and Explanations:

1) The foundation of netiyat hamazalot: The world (earth) is in the middle. The **kav hameshuva** (equator) is the base circle that divides north and south. The **galgal hamazalot** (ecliptic) is the circle where the sun travels, and it is **inclined** from the kav hameshuva.

2) The two intersection points — rosh taleh and rosh moznayim: The two places where the galgal hamazalot crosses the kav hameshuva are **rosh taleh** (spring equinox) and **rosh moznayim** (autumn equinox). There the days and nights are equal — this is Nisan and Tishrei. When the sun is at rosh taleh or rosh moznayim, the sun rises exactly in the

middle of the east and sets in the middle of the west, **and the day and night are equal in all inhabited areas**. But at other times it changes depending on where one is located — on the northern side of the world it is summer when in the south it is winter, and vice versa.

3) [Digression: Why summer is hotter and winter colder:] Because the galgal hamazalot is not aligned with the kav hameshuva, when the sun is in the northern constellations (summer), it travels a longer path across the sky, and the days are longer. When it is in the southern constellations (winter), the days are shorter.

4) The six northern and six southern constellations:

- **Inclined to the north:** Taleh, Shor, Te'omim, Sartan, Aryeh, Betulah (summer constellations)

- **Inclined to the south:** Moznayim through Dagim (winter constellations)

5) Gradual inclination — maximum at rosh sartan: From rosh taleh the inclination begins "little by little" (gradually), until rosh sartan where it is the maximum — **23 degrees and 30 parts** (23.5°) — "approximately," because the number is not exact. Afterward it goes back down to the kav hameshuva at rosh moznayim, then down to rosh gedi (23.5 degrees to the south), and back up to rosh taleh.

6) Difference between netiyat hamazalot and rosh halevana: For the **moon** the rosh (point of intersection with the ecliptic) changes — it moves among the constellations. But for the **sun** the rosh doesn't change — the inclination of the ecliptic remains constant. This is the foundation of seasons.

7) The Rambam's chart of inclination for every ten degrees: The Rambam gives a chart (his custom to make "steps" of tens): 10°=4, 20°=8, 30°=11.5, 40°=15, 50°=18, 60°=20, 70°=22, 80°=23, 90°=23.5. One sees that it doesn't go up uniformly — **it's a circle, and circles don't go linearly**. The rate of increase becomes smaller as one approaches the maximum.

8) The trick of interpolation: The Rambam's **trick from before** (with rochav and orech) is applied again: for degrees between tens, one takes the difference between two steps and divides by ten. For example, between 10 (=4) and 20 (=8) the difference is 4, so each degree is 0.4. Also, **one only needs to know up to 90°** — for 90°–180° one subtracts from 180°, for 180°–270° one calculates differently, because **there are only four corners of the circle** and one only needs to know a quarter.

Law 3 — Distance of the Moon from the Equator

Words of the Rambam: One calculates the inclination of the degree when it is at the place of the mean moon, and adds or subtracts the first latitude of the moon, according to whether both are in the same direction or not. And there remains the distance of the moon above the equator in that direction which was greater of the two.

Simple Meaning: In order to know how far the moon is from the kav hameshuva, one must calculate together two things: (1) the inclination of the degree where the moon is located (how far the point on the galgal hamazalot is from the kav hameshuva), (2) the rochav hayare'ach (how far the moon is from the galgal hamazalot/galgal hashemesh). If both are in the same direction (both to the north or both to the south) — one adds. If in opposite directions — one subtracts, and the direction that remains is according to the greater one.

Insights and Explanations:

1) Two components of the moon's position: The moon doesn't travel on the kav hameshuva and not on the galgal hamazalot, but on **galgal hayare'ach**, which is next to the galgal hashemesh. Therefore one needs two calculations: first where on the galgal hamazalot the moon is located (netiyat hama'ala), and second how far from the galgal hamazalot (rochav hayare'ach).

2) Example from the Rambam: On the night of visibility, the second of the month of Iyar year 4938 — the moon was 19 degrees from Shor. The inclination of 19° Shor is approximately 18 degrees to the north. The rochav hayare'ach was approximately 4 degrees to the south. One subtracts 4 from 18 = **14 degrees north of the kav hameshuva**. "For we subtracted from the greater which was eighteen northern degrees."

3) Approximately, not precise: The Rambam emphasizes again that **the entire calculation is approximate** — it is not relevant for visibility to be more precise.

Law 4 — In Which Direction It Was Inclined (Direction of the Horns)

Words of the Rambam: If [the moon] was on the equator or close to it by 2 or 3 degrees — the moon is aligned opposite the middle of the west. And if it was distant from the equator to the north — it will be seen between the west of the world and its north, and its deficiency will appear inclined from opposite the east of the world toward the south of the world. And if it was distant to the south — [its deficiency inclines] from opposite the east toward the north. And according to the extent of the distance — according to the extent of [the inclination].

Simple Meaning: The Rambam explains how one determines where the moon inclines (north or south of west) and where the pegima (the dark part) inclines, based on how far the moon is from the kav hameshuva.

Insights and Explanations:

1) Foundation — where it is illuminated on the moon: Where it is illuminated on the moon is where the sun shines. "The sun never saw the deficiency of the moon" (Gemara) — the sun doesn't see the lack of the moon, because the illuminated part is always turned toward the sun. If both (sun and moon) are on the kav hameshuva, the illumination will be straight up. If the sun is more on one side, it will shine in that direction.

2) A difficult question on the Rambam — he calculates relative to the kav hameshuva, not relative to the sun: In truth, the direction of the pegima depends on where the **sun** is (because the illumination comes from the sun), not on the kav hameshuva. The Rambam, however, says one should calculate relative to the kav hameshuva, "as if the sun is always at the kav hameshuva." Apparently one should only have needed to calculate the rochav hayare'ach itself (how far the moon is from the galgal hashemesh) in order to know this. **It is not clear that the Rambam's calculation here is correct**, although the Rambam probably calculated that the

moon will always be more north or south than the sun relative to the kav hameshuva — but this is not necessary. **All commentators struggle with this.**

3) The logic of north/south inclination: When the moon is north of the kav hameshuva (i.e., during the time of constellations that go up), one sees it between west and north (northwest), and the pegima inclines from east to south. When the opposite — to the south — the pegima inclines from east to north. **It is always from the east** (because the illuminated part faces west, toward the sun), but the north/south inclination changes.

4) "And according to the extent of the distance — according to the extent of [the inclination]": The proportional language — the farther from the kav hameshuva, the more the pegima inclines.

Law (Earlier in the Chapter) — How High Was It (Height of the Moon)

Words of the Rambam: "How high was it in your sight — this matter is examined from the arc of visibility. When the arc of visibility is short, the moon will appear as if it is close to the earth, and when it is long, it will appear high above the earth. And according to the length of the arc — according to its height."

Simple Meaning: The question "how high was it" (which is asked during the examination of witnesses) is determined by the keshet hare'iya — the arc of vision (angle between the moon and the horizon). A smaller keshet hare'iya means the moon appears closer to the earth; a larger keshet hare'iya means it appears higher.

Insights and Explanations:

1) The Rambam did not bring "how high was it" in Chapter 4 (examination of witnesses) but did here in Chapter 17: In Chapter 4, where the Rambam speaks of the examination of witnesses, he did not mention the question "how high was it." Only here, in the calculation of re'iyat halevana, does he bring it. This shows that the Rambam held that the topic of govah hayare'ach belongs more to the calculation part than to the procedural examination part.

2) "As if it is close to the earth" — it's not actually closer: The Rambam emphasizes that it is only a re'iyat ha'ayin — the moon *appears* as if it is closer to the earth when the keshet hare'iya is small, but in truth it is not closer. This is an important precision in the Rambam's language.

3) "According to... according to" — language of the Torah: The Rambam uses the language "according to the length of the arc — according to its height," which is compared to the language of the Torah "ka'uma kevata" — a proportional language, which means: as this, so that.

Conclusion of the Rambam — "And No Path from the Paths of Torah Will Be Missing"

Words of the Rambam: "And see, our master, I have calculated all the paths that are needed... so that everything will be known and explained... and no path from the paths of Torah will be missing, and one will not need to seek after it in other books. 'Seek from the book of Hashem and read — not one of these will be missing.'"

Simple Meaning: The Rambam concludes with a declaration that he has included all calculations — both for knowledge of visibility and for examination of witnesses — so that one should not need to search in other (non-Jewish) books, and no law should be missing from the Torah.

Insights and Explanations:

1) "And no path from the paths of Torah will be missing" — law or wisdom? It is discussed whether the Rambam means that **no wisdom** should be missing from the Torah, or only that **no law** should be missing. The conclusion is that the Rambam means **law** — "path from the paths of Torah" means that all things that are necessary for the beit din to be able to fulfill kiddush hachodesh (such as knowing where one will see the moon) are themselves laws. Therefore it is not fitting that a law in Torah should be missing.

2) Why the Rambam included so much detail: The Rambam could have only given the foundations and said "go look at Ptolemy for more details." But he held that **it is not fitting for the Torah** that one should need to go to books of the nations of the world for halachic knowledge. Therefore he included **everything** — even the measurements and calculations — in his book.

3) "Not one of these will be missing" — applied to Mishneh Torah: The verse (Isaiah 34:16) "Seek from the book of Hashem and read, not one of these will be missing" is applied: the "book of Hashem" is the Rambam's book itself (Mishneh Torah), where not one of the necessary pieces of knowledge is missing. **This is perhaps the reason** why the Rambam gave all the measurements so long and in detail ("and these are the measurements" etc.) — in order to fulfill "not one of these will be missing."

4) Why the Jewish books were lost: A reasoning is proposed that the reason why earlier Jewish astronomical books were lost is because **people were too lazy** — they were given a book with foundations, but still had to do calculations, and people didn't do it. The Rambam therefore included **also** the full calculations, not just the foundations.

5) Essentially it may be that the Rambam thinks that all this is a commentary on gemaras in tractate Rosh Hashanah: It is proposed that the Rambam perhaps held that all astronomical calculations are essentially a commentary on the several sugyot in tractate Rosh Hashanah that speak of such topics, and therefore they belong in a halacha book.

[Digression: Rosh Hashanah — Book of Life and Book of Heaven]

In honor of Erev Rosh Hashanah, a beautiful connection is brought: Tractate Rosh Hashanah speaks of kiddush hachodesh, which is based on the "book of heaven" — the movement of the stars. Just as the Sages establish the order of times through kiddush hachodesh, so does the Almighty establish on Rosh Hashanah in the Book of Life how the year will be. "Seek from the book of Hashem" — study diligently, no one is missing anything.

Full Transcript

Chapter 19: Calculating the Moon's Inclination — Where the Moon Was Inclined

Introduction to the Chapter

Good. We are learning the holy Torah, the last chapter of Hilchos Kiddush HaChodesh, the nineteenth chapter. Let's see what the chapter is. Meanwhile, we mention Rav R' Yoel Wertzberger who pays for the shiur and for many other good things, may the Almighty help him further.

And now we learn like this, Chapter 19. Says the holy Rambam, I need to learn a bit faster because this is difficult. The last chapter of Hilchos Kiddush HaChodesh.

Halacha 1 — The Three Questions to the Witnesses

Says the Rambam, **"Since the Sages said"**. It's very interesting, until now the Rambam has stated everything that the Rambam held to be important to know when the moon will come, and this is important both regarding halacha and regarding theory, to understand the Rambam, to understand the "Yagdil Torah v'yadir" regarding all that we have spoken.

Now the Rambam says like this, the Sages said **"that among the matters with which they would examine the witnesses, they would say to them: Where was the moon inclined"**. That means, until now we learned how one can see the moon at all. Actually, we learned a few other things, how high it will be according to the calculation of the keshet hare'iya (arc of visibility), one basically knows that, and so forth.

But we see in the examination of the witnesses here a few things that were learned in a halacha from an earlier chapter, right? Where did we learn this? In Chapter 3, I think, all the way earlier, that the Sages instituted, even though from the Torah one doesn't need to, the Sages instituted that one should examine the witnesses, to make sure that they are telling the truth that they actually saw the moon, right? And it says there various things that one must examine the witnesses about. If I remember, Rav R' Elimelech surely brings it, there are... among the matters, I don't remember, two or four things one must look at. There it says a few things that one examines the witnesses about. Yes, and we learned that there were wicked people then who wanted to undermine things, so one had to examine a lot.

The Three Questions: Width, Length, and Inclination of the Horns

Let's learn. It says there like this: First of all, **"whether it was to the north of the sun or to its south"** — this is basically the width of the moon that we already learned.

The second thing, **"whether it was wide or narrow"** — this is basically the length that we learned. That means, the moon itself, how large it is, depends on how far it is from the sun. It's wider. We had this in the eighteenth chapter. It wasn't stated explicitly, but it says itself what comes out from this, something.

Now, this is the third thing that we haven't yet learned, which isn't yet included. The previous things are basically still part of the main calculation. The north and south is the width of the moon, which when you don't know this, you don't know if one will see the same thing, wide or narrow, is basically part of the calculation. It has to do with the main visibility is exactly that, whether one can... It was a small moon, or it's already a bit larger. Right, if it's completely too small one can't see it, but further one can know further.

The third thing is **where the tips of its horns were inclined**. That means, the moon is like a half plate, yes, how do you call it? It's like a banana with points. There are two points, and the two points, one looks at the... It can go up or down, or up or down to the side. It can be all kinds of positions. It can be different positions, exactly. At the beginning of the month it's more or less one of two or three positions, but it can be different positions. So this is one of the things that one asks the witness.

Why the Rambam is "Not Precise" in This Calculation

Says the Rambam here, **therefore, it seems proper in my eyes**, we've already seen this language before, **it seems proper in my eyes**, it seems right to everyone, one says, **to make known the method of this calculation** to explain how. That means, if the beis din asks the witness, perhaps the beis din knows itself how it should be, and the witness goes... Although, one can say no, one can say that the beis din only wants to know, that both witnesses saw the same thing. But the Rambam understood that the beis din had to know which it is, and according to this, if the witness says completely wrong, one knows that they didn't see the moon. Just as we saw here times when one must check well, etc. Says the Rambam, one won't say how one sees it.

But, says the Rambam, **and I am not precise in it**, I'm not very precise in this calculation. Why? **Because it doesn't help with visibility at all**. It's interesting. He won't make ten signs about this, as he did about the other questions. He only makes one sign. He won't be precise. It seems, the entire calculation that he will say is only approximate. Why? **Because it doesn't help with visibility**.

It seems... We go back to what is the main reason why the Rambam wrote all these chapters? It seems that the Rambam mainly wanted to know when he will see the moon. That the beis din, that means, although the Rambam said that he writes this because the beis din needs to know, very good. He will indeed say this also. But it's not the thing that truly concerns him. Unless a Jew shouldn't have to rely on his eyes, you understand? That he should be a sage superior to a prophet, he should be able to say in advance, even a thousand years before, when the moon will come. That's important.

But to know in which direction the moon will be, it's actually also a thing that one can predict, but it's not the main thing. He will say approximately what is built on the calculation that one can know, but not precisely. That means, it can sometimes be a bit off from Rav Avraham's calculation, or it can be that certain things that he brings here the astronomy isn't precise, or even far from precise. One sees that there are certain things that the commentators struggled with altogether, it seems that the Rambam says things that aren't precise at all. But the Rambam understood that in a general manner the rules that he will say are correct, so it's enough.

What Does "Enough" Mean?

But it means like this, that it's enough for the judges to be able to ask the witnesses the question. Yes, it can be that even that isn't completely enough, because the Rambam didn't take the question seriously. The first two questions are truly dependent on whether one can see. This isn't dependent, because the moment you saw, you already saw how the month was. It's not

a thing that can really be decisive whether one saw or not. So it seems the Rambam thought.

It can be that "I am not precise in it" means that it's enough that one should be able to catch if the witnesses should lie, but the small detail of how much it's moved isn't important. This was until now also approximately so. But the Rambam also made it so that when Mashiach will come and there will be a Sanhedrin, they will learn the book. They will need to know what to ask the witnesses. But for this it's enough.

I say that even this one doesn't need to be precise about, because the other questions one must ask the witnesses, because if they say it's too high, it's too wide, they certainly didn't see the moon, because that is dependent on whether one can see it, and this isn't dependent. As if, when the Rambam made the halacha, he wouldn't have said to ask the question. It's a side question. It's a question that one only uses as an aid, for example, as you said, when the beis din has a reason not to accept, they can use this. Yes, it can be.

Halacha 2 — The Inclination of the Constellations (Obliquity of the Ecliptic)

So this is what the Rambam says. So, how does one know this? Says the Rambam like this: **"The beginning of this calculation is to know the inclination of the constellations first"**. So I want to try to see if I can show a picture that I have of this. The inclination of the constellations presumably means the tilt of the constellations.

So what does this mean? It means like this, the inclination of the constellations, one must make it smaller so it will fit in here. And this is the inclination of the constellations. Yes, I can... Oops, that's not what I meant. I can move the whole thing, it should be bigger, and one doesn't need to see it to the minute.

The inclination of the constellations is simple. We learned that there is the world, and see the world in the middle of my diagram, and see... That means, the constellations are the wheel of constellations, through which the sun travels. Yes, one can see that the sun travels from one constellation to the moon also, and a bit off from the sun, but the moon and the sun travel around the wheel of the constellations.

Now, the entire wheel of the constellations isn't exactly equal with what is called the equator, or we called it the equator, which is the world. That means, there where it's blue, that doesn't move, because nothing moves there. But there the blue, that's the equator of the world. That means, right in the middle of the world, as if where the world stands, from where we begin to calculate north and south, the equator is the constellations, and a bit off from this. One sees that the blue and the orange aren't the same lines.

The Rambam's Words About the Inclination of the Constellations

So now you'll understand a simple thing. Let's say the Rambam, I have here the text, let's be able to read it. So one must know that **the circle that passes through the middle of the constellations in which the sun travels**, yes, the sun travels in the middle of the constellations, that means the circle of the sun, I called it the path where the sun travels, to catch it. **It doesn't pass through the middle of the world from half east to half west**. What means, half east to half west would be the blue line which is called the equator, the equator in the sky, but which is aligned with the equator here on the world.

Rather it is inclined from above the equator that circles in the middle of the world, toward north and south. It's off, inclined, it's tilted, toward north and south. **Half of it inclines to the north, and half to the south**. That means, there are parts that are higher than the equator here, to the north, it goes up. And half, the second part inclines to the south, is down. Very simple.

Now, essentially the same structure that they learned regarding the moon with the circle of the sun. So the moon is also a bit off, this is even more off. Two sides, as they learned there, so it says in **there are points where it meets the circle of the equator that circles**. There are two places where they meet, yes. These are the two sides which are home. The first point, this is different from that, as that changes. The moon is Rosh Chodesh changes between the constellations. The head of the sun doesn't change, because that's the whole point that you'll understand, the thing is what makes summer and winter.

Why Summer is Hotter and Winter is Colder

If you wanted to know why summer is hotter and winter is colder, or because summer is longer in this and winter is shorter in this, you'll understand before this, because the sun doesn't travel on a perfect circle around the world, exactly like the world. It doesn't travel on a perfect circle, yes a perfect circle, but in, but it doesn't travel. Yes, it's not exactly like the equator.

Therefore when it's at the equator, that means when it's at Rosh Taleh or at Rosh Moznayim, then the days are equal, this is Nissan and Tishrei. But when it travels higher than Rosh Taleh throughout the summer, then the days become longer, because it takes longer to go each piece. Therefore the same thing in reverse, when it goes down throughout winter they become shorter, because it's even faster each piece somewhat. So in any case, these are the two places where they are exactly the same. But in between it comes out, yes?

Halacha 3 — The Two Points and the Six Constellations

"And there are two points where it meets the circle of the equator that circles in the middle of the world, one point is the head of the constellation Taleh, and the second point opposite it is the head of the constellation Moznayim", that means Taleh, Shor, Te'omim, what's it called? Sartan, Aryeh, Betulah, **"and it turns out that six constellations incline to the north"**, that means when the constellations incline to the north, when the sun is there it's more northerly. **"And six constellations incline to the south"**, from Moznayim until Dagim incline to the south, these are the winter constellations.

Halacha 4 — Gradual Inclination Until Rosh Sartan

And you also understand that this changes, **"from the head of the constellation Taleh the constellations begin to incline little by little"**, now it can be it moves a degree, another degree, another degree, like this, until it comes, until **"to distance from the equator until the head of Sartan"**, you go to the middle constellation, which is the head of Sartan, there it's already completely the highest, the farthest, the most inclined to the north side. Which is approximately twenty-three and a half degrees, as it says here, twenty-three and a half degrees, 23°30', right? Thirty is half,

thirty parts, **"approximately"**, because this is a number not exactly, but remember that it wasn't necessary now so exactly.

And afterwards it goes back down, **"and the constellations return"** it goes back down **"to approach the equator"**.

Calculating the Inclination of the Constellations and the Moon from the Equator

The Inclination of the Constellations to North and South

That means, from Taleh, Shor, Te'omim, Aryeh, Betulah, they are all inclined to the north. That means, when the sun is there, it's more northerly. And six constellations are inclined to the south, from Moznayim until Dagim are inclined to the south. These are the winter constellations.

And you also understand that it changes, **from the head of the constellation Taleh the constellations begin to incline little by little**. Now it can be it moves a degree, another degree, another degree, and so, until it comes, **until the head of Sartan**. You go to the middle constellation, which is the head of Sartan, there it's already completely the highest, the farthest, most inclined to the north side. Which is approximately twenty-three and a half degrees, as it says here, twenty-three and a half degrees, 23:30, right? Thirty is half, thirty parts, approximately, because the number isn't exactly, but remember that it wasn't now so exactly.

And afterwards it goes back down, **the constellations return**, it goes back down, **to approach the equator until the head of Moznayim**, which is further on the equator. And from the head of Moznayim further it goes back until the head of Gedi, where there it's twenty-three degrees below, to the south, and it goes back up until the head of Taleh.

It comes out, when the sun is at one of the two heads, it goes neither north nor south, and then indeed the sun rises exactly in the middle of the east and sets exactly in the middle of the west. These are the middle days of the year, **and the day and night are equal in all inhabited places**, everywhere is equal. Which is not so when it's other places, then it depends where you are. If you are on the top part of the world, there will be summer here and winter there, and vice versa, and vice versa, yes, and the like.

Halacha 5: The Measure of Inclination of Each Degree

Now, says the Rambam, **it is thus clarified to you, that every single degree of the degrees of the constellations is inclined to the north or to the south**, yes? Until now we didn't know this, now it's covered. **And its inclination has a measure**, there is a certain measure for each constellation how much it's inclined.

Says the Rambam, **and the width of the inclination**, that means the greatest... width of the inclination, yes? Most, most, the most that the inclination can be, **will not be more than twenty-three and a half degrees approximately**. That means, the greatest, again, width of the inclination means the Rambam, the greatest inclination is when there is, or completely there. There is a greatest degree of the... I don't know if there's a term. Width of the inclination means the greatest degree of the... That means, it's simple, it moves from zero to twenty-three and back, and so forth.

Table of Inclinations of the Constellations

Now, what, how much is the inclination? Says the Rambam a chart, I already brought here a chart, but you can already go. How much? That means, remember, the Rambam had mercy on the Jews, he calculated for us, he said how much, and he said, as he said his custom, for every ten degrees he said how much the inclination is, because truly every degree has the inclination, but he said for every ten, he made from this steps.

And, you'll be able to see, says the Rambam, he begins from zero of the constellation Taleh:

- So ten degrees is four
- Twenty is eight
- Thirty is eleven and a half
- Forty is fifteen
- Fifty is eighteen

Does it come to four the whole time? Ah, no, it goes back down. No, it doesn't go exactly, it's a circle. Circles don't go the way you want it to go.

- Sixty is, and there are reasons why the inclination is so
- Sixty is twenty
- Seventy is twenty-two
- Eighty is twenty-three
- Ninety is twenty-three and a half

Again, all these numbers are approximate. And this is, yes, you can see it, how it goes up and down, it goes up all the way until here, it comes to ninety. Actually, the Rambam only said the number until ninety, right? So you can see like this, this he made from the circle such a wave, so you can see a bit easier how it goes up and down, because essentially the wave, yes, a circle is a wave, I think, the same thing.

The Rambam's Previous Trick: Calculating Units

English Translation

And, after that, says the Rambam, do you remember the Rambam's trick from before? What did he have in the middle? Says the Rambam, make it moderate. Again, approximately, if it's by ones, and it's not by tens, it's nefshach amana, you simply need to take the amount. How much? If for example between ten and twenty comes out four, then each one is divided four by ten, one and a fifth, so this is how you'll calculate for each degree, just as you learned by the width, yes?

And oy, and says the Rambam further, yes? You don't need to know, I've only told you the numbers from one to ninety, but make a calculation: if it's between ninety and one hundred and eighty, you simply need to subtract one hundred and eighty, so it should come to the same number. The same thing. Yes? The same thing, if you go from 120 to 270, you only need to do minus eighty to come to the number here. The same thing here, it's all the same four, because there are only four corners, four sides of the circles, and you only need to know a quarter just as the Rambam did by the width and length. **Consequently you will know the netiya without deficiency or addition**. This is how to know according to each constellation how much it inclines from the... yes, correct? Yes.

Where are we here? We needed to learn the measurements. We're now holding at chapter 14. I think I have it here also.

Law 6: Calculating the Moon's Distance from the Equator

Now says the Rambam, if you want to know, so if so, now you need to know how the moon is, how much is the moon inclined from the equator, okay? Now, the problem is that the

moon doesn't travel exactly on the equator. It doesn't travel exactly on the ecliptic either, right? It travels where? On the lunar sphere, which is next to the solar sphere.

Says the Rambam, you want to know how far the lunar sphere is from the ecliptic? That's the point. Consequently, we want to know the relation of the moon to the equator, in order to know how high the moon is relative to the equator, okay?

The Method of Calculation

Says the Rambam, right? **Figure out how much the inclination of the degree is when it is at the mean position of the moon**. You remember that the mean position of the moon is there where the moon is in degrees, right? And you remember that we have a chart for each degree how much its inclination is, yes? And you also remember **to which direction it inclines, to the north or to the south**. How do you know this? Because you remember that the Rambam said this earlier, I think I skipped it, but the Rambam said that from here to here it goes to the north, afterwards it goes to the south, right? Basically, from 180. Yes, correct? So from the numbers you already know whether it's to the north or to the south.

Afterwards you will do thus: **Calculate the first lunar latitude**. You remember that the lunar latitude is how far the moon is from the solar sphere, right? This is the same as the ecliptic that we just mentioned. See if the moon is more north or more south than the sun, right?

So it is: if the lunar latitude is in its inclination is in the same degree, right? For example, now is the time when, yes, we are here, I know, let's say, we are here, yes, approximately. Now the, according to the degrees, it doesn't say here the degrees, but according to how many degrees we are, the inclination is 18 degrees to the north, right? Because we're at a positive number, at 18, at let's say at 50, whatever. And the lunar latitude, which means how far the moon is from the orange line basically, right? is also another two degrees, let's say, to the north, you will add, right? You will add to this that. You will have how far the moon is from the equator. It's very basic, right?

If it's the opposite, if for example the moon is north of the sun, you will subtract it. You will subtract how many degrees further the moon is from the orange thing than how high the sun is, because this will tell you where the moon is. **And there will remain the moon's distance above the equator in that direction which was the greater of the two**. Yes, very simple. Because it can sometimes happen that the moon is actually below the equator, if there's enough to subtract.

Example: The Second Night of Sighting for the Month of Iyar

How so? And he gives an example from his time, sort of like he gave his examples. And we want to know how far is the moon on the night of sighting, which night of sighting does the Rambam calculate? The second of the month of Iyar of this year from the year 938. We already learned that the moon was then nineteen degrees of Taurus. Yes? It comes out the inclination in the north, I don't know if he knows it here. Anyway, the inclination in the north is approximately eighteen degrees. And the lunar latitude was, that is the inclination of nineteen is eighteen, and the lunar latitude was then approximately four degrees to the south. Consequently you subtract four from eighteen, you remain with fourteen. It comes out, today the moon is fourteen degrees north, north, above the equator, **for we subtracted from the greater which was eighteen degrees northerly**.

Says the holy Rambam, **the entire calculation is approximate, not precise**, you know more exactly, it's not relevant for sighting, consequently the entire calculation is very simple.

Law 7: To Which Direction Does the Moon Incline

Now, with this in hand we will be able to know which way the moon goes. You remember what they ask us about the moon? They ask us one thing about the moon, I just want to show here, whether the moon inclines to the north or to the south, correct? That is, whether the crescent goes this way, then it would mean to the north, or the way that is to the south, correct? So what will you do?

The Foundation of the Calculation: Where the Sun Shines

Says the Rambam thus: This is dependent... let's understand, the Rambam doesn't explain why, but I can tell you the basic reason why this should work. There are questions on the Rambam's calculation here, it doesn't fit, it's not clear that the Rambam's calculation works. But in any case, what the Rambam says here is a simple thing.

Let's understand for a second, I didn't show it in the picture, I didn't figure out a picture that can show this, perhaps soon. But the point is, why this way? Why is the moon sometimes this way and sometimes that way? What is the matter? The matter is very simple. There is a rule, it says in the Gemara, **the sun has never seen the deficiency of the moon**. The deficiency of the moon is where it's empty, where it's black. Here is much coarser than it is at the beginning of the month, yes, it's just much easier to see.

Now, always, it's simple, where is it light on the moon? There where the sun shines. If the sun is here, it will shine. The sun only sees where it shines. So consequently, it depends where the moon is relative to the sun. If the moon is for example... if both, let's say, if it's exactly, right? If both are at the equator, yes? The sun is at the equator and the moon, it will be straight up. Sometimes the moon is thus in the season. If the sun is on the side of the moon, more, it will shine this way. If the sun is on that side, it will shine that way.

Question on the Rambam's Calculation

Now, here it's very strange that the Rambam said, he forgot about the sun, and the Rambam said one should calculate simply where the moon is relative to the equator, as if the sun is always at the equator. It appears that the Rambam calculated that the moon will always be more north or south than the sun relative to the equator. Although it's not dependent on the equator, the entire calculation is as if only the sun, but so. Indeed, apparently one only needed to calculate the lunar latitude relative to the sun to know this.

Law 17 (Continuation) — To Where Was It Inclined (Direction of the Deficiency)

If the sun is on that side, it will shine that way. Now there is very strange that the Rambam said that he forgot about the sun, and the Rambam said that one should calculate simply where the moon is relative to the equator, as if the sun is always at the equator. It appears that the Rambam calculated that the moon will always be more north or south than the sun relative to the equator. Although it's not dependent on the equator, the entire calculation is dependent only on the sun,

but so, indeed apparently one only needed to calculate the lunar latitude relative to the sun. But for some reason, the Rambam held that it should be easier to calculate the equator, all the commentators struggle with this.

And this says the Rambam very simply. Says the Rambam, **calculate and know its distance above the equator**, one should first calculate this, this was the previous step. Says the Rambam thus, **if it will be on the equator, or close to it two or three degrees**, it will be **the moon aligned opposite the middle of the west**, just like the picture, yes? Right in the middle will be the moon like a plate thus, right?

And if it was distant above the equator to the north of the world, yes? They learned how can it be to the north? That is, it can be at the time of the constellations that go up, yes? Then it will be **and it will appear between the west of the world and its north**, **it will appear between the west of the world and its north**, that is the moon will be between west and north, in other words there is northwest, **and its deficiency will appear inclined from opposite the east of the world toward the south of the world**.

And if the opposite, if **and it was distant above the equator to the south of the world**, yes, you go down here, I will need to show here how I take it down, yes, then it will be **its deficiency inclined from opposite the east of the world, toward the north of the world**, from east to the north of the world. It's always from east or from west, but it's also toward the north. **And according to the extent of the distance, according to the extent of the inclination**, as far as the distance is so, yes, according to, the Rambam goes here with the language of the Torah, according to according to, just as "like the cubit like the span," we say there both, it means just as the world. So is closer. Yes, just a stylistic point. Very good.

Until here we have shown approximately the thing. Let me take this down and return to the simple Rambam. Okay, correct? Yes. Yes, good.

Law 17 (Continuation) — How High Was It (Height of the Moon)

Until here we have learned how one knows which way. Now, until here is the question of how far was it, to where was it inclined. The Rambam says approximately, its horn tips were inclined to which side, yes. And there's a business on this, but this is what the Rambam said.

Says the Rambam, another thing we brought. The Rambam didn't bring it, in chapter 4 he didn't bring it, but here he brings it. **How high was it**? Yes. Says the Rambam, in the interrogation of witnesses he asks how high was it. The Rambam didn't bring it in chapter 4, I remember, but here he brings it. Says the Rambam, so it is, it says yes, **how high was it in the sight of your eyes**.

Says the Rambam, how does one know this? This is simple, **this matter will be examined from the arc of visibility**. The arc of visibility is the angle from where one can see the moon. **And when the arc of visibility will be short, the moon will appear as if it approaches the earth**. It's not truly closer to the earth, but yes, when the arc of visibility should be closer, the moon will be closer to the earth, **and when it will be long, it will appear high above the earth. And according to the length of the arc**, further, **according to its height based on experience will appear in their eyes**, very simple. Yes, this is already something we know, because it's the arc of visibility in total.

The Rambam's Conclusion — "And No Path from the Paths of Torah Will Be Missing"

Until here are the words of the Rambam, says the holy Rambam, our master the Ari, yes, you can say it strongly. **And see our master the Ari calculated all the paths that are needed for them**, both knowledge of the sighting and also the extra things that he calculated at the end, and also a bit from before, **in the interrogation of the witnesses, so that everything should be known and explained** to be easy for those who understand it, **and no path from the paths of Torah will be missing**. Nothing should be missing from the paths of Torah.

This means, the commandment of sanctifying the new moon is a commandment in the Torah. And in order to understand it, one must understand things that are not written in the Torah, that are written in the books of the nations of the world, just as the Rambam said earlier. Here he brought in that nothing should be missing from the Torah. I shouldn't say... The Rambam could have made it so that there would only be a little that I want to say. If you want to know more, go look by the gentile Ptolemy or I don't know what, but it doesn't fit for the Torah. What did he bring into the Torah? Yes, because the Rambam says that if you want to understand, you need to look by the gentiles, right? But what is relevant to the court.

Discussion: Does the Rambam Mean That No Wisdom Is Missing in the Torah, or No Law?

But they discussed earlier, whether the Rambam means that no wisdom is missing in the Torah, or no law is missing in the Torah. **Path from the paths of Torah**, all these things are a path to be able to learn well the laws of sanctifying the new moon. It's laws itself, because the court must know where the witnesses will see the moon. Nothing is missing in the Torah, there should not be any law missing in the Torah, **and they should not need to seek after it in other books**, because they need to seek in other books for laws. If one would just seek science in another book, the Rambam says it doesn't work. It's true, anyway, in the Torah it wouldn't be fitting that there should be a law in the Torah that is missing.

Actually it could be the Rambam thinks that this is all a commentary on the few Gemaras that there are in tractate Rosh Hashanah that already say such sorts of things. Yes?

The Verse "Seek from the Book of God and Read"

And the Rambam brings a verse, **"Seek from the book of God and read"**, you learn from the book of God, because **"not one of them is missing"**, nothing is missing from the book of the Torah of God. Not one of the commandments is missing.

I thought it could be because of this the Rambam brings here in his book here, because this is his book of God. No, well, book of God. I think it could be because of this the Rambam gave the entire calculation all the time, just like "and these are the measurements" all the time, because even this, it should be "not one of them is missing."

It could be that the reason why the Jewish books were lost is because people are too lazy, because one gives you a book that tells you the foundations, but you still need to do all the math afterwards. Do you understand? So the Rambam is giving you

also everything everything, "not one of them is missing." Yes. Wonderful. Blessed is the Merciful One who helps.

This is very important. It was important for the Rambam, it appears, that the Torah should not be missing anything, and in his book everything will be written. Ah, already.

Sermon for Erev Rosh Hashanah — The Book of Life and the Book of Heaven

Okay, until here. And now what one learns here for erev Rosh Hashanah, is that on Rosh Hashanah the Holy One Blessed Be He writes in the Book of Life, and this is the same book, from this tractate Rosh Hashanah one speaks of sanctifying the new moon, which this is a book that stands from "and rolled like the book of heaven," which one learns sometimes at length in Rosh Hashanah about sanctifying the new moon, because in this it stands just as in the stars the entire course goes, this establishes just as the order the sages are here establishing the order of the times, so this is like the book that says thus just as the sages say when it will be the new month each year, so the Holy One Blessed Be He says how it will be the year. This is the whole thing. Wonderful.

"Seek from the book of God", learn diligently, learn the entire book, no one is missing anything. I said, I said, I said. Good blessed year. Blessed is the Merciful One who helps.

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